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Behavior and Knowledge of Outgoing Thai Travelers Related to Medicinal use

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Abstract

Consultation with a healthcare professional before to travel is the basis of travel medicine. Those who received pre-travel advice from health experts exhibited lower risk behavior. This study aimed to identify outgoing Thai travelers' behavior and knowledge regarding medicinal use when traveling. A cross-sectional survey of Thai nationals traveling abroad was conducted via a self-administered online questionnaire. The analyzed data was collected from February 2020 to June 2020. A descriptive statistic was used for the data analysis. Seven hundred people agreed to take part in this study. Most of them were female and aged 51-60 years old. The most popular destinations among the respondents were located in Asia, followed by Europe. The top five destination countries were Japan, China, Vietnam, Laos and Germany. A preferred source of information on pre-travel health consultation was the internet (43.51%). Most of the respondents did not have travel vaccinations (82.29%). Over-the-counter drugs were the most common medication carried by the respondents. Many of the outgoing Thai travelers had a good (41.29%) to excellent (46.86%) level of behavior related to medicinal use both before and during their journeys. Many participants reported that they checked the expiration date and the appearance of the medicine. Age exhibited a significant relationship with respondents' behavior. Numerous respondents had an excellent level of knowledge related to medicinal use in terms of their medicines' stability and storage, its use and administration, and medical laws. Gender, marital status, income, and immunization before travel had a significant relationship with the respondents' knowledge. Most of respondents obtained health-related information prior to their travels via the internet. Most participants had great level of health behavior and medicinal use knowledge.

Keywords: Travelers, Medicinal use, Behavior, Knowledge

Introduction

International leisure travel has grown exponentially during the previous two decades. Travel medicine involves a variation of elements of travel-related health, with capability to travel and an awareness of the potential health hazards to travelers' health. Knowledge of current immunization recommendations before traveling, as well as preventative and therapeutic medications, is required [(1)]. Travelers who obtained counselling from healthcare providers before traveling had improved health behavior [(2)]. The individual's knowledge and awareness related to medicinal use are important to ensure the appropriate use of medicine [(3,4)]. Health consultation before traveling is the cornerstone of travel medicine [(5)]. The primary objectives of such an action are: a) to educate travelers about pre-existing medical conditions, b) to provide preventive measures such as vaccines, and c) to empower travelers to manage their own health while abroad [(6)]. To attain these objectives requires healthcare professionals or travel advisors to help travelers with health preparations such as: a) immunization, b) destination-related risks, c) consequences of traveling with pre-existing conditions, d) travelers' behavior and knowledge of medicines (e.g., stability and storage, medicinal use), and e) international health laws [(6)]. Moreover, the World Health Organization (WHO) recommends that travelers be counseled on the risk of illness associated with the countries they intend to visit [(7,8)]. Additionally, travel and tourism are among the businesses that have been significantly impacted by the Covid-19 situation, with global demand declining as either a result of global travel

restrictions that have been implemented in order to contain the infection [9].Since practically all international travel ceased in March 2020, the tourist and business travel sectors have experienced an extraordinary reduction. In 2019, the Tourism Authority of Thailand (TAT) Intelligence Centre reported data related to outgoing and expenditure by Thai travelers: 10,446,496 people with a tourism expenditure of 318,451 million Thai baht (THB) [10]. Getting pre-travel medical care, and receiving the necessary drugs and immunizations were all suggestions for being healthy while traveling. According to such information, the Thai travelers' health preparations were beneficial to both themselves and health professionals[11]. However, there was a lack of reports relating to outgoing Thai travelers about the pattern of health preparation in terms of behavior and knowledge. Understanding the characteristics of health preparation, behavior and knowledge would enable travelers to engage in low risk in travel health practice. In addition, healthcare professionals would offer travelers pre-travel guidance. Therefore, the objectives of this study were to investigate: a) Thai travelers' behavior and b) their knowledge regarding medicinal use.

Materials and Methods

Research design

This countrywide cross-sectional research in Thailand was performed from February 2020 to June 2020, utilizing convenience and snowball sampling methods [12,13]. An on-line self-administered questionnaire was constructed for data gathering using Google Forms.

Participants

The inclusion criteria required all participants to be older than 18 and have reported traveling abroad in the last 3 years (2017-2019). Participants who declined to consent were excluded. The sample size was determined to be 400 using the Yamane formula [14], with the population of all outbound travelers in 2019 being 10,446,496. The level of precision was at a 95% confidence interval with a p-value of 0.05.

$$n = \frac{N}{1 + N(e)^2}$$

Where: n = sample size required; N = number of people in the population ;e = allowable error (%)Substitute numbers in formula: n = 0,446,496/(1 + (10,446,496)$(0.05)^2$)= 399.98

Questionnaire development

The questionnaire was developed by the researchers and then had its face validated by three experts. The questionnaire was composed of three sections: 1) demographics and characteristics, 2) behavior about the medicinal use, and 3) knowledge about the medicinal use of outgoing Thai travelers. Cronbach's alpha coefficient was obtained for section 2 and 3 at 0.980 and 0.965, respectively.

Data analysis

A descriptive statistic was used for the data analysis. The association between the participants' attributes was described using the chi-squared test or Fisher's exact test: 1) age, 2) gender, 3) marital status, 4) education level, 5) health problems, 6) occupation, 7) drug allergies, 8) salary, 9) frequency of traveling abroad, and 10) vaccination before travel, in relation to their behavior and knowledge related to medicinal use. The public version of Tableau, Software which is available with a free 14-day trial, was used to generate the data visualization. Eight questions were used to assess each traveler's behavior, and all replies were classified as 'excellent', 'good', or 'poor', as follows: ≥ 80 percent excellent behavior (13-16 right answers), 60-79 percent as good (10-12 right answers), and poor < 60 percent (< 10 right answers). Individual items are rated on a three-point scale (i.e., 0 = no, 1 = sometimes, 2 = yes).

Moreover, twelve questions were used to evaluate travelers' knowledge, with each item having true, false, and do not know answers. The analysis was undertaken by allocating a 1 to a valid response and a 0 to an erroneous or do not know answer. The overall score may vary between 0 to 12. The responses were scored as excellent, good, or poor, as follows: ≥ 80 percent indicating excellent (10-12 scores), 60-79 percent indicating good (7-9 correct answers), and poor < 60 percent (< 7 correct answers) [15]. This study was approved by the Research Ethics Committee of Ubon Ratchathani University (No. UBU–REC–02/2563).

Results and Discussion

Results

Demographics and characteristics

Of the 700 respondents, 471 (67.29%) were female. Most of them were 51-60 years old. The average age of the travelers was 41.16±13.35 years old. Half of the respondents were single (53.57%), had a bachelor's degree (49.00%), and received an income per month of more than 30,000 THB (approximately 900 USD) (63.43%). Many respondents were officials from government agencies and public enterprises (40.57%). Approximately 27.71% of the respondents had pre-existing medical conditions, and 13.29% reported a history of drug allergy (Table 1).

Table 1. The demographics and travel characteristics of outgoing Thai travelers (n=700).

Demographics	No.	%	Demographics	No.	%
Sex			**Health problems**		
Female	471	67.29	Yes	194	27.71
Male	229	32.71	No	506	72.29
Age			**Drug allergy**		
Range 18-78, mean ± SD = 41.16 ±13.35 years old			Yes	93	13.29
<20	20	2.86	No	607	86.71
21-30	167	23.86	**Frequency of traveling abroad**		
31-40	153	21.86	Once a year	402	57.43
41-50	145	20.71	Twice a year	150	21.43
51-60	175	25.00	Three times a year	51	7.28
>60	40	5.71	> Three times a year	97	13.86
Marital status			**Travel period**		
Single	375	53.57	1-3 days	139	19.86
Married	325	46.43	4 -7 days	419	59.86
Education level			8 -14 days	132	18.86
Lower than Bachelor's degree	41	5.86	> 14 days	10	1.42
Bachelor's degree	343	49.00	**Taken medicines with you when traveling abroad**		
Master's/ Doctor of Philosophy degree	316	45.14	Yes	574	82.00
Occupation			No	126	18.00
Government officer or state enterprises	284	40.57	**Received the vaccine to prevent the disease before leaving to travel abroad**		
Company employee	148	21.14	Yes	124	17.71
Private business	131	18.72	No	576	82.29
Student	92	13.14	**Source of information about health preparation before travel (The respondents could select more than one answer)**		
Others	45	6.43	Internet	422	43.51
Income (Thai baht, THB)			Family or friends	182	18.76
< 600 USD	151	21.57	Do not search for information	159	16.39
600-900 USD	105	15.00	Physicians and Pharmacists	97	10.00
> 900 USD	444	63.43	Travel agents	97	10.00
			Others	13	1.34

The most popular destinations among the Thai respondents were those countries located in other parts of Asia (76.78%), followed by Europe (18.65%). The top 5 destination countries were as follows: Japan (26.74 %), China (12.49%), Vietnam (10.73%), Laos (5.10%), and Germany (4.49%) (Figure 1).

The majority of the respondents traveled abroad once a year (57.43%) and had a travel period of 4-7 days (59.86%). Prior to their trips, most of the health information sources that the travelers used were: a) the internet (43.51%), and b) family or friends (18.76%). Most respondents did not have travel vaccinations (82.29%), but they did have medicines with them (82.00%) (Table 1). The reasons for carrying medicines abroad were to treat minor illnesses quickly and easily (386, 57.87%) and for self-management routines for those who had chronic diseases (281, 42.13%). Over-the-counter (OTC) drugs were the most common medication carried (86.43%) by the respondents. Antipyretics and analgesics (24.67%) and antihistamines (19.30%) were the most common medications carried (see Table 2). In addition, the respondents were concerned with legal information about which medicines would be allowed to be taken into the destination country

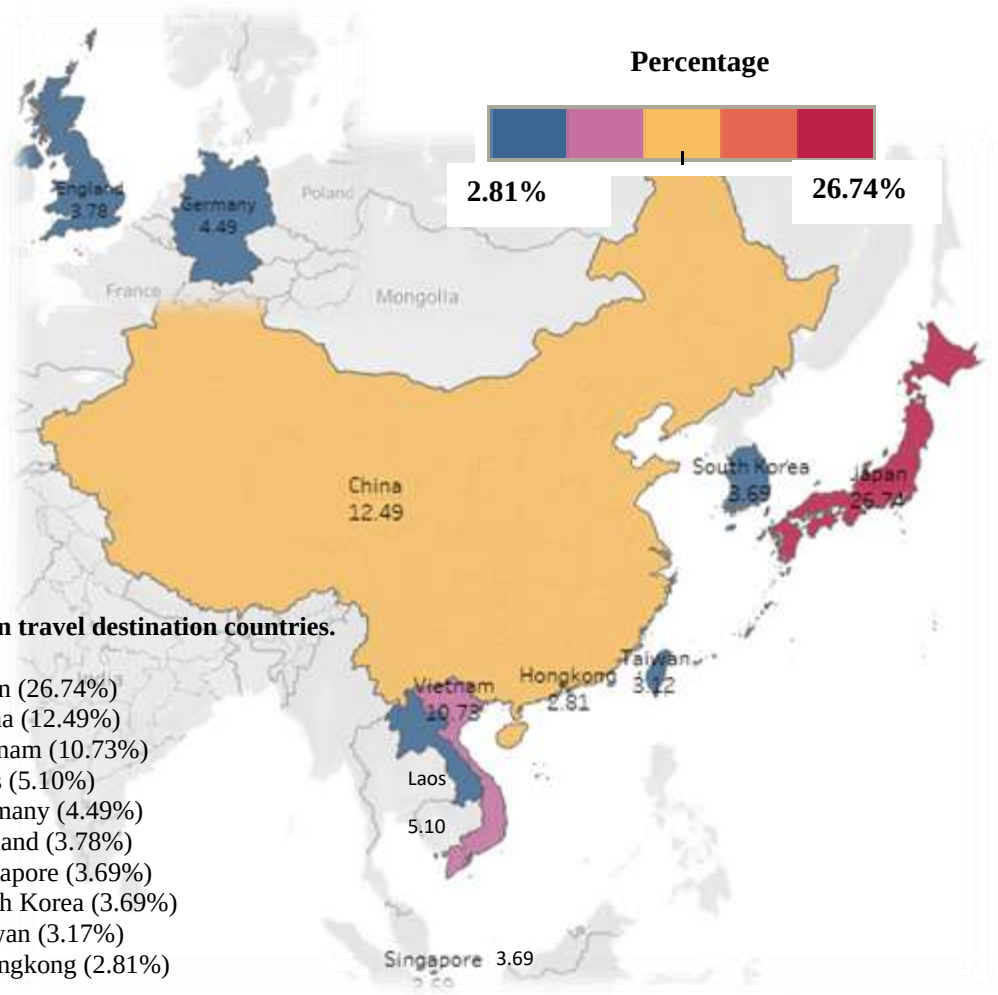

Figure 1. Thai tourists' top ten travel destination countries

Table 2. Types of medicines carried by outgoing Thai travelers (the respondents may select more than one answer).

Types of medicines	No.	%
1. Over-the-counter (OTC) medicines		
Antipyretics and analgesics	529	24.67
Antihistamines, nasal congestions	414	19.30
Inhalers, balms, mosquito repellents, first aid kits	357	16.65
Gastrointestinal drugs	296	13.81
Motion sickness and antiemetic drugs	250	11.66
Others	7	0.33
Total OTC medicines	**1,853**	**86.43**
2. Chronic disease medicines		
Chronic diseases (e.g., oral medication, special technique medicine)	135	6.30
Antibiotics	131	6.11
Others	25	1.17
Total chronic disease medicines	**291**	**13.57**
Total	**2,144**	**100**

Part 1. Behavior related to the health preparedness and medicinal use of outgoing Thai travelers

Of the 700 Thai travelers who agreed to participate in this study, 574 participants actually responded to the questionnaire. Before traveling, only 96 participants (16.72%) had seen a doctor to receive medication or check their body's readiness to journey out of Thailand. The majority of the

participants (367, 63.94%) purchased travel insurance that covered potential medical expenses during an overseas trip. Most respondents (536, 93.38%) reported buying the OTC drugs or receiving their chronic disease medicines (Table 3).

According to reported behavior that occurred during travel, more than half (69.69%) did not transfer the pills from their original packaging. However, there were 174 (30.31%) who transferred their medicine from the original packaging into other small containers for ease of travel. Approximately 64 participants (11.15%) reported that they did not take their chosen medication on time. There were 493 (85.89%) participants that checked the expiration date before taking the medicine. Among 467 (81.36%) of the participants, they checked if the medicine looked or smelled different before taking it. Also, 484 (84.32%) of the participants checked if the packaging was torn or leaking before taking medicine. The rankings of the Thai travelers' behavior were as follows: 'excellent' (269, 46.86%), 'good' (237, 41.29%), or 'poor' (68, 11.8%).

Table 3. Behavior related to the health preparedness and medicinal use of outgoing Thai travelers (n=574).

Behavior	Yes (%)	No (%)	Sometimes (%)
Before travel			
Did you see a doctor to receive medication or check your body's readiness before traveling?	96 (16.72)	357 (62.20)	121 (21.08)
Did you purchase travel insurance that covers medical expenses during an overseas trip?	367 (63.94)	131 (22.82)	76 (13.24)
Did you prepare the OTC drugs or chronic disease medicine for use while traveling?	536 (93.38)	9 (1.57)	29 (5.05)
During travel			
Did you transfer the pills from the original package into other small containers for ease of travel?	100 (17.42)	400 (69.69)	74 (12.89)
Did you take your medication on time, according to the drug label, during the trip?	385 (67.07)	64 (11.15)	125 (27.78)
Did you check the expiration date before taking the medicine?	493 (85.89)	38 (6.62)	43 (7.49)
Did you check if the medicine looks or smells different before taking it?	467 (81.36)	48 (8.36)	59 (10.28)
Did you check if the medicine's packaging was torn or leaking before taking it?	484 (84.32)	36 (6.27)	54 (9.41)

Part 2. Knowledge related to the medicinal use and medical laws of outgoing Thai travelers

The levels of the respondents' knowledge were as follows: 'excellent' (313, 54.53%), 'good' (175, 30.49%), or 'poor' (86, 14.98%), respectively. Regarding stability and storage of medicine, it was reported that the participants did not store the medicine in extremely hot or humid places as the active ingredients may decompose (514, 89.55%). In addition, the participant gave the correct answer that "they kept their medicine in an airtight container protected from light" in order to maintain that medicine's stability (490, 85.37%) (Table 4). However, more than half of the participants (307, 53.48%) selected the incorrect answers regarding medicine that needed to be refrigerated.

Approximately 90% of participants had excellent knowledge related to medicine use and administration, regarding such actions as checking on an expiration date and checking tablets and packaging appearance if changed from the original form). However, approximately 30% of participants gave incorrect answers related to the issue that some tablets cannot be cut or split prior to administration. Regarding the medicine laws of the destination countries, most of the participants had an excellent level of knowledge in terms of the package size of liquid medicine that was allowed to be carried on board and the differences in medical laws among countries. In addition, approximately 60% of participants had correct answers about: a) the storage of medicine in its original packaging with original labelling, b) the need for a medical certificate for their medication, and c) the declaration requirement of medicine in some countries.

Table 4. Knowledge related to the medicinal use and medical laws of outgoing Thai travelers (n=574).

Knowledge	Correct Frequency (%)	Incorrect Frequency (%)
Stability and storage of medicine		
1. Do not store the medicine in extremely hot or humid places as the active ingredients may decompose.	514 (89.55)	60 (10.45)
2. Some medicine must be kept in an airtight container protected from light in order to maintain their stability.	490 (85.37)	84 (14.63)
3. Medicine that need to be refrigerated should be placed in a cooler box or stored at 2–8 degrees Celsius.	267 (46.52)	307 (53.48)
Medicinal use and administration		
4. Check the expiration date of the medicine before use.	551 (95.99)	23 (4.01)
5. If the tablets or packages have changed from their original form, they should not be consumed.	532 (92.68)	42 (7.32)
6. Some medicine, such as antibiotics, must be taken continuously, even while traveling.	526 (91.64)	48 (8.36)
7. Some tablets cannot be cut or split prior to administration of the medication.	427 (74.39)	147 (25.61)
Medical laws		
8. The package size of liquid medicine carried on board the aircraft cannot exceed 100 mL per piece.	526 (91.64)	48 (8.36)
9. When traveling abroad, one must consider the medical laws of migration among different countries.	422 (73.52)	152 (26.48)
10. Certain nations require that medicines be packaged in hospital or pharmacy-dispensed packaging, the original packaging, or with the original label clearly describing the contents of the health product.	360 (62.72)	214 (37.28)
11. In some countries, there is a need to take the medical certificate for the chronic disease medication when the travelers go to those countries.	359 (62.54)	215 (37.46)
12. In some countries, the travelers must declare the medicine that they have brought with them.	349 (60.80)	225 (39.20)

Part 3. Relationship between the travelers' characteristics and their behavior and knowledge related to medicinal use

The age group had significantly correlation with the respondents' behavior regarding medicinal use. Gender, marital status, income, and vaccination before travel demonstrated statistically significant associations ($p<0.05$) with the respondents' knowledge related to medicinal use (Table 5).

Table5. Univariate analyses of relationships between demographic characteristics (n=574) and the travelers' behavior and knowledge.

	Travelers' behavior[a]				Travelers' knowledge[b]			
Characteristics	**Number (%) of respondents**		**Univariate[c]**		**Number (%) of respondents**		**Univariate[a]**	
	Excellent	**Good and poor**	**χ^2 value**	**p-value**	**Excellent**	**Good and poor**	**χ^2 value**	**p-value**
Gender								
Male	71 (26.4)	103 (33.8)	3.682	0.055	79 (25.2)	95 (36.4)	8.389	0.004[d]
Female	198 (73.6)	202 (66.2)			234 (74.8)	166 (63.6)		
Age								
<50 years	168 (62.5)	231 (75.7)	11.902	0.001[d]	217 (69.3)	182 (69.7)	0.011	0.917
≥ 50 years	101 (37.5)	74 (24.3)			96 (30.7)	79 (30.3)		
Marital status								

Single	124 (46.1)	141 (46.2)	0.001	0.975	131 (41.9)	134 (51.3)	5.155	0.023[d]
Married	145 (53.9)	164 (53.8)			182 (58.1)	127 (48.7)		
Education level								
≤ Bachelor's degree	142 (52.8)	170 (55.7)	0.501	0.479	167 (53.4)	145 (55.6)	0.278	0.598
> Bachelor's degree	127 (47.2)	135 (44.3)			146 (46.6)	116 (44.4)		
Health problems								
Yes	98 (36.4)	90 (29.5)	3.110	0.078	97 (31.0)	91 (34.9)	0.971	0.325
No	171 (63.6)	215 (70.5)			216 (69.0)	170 (65.1)		
Occupation								
Government	125 (46.5)	119 (39.0)	3.248	0.072	132 (42.2)	112 (42.9)	0.032	0.858
Non-government	144 (53.5)	186 (61.0)			181 (57.8)	149 (57.1)		
Drug allergy								
Yes	44 (16.4)	39 (12.8)	1.518	0.218	40 (12.8)	43 (16.5)	1.620	0.203
No	224 (83.6)	266 (87.2)			273 (87.2)	217 (83.5		
Income (Thai baht, THB)								
≤ 30,000 THB	88 (32.7)	111 (36.4)	0.854	0.355	97 (31.0)	102 (39.1)	4.113	0.043[d]
> 30,000 THB	181 (67.3)	194 (63.6)			216 (69.0)	159 (60.9)		
Frequency of traveling abroad								
Once a year	143 (53.2)	164 (53.8)	0.021	0.884	158 (50.5)	149 (57.1)	2.499	0.114
> Once a year	126 (46.8)	141 (46.2)			155 (49.5)	112 (42.9)		
Vaccination before travel								
Yes	62 (23.0)	53 (17.4)	2.870	0.090	78 (24.9)	37 (14.2)	10.254	0.001[d]
No	207 (77.0)	252 (82.6)			235 (75.1)	224 (85.8)		
Total for each characteristic	**269 (100.0)**	**305 (100.0)**			**313 (100.0)**	**261 (100.0)**		

[a] Traveler's behavior: ≥ 80 % excellent behavior (13-16 scores), 60–79% good (10-12 right answers), and poor < 60% (< 10 right answers).[b] Travelers' knowledge: ≥ 80 % excellent knowledge (10-12 scores), 60–79% as good (7-9 correct answers), and poor < 60% (< 7 correct answers) [(16)].[c] The Chi-square test was used to establish the association between variables, while Fisher's exact test was utilized when more than 20% of cells contained an expected count < 5. [d] Significant at p-value < 0.05.

Discussion

Most respondents used the internet, family or friends as sources of information about health preparation, before traveling. Other surveys indicate that the internet, along with relatives and friends, constitute their primary sources of travel information [(17,18)]. The immunization schedule is tailored to the needs of the particular traveler as well as the destination countries[(7,8)]. Examples of travel-related vaccinations demanded by certain countries recommended by WHO are those against: a) polio, b) yellow fever, and c) meningococcal [(7,19)]. Most of the destinations for the participating Thai travelers in this study did not have vaccination requirements. As a result of this survey, the majority of respondents did not acquire travel vaccines (82.29%). Nearly all of the respondents (93.38%) had OTC drugs with them in order to manage minor illnesses during their travels. Healthcare providers and community pharmacies should have a role in providing travel health-related services (e.g., vaccination requirements, medicine) to cover the management of chronic diseases and possible minor ailments during a person's travels [(20)].

Before traveling, only 96 (16.72%) respondents reported that they had seen a doctor to receive medication or check their body's readiness prior to travel, which was less than the results from Al-Abri et al., [(16)] who reported 34.8% of that study's participants had obtained health advice. This deficit might be because there were insufficient numbers of Thai healthcare practitioners who have expertise in travel medicine; a similar situation to other countries in the Asia-Pacific region [(1)]. Such a situation is certainly different countries such as Sweden and South Africa that have travel health clinics where people can seek pre-travel health advice [(21-23)]. Travel insurance is particularly consideration for travelers with medical needs during travel [(24-26)]. In this study, 367 (63.94%) participants had travel health insurance, while Al-Abri et al. reported only 78 (38.2%) [(16)]. In accordance with preparing or buying medicine to use while traveling, approximately 93% of the participants in this current study prepared for their trip with OTC drugs or their chronic disease medicines, while Al-Abri et al. reported only 30.4% of the respondents in their study bought medicines [(16)].

During travel, this current study revealed that approximately 67% of the participants took their medication on time, according to the drug label. Taking medicine as prescribed or medication adherence is important for managing chronic disorders or treating acute conditions, especially when dealing with antibiotics that need to be used continuously [3,27]. However, approximately 30% of participants, transferred their medicine from the original package into other small containers for ease of travel. So, there should be concern about the stability of medicine, in addition to the issue of medication adherence, if the original packaging has been removed. Product deterioration and degradation of the active ingredient may occur when the product is stored outside of its original packing, resulting in a loss of efficacy and a lack of safety [28]. Pharmacists should provide advice to the public about the guidelines on the process of repackaging to ensure the stability and efficacy of medicine [28,29].

Furthermore, many of the participants (approximately 80%) have already checked both the expiration date and the alteration of medicine in terms of appearances, smells, and completeness of medicine packaging. The World Health Organization and other pharmaceutical societies recommended consumers to check medicine's visual alterations in order to ensure the efficacy and safety of the medicine [28]

According to the findings of this study, the age group showed a significant association with the respondents' behavior. More than half of the seniors (≥ 50 years) demonstrated excellent levels of travel behavior. Al-Taweel et al., reported that [30].
This finding is in line with the study by Stienlauf et al., discovered that more over half of their 'elder travelers' participants received a pre-travel clinic counseling [31]. The reason for such a decision might be that they have chronic conditions and are aware of the risks associated with their chronic medicine when traveling overseas [32,33]. Therefore, the matter of specialized medicine consultation prior to travel should be considered for the elderly population. Stakeholders should pay more attention to elderly people's travel behaviors and particularly their specific medical needs. There should be more sources of travel medicine information and pre-travel clinical services that are related to the potential clients' pre-existing conditions and medical records [34].

Half of the participants had excellent knowledge relating to the stability and storage of medicine. Temperature variations can affect the active pharmaceutical ingredients that might cause them to degrade or lose their efficacy [35]. However, more than half of the participants selected the incorrect answers regarding medicine that needed to be refrigerated [28]. Travelers who use specific medicines that need to be safely stored within a narrow temperature range (+2˚C and +8˚C) should ask the flight attendant to put the medication in the proper storage facility [35].

In terms of medicine use and administration, the participants had excellent knowledge. They knew about checking on an expiration dates and checking tablets and packaging appearance to see if it had changed from the original form. However, the knowledge regarding checking expiration dates is still an important issue because a lack that information can negatively affect people's health [36,37]. According to the study, 30% of participants needed more information related to the issue that some tablets cannot be cut or split prior to administration [38]. Regarding the laws, there were many issues concerned by the travelers in our study. For example: a) how to carry chronic disease medicine (e.g., diabetes, hypertension, heart disease, and asthma) or b) what is the maximum quantity that can be imported for personal use [39]. In this study, most of the participants had an excellent level of knowledge in terms of the package size of liquid medicine that was allowed to be carried on board and the differences in medical laws among countries [40,41]. However, only 60% of participants had correct answers about: 1) the storage of medicine in its original packaging with original label, 2) the need for a medical certificate for their medication, and 3) the declaration of medicine in some countries.

The variables associated with knowledge related to medicinal use were: a) gender, b) marital status, c) income, and d) vaccination before travel ($p<0.05$). Therefore, pre-travel health education programs should be designed and considered for all of these variables, which should be studied more in future research. In this present study, females with excellent knowledge were more prevalent than males. However, the study by Hauer et al. revealed that men and women showed no statistical difference in medical knowledge [42].

In agreement with previous studies, the findings indicated that a family's economic condition had a positive influence on health knowledge; specifically, that a higher-income family would prioritize and spend more attention on education and health than would a relatively lower-income family [43]. It was observed that there was a lack of information and responsiveness from stakeholders about traveling with medication [35]. Additionally, there were two studies that also established the requirement for a travel medicine service [44]. Moreover, healthcare professionals have been expected to, and it would be beneficial if they could, provide a service offering information regarding travel medicine restrictions [39].

Little research has been done to study the knowledge and behavior of Arabian travelers [45]. The findings of our study would provide useful information for stakeholders to develop effective

strategies supporting the pre-travel advice for Arabian travelers in order to lower the potential health hazards for travelers' health.

There are some limitations to this study. Firstly, convenience sampling was used in this study. It did not include a random selection of participants. Therefore, the participants in this study were not representative of all travelers. Secondly, the data collection period was a pre-COVID-19 situation. Therefore, the recent practice concerning vaccination and the requirements for traveling between countries have been different from that time. Further study related to behavior and knowledge of pre-travel should focus on the current situations (e.g., COVID-19, monkey pox)[46-48].

Conclusions

This study has explored the health preparation patterns of outgoing Thai travelers. The top travel destination was Japan. Before their trip, most respondents acquired information regarding health preparation *via* the internet, family, or friends. Over-the-counter (OTC) medications were those most frequently chosen and carried. The majority of the outgoing Thai travelers had a good to excellent level of behavior related to medicinal use both before and during travel. Approximately 90% of the participants prepared the OTC drugs or their chronic disease medicine to take with them on their journey. Many participants reported that they checked the expiry date of the medicine. They also checked the appearance of the medicine and the packaging to ensure that they were in good condition before taking them. However, some of the participants transferred their medicine from the original packages into other small containers for ease of travel, which may affect the stability of medicine. More than half of the respondents had excellent levels of knowledge related to medicinal use. The two concerning issues for participants were: 1) that some medicine needed to be refrigerated and 2) that it was inappropriate for the participants to cut or split their medicines when in capsule or pill / tablet form. Understanding travelers' behavior and knowledge will help improve the travel medicine consultation services, develop an awareness of pre-travel counseling, and inform patients on when it is appropriate to seek travel health advice. However, some of the participants should be informed more about the medical laws in some countries, as follows: 1) the medicine must be in their original packaging, 2) the traveler must bring his or her medical certificates, and 3) the travelers must declare their medicines.

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Ethical Statement

The study was approved by the Research Ethics Committee of Ubon Ratchathani University (No. UBU – REC–02/2563).

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Conflict of Interest

The authors declare no conflicts of interest.

Author Contributions

Chonladda Pitchayajittipong: Conceptualization, Methodology, Data collection, Formal analysis, Validation, Writing-original draft preparation.

- Thansiri Jantan: Data collection, Formal analysis, Writing-reviewing and editing.
- Pornpimol Putsri: Data collection, Formal analysis, Writing-reviewing and editing.
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Appendix 1

Questionnaire number .....

Date .....Month .....Year .....

Behavior and Knowledge of Outgoing Thai Travelers related to Medicinal Use.

Please read the statements below and check the boxes if you agree.

- I have read the participant information and found it to be comprehensive in answering all of my queries.
- I understand that my responses are anonymous and confidential, and that I am able to withdraw from the research at any time before submitting my responses and without giving a reason.
- I understand that my consent to participate in this study does not affect my legal rights.

The questionnaire was composed of three sections, as follows:

1) Demographic
2) Behavior related to the medicinal use of outgoing Thai travelers
3) Knowledge related to the medicinal use of outgoing Thai travelers.

Please allow 15-30 minutes to complete this form**.**

*****Thank you very much for participating in this study. *****

Part 1 Demographic questions

Please tick √ in the box that represent the fact

1. Gender ☐Male ☐Female ☐……..(short answer space) ☐Prefer not to answer
2. Age ..... years old ☐Prefer not to answer
3. Marital status
   ☐Single ☐Married
   ☐Widowed/divorced/separated ☐……..(short answer space) ☐Prefer not to answer
4. Education level
   ☐< Bachelor's Degrees
   ☐Bachelor's Degrees ☐> Bachelor's Degrees
   ☐……..(short answer space) ☐Prefer not to answer
5. Health problems
   ☐No
   ☐Yes If "Yes" please specify ☐Hypertension
   ☐Diabetes mellitus
   ☐Dyslipidemia
   ☐Cardiovascular Disease
   ☐Chronic kidney disease
   ☐Others (please specify) .....
6. Occupation
   ☐Government officer or government employee or state enterprises
   ☐Company employee
   ☐Private business
   ☐Student
   ☐Others (please specify) ..... ☐Prefer not to answer
7. Drug allergy
   ☐No ☐Yes
8. Income ..... Baht/month ☐Prefer not to answer
9. Frequency of traveling abroad
   ☐Once a year
   ☐Twice a year
   ☐Three times a year

☐ > Three times a year

10. Vaccination before travel ☐No ☐Yes

11. Travel period

☐1 -3 days

☐4 -7 days

☐8 -14 days

☐> 14 days

12. Source of information about health preparation before travel (The respondents could select more than one answer)

☐Internet

☐Family or friends

☐Do not search for information

☐Physicians and Pharmacists

☐Travel agents

☐Others

13. Previously, have you taken medicines with you when traveling abroad? ☐No ☐Yes

14. Types of medicines carried by outgoing Thai travelers (the respondents may select more than one answer).

14.1 Over-the-counter (OTC) medicines

☐ Antipyretics and analgesics

☐Antihistamines, nasal congestions

☐ Inhalers, balms, mosquito repellents, first aid kits

☐Gastrointestinal drugs

☐Motion sickness and antiemetic drugs

☐Others

14.2 Chronic disease medicines

☐Chronic diseases (e.g., oral medication, special technique medicine)

☐Antibiotics

☐Others

Part 2 Behavior related to the medicinal use of outgoing Thai travelers

Please choose one of the most correct answers and mark an X on the answer sheet.

Behavior	**Yes**	**No**	**Sometimes**
Before travel			
Did you see a doctor to receive medication or check your body's readiness before traveling?			
Did you purchase travel insurance that covers medical expenses during an overseas trip?			
Did you prepare the OTC drugs or chronic disease medicine for use while traveling?			
During travel			
Did you transfer the pills from the original package into other small containers for ease of travel?			
Did you take your medication on time, according to the drug label, during the trip?			
Did you check the expiration date before taking the medicine?			
Did you check if the medicine looks or smells different before taking it?			
Did you check if the medicine's packaging was torn or leaking before taking it?			

Part 3 Knowledge related to the medicinal use of outgoing Thai travelers.

Please choose one of the most correct answers and mark an X on the answer sheet.

Knowledge	True	False	Don't know
Stability and storage of medicine			
1. Do not store the medicine in extremely hot or humid places as the active ingredients may decompose.			
2. Some medicine must be kept in an airtight container protected from light in order to maintain their stability.			
3. Medicine that need to be refrigerated should be placed in a cooler box or stored at 2–8 degrees Celsius.			
Medicinal use and administration			
4. Check the expiration date of the medicine before use.			
5. If the tablets or packages have changed from their original form, they should not be consumed.			
6. Some medicine, such as antibiotics, must be taken continuously, even while traveling.			
7. Some tablets cannot be cut or split prior to administration of the medication.			
Medical laws			
8. The package size of liquid medicine carried on board the aircraft cannot exceed 100 mL per piece.			
9. When traveling abroad, one must consider the medical laws of migration among different countries.			
10. Certain nations require that medicines be packaged in hospital or pharmacy-dispensed packaging, the original packaging, or with the original label clearly describing the contents of the health product.			
11. In some countries, there is a need to take the medical certificate for the chronic disease medication when the travelers go to those countries.			
12. In some countries, the travelers must declare the medicine that they have brought with them.			