A Prospective Study on the Incidence of Skin Diseases Among International Travelers in Southeast Asia

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Abstract

This prospective cohort study aimed to evaluate the incidence of skin conditions among international travelers in Southeast Asia, investigating the incidence and spectrums of skin conditions in travelers above 18. Out of 449 initially enrolled participants, with a response rate of 20.5% owing to lose follow-up, 92 were included in the study, with a mean age of 35. Most were from Europe, North America, Australia, and New Zealand (84.8%), staying for a median of 11 days. This study represents the initial phase of the prospective study, reporting on the first cohort of participants collected (92 out of the targeted 227), showing 39 travelers with skin lesions (42.3%) and an incidence rate of 0.013 person-day. All reported skin conditions during their trip, in total 60 reports, predominantly eczema (31.7%), unspecified rashes (18.3%), and insect bites (16.6%). The study underscores the significance of pre-travel counseling to increase awareness and promote preventive measures against skin conditions for international travelers visiting Southeast Asia. Approximately 42% of travelers experienced skin conditions during their trip, highlighting older ageing illustrating the protective factor. Further study of association factors was still in the process to reach the target response of 227 travelers.

Keywords*: *Skin diseases, Prospective study, Risk factors, Incidence rate, Traveler in Southeast Asia

1. Introduction

After the COVID-19 pandemic, international travelers are increasing to nearly the same number as travelers as before the pandemic according to UNWTO, (2023). Apart from COVID-19, Mpox, previously known as Monkeypox, shows the skin conditions of pox lesions announced to be a public health emergency of international concern (PHEIC) by the World Health Organization (WHO) according to the potential pandemic intensified the importance of surveillance of travel-related skin diseases (Bhattacharya, Dhama, & Chakraborty, 2022; Thornhill et al., 2022).

Southeast Asia is recognized as one of the regions with a high prevalence of neglected tropical diseases (NTDs) and other tropical illnesses, as classified by the World Health Organization (WHO) (Leggat, Graves, Laha, & Aye, 2018).

Travel-related dermatological issues in this area are often linked with ailments such as dengue fever, particularly from animal bites such as those from dogs, as well as rickettsial infections (Aung, Spelman, Murray, & Graves, 2014; O'Brien, 2009).

From 2018 to 2019, skin ailments ranked as the second most frequently reported problem among travelers heading to Southeast Asia. These included conditions like itchy skin, sunburn, insect bites resulting in skin or soft tissue problems, and unidentified rashes (Pisutsan et al., 2019).

Additionally, there are difficulties in dealing with travelers affected by skin diseases. Previous studies are based on hospital base and showed travelers with skin diseases can be hospitalized up to 10% and 53% related to tropical infection (Caumes et al., 1995).

Since skin condition is one of the most common problems among travelers (Diaz, 2014), to deal with skin conditions more effectively and update because most of the studies done before covid-19 pandemic, this prospective study with questionnaire-base of incidence of the diseases, spectrums of skin diseases and risk factors will bring us more information of burden of the common skin diseases and guide us to prevent risk factors or more focus on high-risk group to improve standard of care and pre-travel counseling.

2. Objectives

1) To illustrate the incidence and spectrums of skin conditions among international travelers traveling in Southeast Asia
2) To evaluate risk and protective factors among international travelers traveling in Southeast Asia

3. Materials and Methods

The study employed a prospective cohort design to investigate skin conditions among international travelers in Southeast Asia. The data collection was started with eligible travelers coming to the enrollment sites (included first at Hospital for Tropical Diseases, then amended to include Suvarnabhumi Airport and various public locations across Bangkok, Pattaya, Surat Thani, Phuket, and Chiang Mai for more participants) to do the informed consent and the onsite questionnaires about demographic data, travel and trip details, and to check whether the participants have skin condition or not (Q1, Q2 and Q3). In case travelers have any rashes, they will be requested to do more details of Q3 of the Case record form (CRF) for skin diseases.

The participants are requested to perform a self-reported of skin diseases via the Q3 questionnaire. Also, the Q3 questionnaire will be sent every one week until four weeks after departure from Southeast Asia.

At the end of the trip, the Q4 questionnaire will be sent to the participants to ask about practices concerning skin conditions. Also, the Q4 questionnaire will be sent every two weeks for 2 times until 4 weeks after departure from Southeast Asia.

The initial diagnosis will be made by the dermatologist using the picture the participants sent from the application.

Data collection spanned from July 1, 2023, to January 31, 2024, with analysis conducted from February 1 to February 29, 2024. The study targeted travelers who traveled in Southeast Asia and were above 18, excluding those who had already resided or traveled in Southeast Asia for more than four weeks (at the enrollment to eliminate the report bias). Also, participants who failed to respond after three follow-up attempts were considered to have withdrawn from the study. Sample size calculation determined a minimum of 227 participants (expected response rate of 50% thus around 454 participants were expected) based on an estimated skin condition incidence of 18% due to the previous research studied by Pisutsan, et al., (2019). at Thai Travel Clinic, Hospital for Tropical Diseases, and other sites. Data analysis will involve statistical software such as SPSS, presenting categorical data as numbers and percentages and continuous data as means or medians with appropriate measures of dispersion. The study aims to assess skin condition incidence, associated factors, impact on trips and quality of life, knowledge, attitude, and practices regarding travel-related skin diseases. Statistical significance will be considered at $p < 0.05$. Data will be collected

electronically and analyzed using SPSS (version 18.0) and Excel (Window 2016). This study was approved by the Ethics Committees of the Faculty of Tropical Medicine, Mahidol University: MUTM 2023-057-01.

4. Results and Discussion

4.1 Result

The study started in July 2023 with the low season of travel (only 40 participants were enrolled). Thus, the researchers amended the protocol to increase the sites of enrollment. Additionally, out of the total, 357 individuals (79.5%) ceased participating following three unsuccessful follow-up attempts. As a result, only 92 responded participants (20.5%) were enrolled and further analyzed. Thus, we initially present the data of the preliminary report and are still in the process of enrolling more participants.

The demographic traits of the participants during their initial visit. Out of the 92 individuals, 52 were identified as male (56.5%), while 40 were identified as female (43.5%). The average age of the participants was 35 years (ranging from 18 to 75), with those aged between 18 and 29 comprising the largest demographic segment (46.7%, n = 43).

Among the participants, 9.8% (n = 9) disclosed a history of prior skin ailments, while 8.7% (n = 8) had pre-existing medical conditions during their travel period. Furthermore, 25.0% of participants (n = 23) were presently under medication, and 23.9% (n = 22) reported allergies to either food or medications.

The predominant countries of origin among participants were Europe, North America, Australia, and New Zealand, accounting for 84.8% (n = 78), with Asia following at 10.9% (n = 10), South America at 3.3% (n = 3), and Africa at 1.1% (n = 1). All participants' median duration of stay was 60 days, ranging from 4 to 187 days.

Most travelers were classified as backpackers (53.3%, n = 49), and tourism was identified as the primary reason for travel by 81.5% of participants (n = 75). Out of the 91 participants, 49 completed the Q4 Practice questionnaire (53.3%), with exposure to heat being a frequently planned activity during their journeys (46.7%, n = 43).

According to the data, the incidence of skin condition equaled the number of travelers who have new skin diseases divided by the number of Total travelers who were enrolled, as 92 participants were included, among whom 39 (42.4%) reported skin conditions. In contrast, 53 (57.6%) denied having any. Also, from poison regression, the incidence rate was calculated from the number of travelers who have new skin diseases divided by the interested population x time frame, as the incidence rate of skin diseases was 0.013 per person-day. They underwent both univariable and multivariable analyses based on their essential characteristics and travel details, as presented in Table 1

In this study, of 39 participants, they reported a total of 60 lesions, and common skin conditions are shown in Table 2, consisting of eczema (31.7), unspecified rash (18.3), insect bite (16.7), Minor trauma wound (10.0), bacterial skin infection (6.7), respectively.

In the univariable analysis, factors such as age group (p-value 0.001), travel style (p-value 0.027), and trip duration (p-value 0.017) were found to be significantly associated with skin conditions among travelers. Gender (p-value 0.195) was also considered for multivariable analysis because their p-values were less than 0.2.

During the multivariable analysis, the age group exhibited significance with a p-value of 0.007. From the data, older ageing and a duration of travel of 1 -3 months may be considered protective factors. Gender and travel style may be the confounders. The adjusted odds ratio (aOR) for travelers aged 30-39 showing 0.062 (95% CI 0.01 - 0.396, p-value 0.002) and over 39 years was calculated as 0.055 (95% CI 0.009 - 0.349, p-value 0.002). This means the older travelers are, the less they may develop skin diseases. Also, the duration of traveling for 1 – 3 months illustrates an aOR of 0.016 (95% CI 0.015 - 0.929, p-value 0.042), interpreting that if the travelers traveled in Southeast Asia for 1 – 3 months, they may had fewer lesions than traveled less than one months or more than three months.

However, due to the loss of follow-ups, 449 participants, only 51 (11.4%) travelers provided responses for exposure in Q4 questionnaires of practice about association factors, which could be further analyzed after receiving more participants.

Table 1 Demographic characteristics and Travel details with univariable analysis and multivariable analysis

Variables	N	Reported skin conditions, N (%)	No skin lesions, N (%)	cOR	95% CI	P value	aOR	95% CI	P value
Gender						0.195			0.418
Male	52	19 (36.5)	33 (63.5)	1	-		1	-	
Female	40	20 (50)	20 (50)	1.737	(0.751 - 4.016)		1.508	(0.559 - 4.07)	0.418
Age group						0.001			0.007
18-29	43	23 (53.5)	20 (46.5)	1	-		1	-	
30-39	26	14 (53.8)	12 (46.2)	0.083	(0.017 - 0.398)		0.062	(0.01 - 0.396)	0.003
> 39	23	2 (8.7)	21 (91.3)	0.082	(0.016 - 0.422)		0.055	(0.009 - 0.349)	0.002
Region						0.225			
Europe - North America - Australia - New Zealand	78	31 (39.7)	47 (60.3)	1	-				
Other	14	8 (57.1)	6 (42.9)	2.022	(0.639 - 6.394)				
Employment status						0.025			
Healthcare	17	12 (70.6)	5 (29.4)	1	-				
Non-Healthcare	54	18 (33.3)	36 (66.7)	0.313	(0.081 - 1.211)				
N/A	21	9 (42.9)	12 (57.1)	1.5	(0.534 -4.214)				
Education						0.371			
Graduate	70	32 (45.7)	38 (54.3)	1	-				
Undergraduate	18	5 (27.8)	13 (72.2)	1.187	(0.158 - 8.912)				
N/A	4	2 (50.0)	2 (50.0)	2.6	(0.284 - 23.814)				
Underlying diseases						0.77			
Yes	8	3 (37.5)	5 (62.5)	1	-				
No	84	36 (42.9)	48 (57.1)	1.25	(0.28 - 5.575)				
Previous skin conditions						0			
Yes	9	9 (100.0)	0 (0.0)	-	-				
No	83	30 (36.1)	53 (63.9)	-	-				
Current medication						0.273			
Yes	23	12 (52.2)	11 (47.8)	1	-				
No	69	27 (39.1)	42 (60.9)	0.589	(0.228 - 1.524)				
Allergy						0.872			
Yes	22	9 (40.9)	13 (59.1)	1	-				
No	70	30 (42.9)	40 (57.1)	1.083	(0.41 - 2.866)				
Travel clinic pretravel counseling						0.311			
Yes	19	10 (52.6)	9 (47.4)	1	-				
No	73	29 (39.7)	44 (60.3)	0.593	(0.215 - 1.637)				
Previous visit to Southeast Asia						0.537			
Yes	34	13 (38.2)	21 (61.8)	1	-				
No	58	26 (44.8)	32 (55.2)	1.312	(0.553 - 3.114)				
Purpose of travel						0.911			
Tourism	75	32 (42.7)	43 (57.3)						
Others	17	7 (41.2)	10 (58.8)	0.941	(0.323 - 2.739)				
Travel Style						0.027			0.749
Backpack	49	26 (53.1)	23 (46.9)	2.609	(1.105 - 6.16)		1	-	
Others	43	13 (30.2)	30 (69.8)				1.195	(0.401 - 3.56)	0.749
Duration of travel						0.017			0.062
< 2 wk.	13	4 (30.8)	9 (69.2)	1	-		1	-	
2 - 4 wk.	12	10 (83.3)	2 (16.7)	1.625	(0.41 - 6.44)		1.928	(0.4 - 9.29)	0.413
1 - 3 mo.	36	12 (33.3)	24 (66.7)	0.144	(0.027 - 0.773)		0.116	(0.015 - 0.929)	0.042

Variables	N	Reported skin conditions, N (%)	No skin lesions, N (%)	cOR	95% CI	P value	aOR	95% CI	P value
> 3 mo.	31	13 (41.9)	18 (58.1)	1.444	(0.534 - 3.905)		1.953	(0.641 - 5.954)	0.239
Knowledge score						0.454			
Fare	43	20 (46.5)	23 (53.5)	1	-				
Good	49	19 (38.8)	30 (61.2)	1.373	(0.599 - 3.15)				

Table 2 Spectrum of skin conditions

Spectrum of skin lesions	Lesion, N (%)
Eczema	19 (31.7)
Unspecified	11 (18.3)
Insect bite	10 (16.7)
Minor trauma wound	6 (10.0)
Bacterial skin infection	4 (6.7)
Urticaria	3 (5.0)
Sunburn	2 (3.3)
Viral exanthem	2 (3.3)
Fungal infection	1 (1.7)
Irritant dermatitis	1 (1.7)
Dandruff	1 (1.7)

4.2 Discussion

Our investigation was undertaken to delineate the spectrum of dermatological conditions prevalent among international travelers visiting Southeast Asia from July 2023 to January 2024. A prior study (Pisutsan, et al., 2019) examined 359 international travelers from high-income countries who journeyed to Southeast Asia, while another study (Kamolratanakul, et al., 2020) surveyed 270 Thai travelers abroad, both conducted at the same clinic, focusing respectively on health issues and skin conditions. However, our study specifically concentrated on dermatological concerns, marking the first prospective exploration of travel-related skin ailments among Southeast Asian travelers, distinct from previous research that addressed broader health problems.

Notably, the earlier study done in a Thai travel clinic (Pisutsan, et al., 2019) indicated an approximate 50% response rate, whereas our study at the clinic yielded a response rate of 44.9%, while the overall response rate, inclusive of Suvarnabhumi Airport and other public sites, exhibited a dropout rate of 79.7%. This may be affected by the enrollment sites and the different time frame after the COVID-19 pandemic.

According to the primary objective of the incidence of skin diseases among international travelers traveling in Southeast Asia, in this study, 42% incidence of skin conditions was shown; on the other hand, a prior study (Pisutsan, et al., 2019) shows only 18% of the incidence of skin problems. Also, the incidence rate from a previous study (Pisutsan, et al., 2019) was 197 per month per 1000 travelers [95% (CI), (170-227)] presumably 0.0065 person-day, so our study found two times of incidence rate, compared to previous studies. This may be affected by bias in reporting and also by the low power of the study.

In this study, common skin conditions include eczema, unspecified rash, insect bite, Minor trauma wound, and bacterial skin infection respectively. A previous study (Pisutsan, et al., 2019) indicated that skin issues were the second most frequently self-reported problem among travelers within the initial two weeks of their journey. Reported problems included insect bites, which were the most common, followed by rashes, itchy skin, and sunburn.

Additionally, Multivariate analysis illustrated that protective factors of prevention skin disease were possibly older ageing and duration of travel of 1 -3 months The adjusted odds ratio (aOR) for travelers aged 30-39 showed 0.062 (95% CI 0.01 - 0.396, p-value 0.002) and over 39 years was calculated as 0.055 (95% CI 0.009 - 0.349, p-value 0.002). This means that the older travelers are, the less they may develop skin diseases, suggesting that older travelers may engage less in activities that expose them to risk factors. Surprisingly, the duration of traveling 1 – 3 months with aOR of 0.016 (95% CI 0.015 - 0.929, p-value 0.042) was potentially a protective factor; this may be from this duration the travelers were adapted to the environment and also could find protective measures which were suitable for them. Compared to a prior prospective cohort study in Finland (Vilkman, Pakkanen, Lääveri, Siikamäki, & Kantele, 2016), they found risk factors for health issues among travelers, including specific destinations, females, younger age, and longer trip duration.

5. Conclusion

In summary, our strength was the first study focusing on examined skin diseases among international travelers in Southeast Asia, revealing approximately 42% incidence of skin diseases. Common issues included eczema and insect bites, impacting participants' quality of life. Older travelers were less likely to engage in activities leading to skin problems. Limitations include a low response rate, potential biases from recruitment at a travel clinic, and possible recall bias. Additionally, the study's duration may overlook seasonal variations. However, this is a preliminary study after a low response rate; the researchers were still in the process of enrolling more participants to reach 227 responses as planned to increase the power of the study. Still, it showed some interesting points to concern for higher incidence and more non-infectious skin diseases, and even a low response rate may imply low awareness of skin diseases. Also, future research may collaborate with other researchers from other enrollments sites from different countries in Southeast Asia to illustrate more variety of the information.

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