

Health Threats among Thai Pilgrims during Pilgrimage to Holy Buddhist Places in India: A Cross–Sectional Descriptive Study

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Abstract:

Objective: The pilgrimage to make merit by visiting and paying respect to four sacred Buddhist places in India is a popular tradition among Thai pilgrims. However, health threats are common occurrences during such pilgrimages. This study aimed to investigate health threats and associated factors among Thai pilgrims during the pilgrimage to sacred Buddhist places in India.

Material and Methods: This cross–sectional descriptive study surveyed 404 Thai pilgrims who visited sacred Buddhist places from December 2023 to February 2024, using cluster sampling. The data was collected in India during their pilgrimage to sacred Buddhist places through a questionnaire. Data were analyzed by using descriptive statistics and multiple logistic regression.

Results: The majority of pilgrims in India experienced health threats (61.4%) during pilgrimage to sacred Buddhist places; including fever (45.8%), cough/sore throat (20.3%), headache/migraine (11.1%), constipation (10.4%), muscle pain/back pain (6.7%), phlegm (6.7%), knee/leg pain (6.4%) and diarrhea/food poisoning (5.4%). After adjusting for the effects of all other variables, factors significantly associated with health threats during the pilgrimage at the Holy Buddhist

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places were: age (adjusted odds ratio (AOR)=1.26, 95% confidence Interval (CI)=1.17–2.22, p-value=0.014), duration of pilgrimage (AOR=1.63, 95% CI=1.01–2.82, p-value=0.042), expenses for pilgrimage (AOR=1.94, 95% CI=1.16–3.16, p-value=0.011), health conditions (AOR=3.29, 95% CI=2.03–5.38, p-value<0.001) and health preparation (AOR=1.63, 95% CI=1.01–2.63, p-value=0.044).

Conclusion: The findings demonstrated that factors related to health threats need to be addressed. Health preparation is a crucial factor for developing guidelines and planning to provide healthcare services for pilgrims.

Keywords: health threats, Holy Buddhist places, India, pilgrims, pilgrimage

Introduction

The history and culture of Thailand have strong roots in Buddhism, and it's evident that Thai people wholeheartedly follow the fundamental teachings of the Buddha. Visiting and paying respect to Buddhist places as a pilgrimage after the rains retreat of the Sangha (order of Buddhist monks) is considered one form of merit-making. This kind of pilgrimage entails traveling to venerate, sacred religious sites as designated by Buddhist scriptures so as to receive blessings, nurture faith, and purify the mind. Consequently, Buddhist pilgrimages typically visit the sacred lands of Buddhist enlightenment, situated in India and Nepal. These places are significant in the history of Buddhism; especially those connected to the life of the Buddha, the founder of Buddhism¹. Undertaking pilgrimages serves as a means to reflect upon the enlightenment and teachings of the Buddha, visiting all four holy sites². The four sacred Buddhist places are associated with the life of the Buddha. They consist of Lumbini, the birthplace; Bodh Gaya, the place of enlightenment; Sarnath, the site of the first sermon; and Kushinagar, the place of the Buddha's passing away into Nirvana³⁻⁵.

Thai Buddhists have increasing opportunities to make pilgrimages to sacred Buddhist sites each year. Most of them travel to make merit and seek blessings at sacred Buddhist places⁶. As a result of the rise in international flights, there has been a significant improvement in transportation infrastructure. Travelers can enjoy greater comfort with the

availability of air-conditioned buses^{7,8}. This also includes disseminating information through various media channels, whether in the form of travel diaries, travel documentaries, articles, television programs, newspapers; or the internet, which has become widely and rapidly popular^{9,10}.

As a result, more Buddhists are increasingly eager to go on pilgrimages to make merit and in search of blessings. This trend is expected to continue, leading to a significant rise in the number of pilgrimage journeys^{11,12}. Based on data from the Medical Tourism and Travel Unit, it was found that between 2014 and 2021, over 90.0% of the individuals who traveled to India did so to visit pilgrimage sites, mostly as part of organized group tours¹³. A recent study showed that 52.0% of Thai travelers experienced health threats when traveling in India; however, only 6.0% sought medical attention and less than 1.0% were hospitalized¹⁴.

Currently, the objectives and styles of pilgrimage journeys vary widely. Travelers may embark on these journeys as part of organized tour groups or independently; often as backpackers¹⁵. Additionally, the demographic profile of those who travel to make merit and seek blessings is diverse, encompassing individuals of all genders, ages, and occupations^{16,17}. It's important to note that health threats can arise during pilgrimage journeys. The winter season, from November to February, is a common time for Thai Buddhists to make pilgrimages, and they generally face issues related to sleeping bags, clothing, travel to each destination, and cold weather^{18,19}.

The gap in this study arose from an increase in the number of Thai pilgrims visiting sacred Buddhist sites in India after the coronavirus disease 2019 (COVID-19) pandemic. Previous studies mainly focused on Thai travelers generally traveling to India¹⁴, with some specifically looking at pilgrimages in Hinduism¹⁹. There has been a lack of research on Thai pilgrims visiting Buddhist pilgrimage sites, which is the specific focus of this current research. Health threats are common health risks faced by Thai pilgrims during their journeys to these sacred places in India. This study aimed to explore health threats and associated factors among Thai pilgrims during the pilgrimage to sacred Buddhist places in India. The study's findings could help identify common health risks and enable targeted health interventions and educational initiatives. This will help pilgrims be better prepared and manage health threats more effectively during their journey. Additionally, the results could create health programs and innovations from factors associated with health threats to prevent and control potential health impacts at the hospitals of Thai temples in India.

Material and Methods

Study design, samples, and population sampling

This cross-sectional descriptive study aimed to explore the relationship between factors and health threats among Thai pilgrims during their pilgrimage to the sacred Buddhist sites in India and to consider the magnitude of their association. The conceptual framework for this study was developed to classify factors under investigation, based on relevant research from a literature review^{18,20}. Similar factors were categorized into the same group and divided into three groups: individual factors, travel factors, and health factors. The research hypothesis was that individual factors, travel factors, and health factors were associated with health threats among Thai pilgrims during their pilgrimage

to the sacred Buddhist sites in India. The sample size calculation was determined using the Cochran equation²¹. Because the exact population size was not known, this was an open population, as the exact total population of Thai pilgrims undertaking journeys to sacred Buddhist places in India cannot be determined. The confidence level was 95.0% ($Z=1.96$), the proportion of health threats reported by travelers visiting India was 0.52¹⁴ and the allowance of error (d) was 0.05. After performing the calculation, the initial sample size of 384 individuals was increased by 5.0% to account for potential errors that might arise during data collection. Therefore, the final sample size for this study was 404 individuals.

The study participants were selected using a cluster sampling method. Cluster sampling divided the population into subgroups, with a focus on the differences within each subgroup, while ensuring that there were similarities between the sample groups. For instance, the population of Thai pilgrims that went on pilgrimage was divided into 4 clusters, based on sacred Buddhist places: Lumbini, Bodh Gaya, Sarnath and Kushinagar. Two clusters, Bodh Gaya and Kushinagar, were randomly selected for the study. Data was collected through questionnaires in India at Wat Thai Buddhagaya and The Royal Thai Monastery Kushinara during a pilgrimage to sacred Buddhist sites in India; between December 2023 and February 2024. To be eligible for the study, inclusion criteria consisted of individuals that had to be Thai pilgrims of any gender, aged 20 years or older, and having visited sacred Buddhist places in India to make merit and seek blessings. They willingly consented to participate in the study and completed the assessment by a questionnaire. Participants who declined to provide information using questionnaires were not comfortable, or were unavailable were excluded from this study.

Research instruments

The questionnaire used in the study was developed and modified based on a comprehensive review of relevant literature and related issues^{3,10}. The instrument comprised of five parts and is explained in detail below:

Part 1. The personal questionnaire: this tool was developed by the researchers from relevant literature³. It consists of seven questions; including open-ended and closed-ended questions, and aims to collect personal information; such as gender, age, marital status, education level, monthly income, occupation and health insurance.

Part 2. The travel factors questionnaire: this part was developed based on relevant literature¹⁰. It was comprised of nine questions; including both open-ended and closed-ended questions, to gather information about the pilgrimage to sacred Buddhist places in India. The questions consisted of: travel insurance, history of pilgrimage trips, characteristics of pilgrimage, duration of pilgrimage, number of sacred Buddhist places in India, receiving the information of pilgrimage, accommodation in India, obtaining data before traveling and expenses for pilgrimage.

Part 3. Health factors questionnaire: this instrument was created by reviewing pertinent literature¹⁰. It included 7 questions, incorporating both open-ended and closed-ended formats, to gather data on health-related factors. These comprised of health conditions, history of COVID-19 infection, medications and healthcare products used during travel, food sources during the pilgrimage, health check-ups before three months, vaccinations before traveling and consulting doctors for health preparation.

Part 4. The health preparation evaluation form: this part was created by reviewing pertinent literature^{3,10}. It comprised of fourteen questions, aimed at assessing the health readiness of Thai pilgrims visiting the sacred Buddhist places in India. The questions were formatted as a Likert scale, with three levels: Never, Sometimes and Always.

The scores were assigned from 1, 2, and 3, respectively. The scoring criteria were classified into three levels with Best criteria²² as follows: an average score of 1.00–1.66 indicates low health preparedness, an average score of 1.67–2.33 indicates moderate health preparedness and an average score of 2.34–3.00 indicates high health preparedness.

Part 5. The questionnaire on health threats during the pilgrimage. The researchers developed this instrument, which categorizes questions with response options of “Yes” or “No.” The survey aims to gather information on health threats experienced by Thai pilgrims. The questions about health threats include COVID-19, diarrhea/food poisoning, acute diarrhea, constipation, heartburn, fever, headache/migraine, cough/sore throat, etc.

The instrument assessed the validity of a peer by consulting three experts in clinical medicine, nursing, and public health. The item objective congruence was greater than 0.95. A pilot study was conducted to gather data using a specific instrument to test its reliability. Thirty Thai pilgrims sharing similar characteristics with the participants were recruited for the pilot study. The Cronbach's alpha coefficient for the health preparation evaluation form was 0.90.

Data collection

A letter was sent to Phra Thammabothiwong (Veerayut Veerayuddho), the head of Overseas Dhammaduta monks in India-Nepal, to explain the research objectives and request cooperation in data collection. Before data collection, training sessions were conducted for the research assistants to establish standardized research operation protocols. Data was collected in India from only Thai people who visited on a pilgrimage to sacred Buddhist sites. Once potential volunteers were identified, the research team collected data by asking the questions in the questionnaire; taking roughly 30 minutes per participant.

Data analysis

In this study, the Statistical Package for the Social Sciences program version 29.0.1.0 license was used to analyze the data. Descriptive statistics was used to describe the characteristics of the samples. The Kolmogorov–Smirnov goodness-of-fit test was used to assess the normality of continuous variables, including age, monthly income, expenses for pilgrimage, duration of pilgrimage, and frequency of pilgrimage. The results showed that all variables exhibited a normal distribution (p -value>0.05). Multicollinearity among variables was assessed before performing multiple logistic regression. This analysis was to examine the relationship between individuals, travel, health factors, and health threats among Thai pilgrims during their pilgrimage to sacred Buddhist places in India. In this analysis, variables were selected using the enter selection method, presenting both the crude odds ratio (COR) from binary logistic regression (BLR) and the adjusted odds ratio (AOR) from multiple logistic regression (MLR); along with the 95.0% confidence interval (CI).

Ethical considerations

This research project was approved for human research by the Research Ethics Committee on Human Research at Valaya Alongkorn Rajabhat University under the Royal Patronage Research. The project was assigned the number REC no. 0061/2023, COA no. 0061/2023, and was certified on November 20, 2023. Participants were required to sign a consent form before joining the research project. They were informed as to the confidentiality measures and the data collection procedures.

Results

Individual factors

The study included data from 404 Thai pilgrims having visited sacred Buddhist places in India. The analysis of individual factors, presented in Table 1 revealed that the sample comprised 68.6% females and 31.4% males. The respondents were aged 35–59 years (47.1%), followed by those aged over 60 years (36.6%). Additionally, 69.8% of the respondents had a bachelor's degree or higher, 47.8%

were of single status, and 50.7% had a monthly income of more than 30,000 Baht. Furthermore, 28.0% of the sample were merchants or business owners, followed by civil servants (26.6%) and self-employed (20.3%), with 36.3% of the respondents having health insurance with civil servant rights.

Table 1 The number and percentage of the pilgrims, divided by individual factors during pilgrimage to the sacred Buddhist places in India (n=404)

Individual factors	n	%
Gender		
Female	277	68.6
Male	127	31.4
Age (years)		
20–34	66	16.3
35–59	190	47.1
≥60	148	36.6
Mean=51.7, S.D.=14.5, Min–Max=20–82		
Education level		
Incomplete education	1	0.2
Primary school	38	9.4
Lower secondary school	22	5.5
Upper secondary school	44	10.9
Diploma	17	4.2
Bachelor or higher	282	69.8
Marital status		
Single	193	47.8
Married	164	40.6
Separated/divorced	47	11.6
Occupation		
Merchants/business	113	28.0
Civil servants	108	26.6
Self-employed	82	20.3
Retired officials	55	13.6
Agriculturists	14	3.5
Students	12	3.0
Employees	10	2.5
Unemployed	10	2.5
Health insurance		
Civil servant	147	36.3
Universal coverage	126	31.2
Social security scheme	73	18.1
Self-payment	33	8.2
Private insurance	25	6.2
Monthly income (Baht)		
<15,000	97	24.0
15,000–29,999	102	25.3
≥30,000	205	50.7
Mean=43,859.4, S.D.=1,480.0, Min–Max=0–250,000		

S.D.=standard deviation

Travel factors

According to the analysis of the travel factors of Thai pilgrims having gone on a pilgrimage to the sacred Buddhist places in India, the majority of the sample had travel insurance (76.5%) and visited the sacred Buddhist places as part of a group tour (84.2%). Most of them had previously been on a pilgrimage (57.9%), stayed for more than 10 days (71.5%), visited four sacred Buddhist places (77.0%), and slept in Thai temples (65.6%). They spent less than 40,000 Baht on pilgrimage expenses (63.6%). Additionally, 52.2% of them received information regarding the pilgrimage, with 38.4% receiving it from temples and 32.2% from tour companies. Finally, 58.2% of them obtained travel data before traveling to the sacred Buddhist places in India (Table 2).

Table 2 The number and percentage of the pilgrims, divided by travel factors during pilgrimage to the sacred Buddhist places in India (n=404)

Travel factors	n	%
Travel insurance		
Yes	309	76.5
No	95	23.5
History of pilgrimage trips		
Yes	234	57.9
No	170	42.1
Duration of pilgrimage (day)		
<10	115	28.5
≥10	289	71.5
Mean=11.8, S.D.=7.2, Min-Max=1-60		
Number of holy Buddhist places (places)		
1-3	93	23.0
4	311	77.0
Accommodation in India		
Thai temple	265	65.6
Hotel/guest house	139	34.4
Characteristics of pilgrimage		
Group tour	340	84.2
Backpacker	64	15.8
Receiving information on pilgrimage		
Yes	211	52.2
No	193	47.8
Source of information on pilgrimage*		
Temples	155	38.4
Tour companies	130	32.2
Internet	104	25.7
Friends	100	24.8

Table 2 (continued)

Travel factors	n	%
Expenses for pilgrimage (Baht)		
<40,000	257	63.6
≥40,000	147	36.4
Mean=32,586.4, S.D.=24,536.4		
Obtaining data before traveling		
Yes	235	58.2
No	169	41.8

*several choices below can be selected

Health factors

The health factors of the participants revealed that the majority of Thai pilgrims had health conditions (56.9%). Among these, hypertension was the most common condition (24.3%), followed by dyslipidemia (11.6%) and diabetes (8.2%). Furthermore, most of the samples (74.5%) had prior COVID-19 infection and 56.9% of them underwent a health check-up three months before traveling on a pilgrimage. The pilgrims mainly consumed food prepared by the Thai temples (71.2%) and had moderate levels of health preparation (54.5%). Before their pilgrimage, 84.2% of the pilgrims received vaccinations; such as Influenza, Rabies, and COVID-19; additionally, 56.0% of the pilgrims consulted with doctors for health preparation. However, 33.9% were prepared with medication and health products before the pilgrimage; these included: paracetamol (58.7%), alcohol gel/mask (39.4%), and chlorpheniramine (35.6%) (Table 3).

Health threats of the samples during the pilgrimages to sacred Buddhist places

A recent study was conducted on 404 Thai pilgrims having visited sacred Buddhist places in India. The study found that 61.4% of the pilgrims experienced health threats during their visit. The most commonly reported health threats of the pilgrims were fever (45.8%), followed by cough or sore throat (20.3%), headache or migraine (11.1%), constipation (10.4%), muscle or back pain (6.7%), phlegm (6.7%), knee or leg pain (6.4%), and diarrhea or food poisoning (5.4%) (Table 4).

Table 3 The number and percentage of the pilgrims, divided by travel factors during pilgrimage to the sacred Buddhist places in India (n=404)

Health factors	n	%
Health conditions		
Yes	230	56.9
No	174	43.1
Type of health conditions*		
Hypertension	98	24.3
Dyslipidemia	47	11.6
Diabetes	33	8.2
Dyspepsia	22	5.4
Sources of food during pilgrimage		
Thai temples	288	71.2
Prepared by the tour	87	21.5
Purchased personally	23	5.7
Self-prepared	6	1.5
Health check-up before three months		
Yes	230	56.9
No	174	43.1
Health preparation		
Low	36	8.9
Moderate	220	54.5
High	148	36.6
Mean=2.38, S.D.=0.27, Min-Max=1.50-2.93		
Receiving vaccinations before traveling		
Yes	340	84.2
No	64	15.8
History of COVID-19 infection		
Yes	301	74.5
No	103	25.5
Prepare medications and products used		
No	267	66.1
Yes	137	33.9
Type of medication prepared*		
Paracetamol	237	58.7
Alcohol gel/mask	159	39.4
Chlorpheniramine	144	35.6
Drug for congenital ill	133	32.9
Tissue/wet wipes	129	31.9
Anti-diarrheal	127	31.4
Inhalant drug	117	29.0
Cough drug	90	22.3
Muscle relaxant/pain	81	20.0
Antiacids	68	16.8
Dimenhydrinate	55	13.6
Hypersensitivity drug	50	12.4
Muscle balm	44	10.9
First Aid Kit	30	7.4

Table 3 (continued)

Health factors	n	%
Consulting doctors for health preparation		
Yes	226	56.0
No	178	44.0

*several choices below can be selected

Table 4 The health threats of Thai pilgrims during a pilgrimage to the sacred Buddhist places in India (n=404)

Health threats during pilgrimage	n	%
Health threats during pilgrimage		
Yes	248	61.4
No	156	38.6
Magnitude of health threats for each individual		
No health threat	156	38.6
1-3 health threat	215	53.2
>3 health threat	33	8.2
Mean=1.34, S.D.=1.45, Min-Max=0-6		
Type of health threats during pilgrimage*		
Diseases		
Fever	185	45.8
Diarrhea/food poisoning	22	5.4
COVID-19	6	1.5
Symptoms		
Cough/sore throat	82	20.3
Headache/migraine	45	11.1
Constipation	42	10.4
Muscle pain/back pain	27	6.7
Phlegm	27	6.7
Knee/leg pain	26	6.4
Nausea/vomiting	22	5.4
Heartburn	10	2.5
Sinusitis	6	1.5
Abdominal pain	6	1.5

*answer more than one item

Factors related to health threats of the samples during the pilgrimages

In Table 5, the study findings showed that several factors were significantly associated with health threats faced by Thai pilgrims during their pilgrimage. These factors included: age, duration of pilgrimage, expenses

for pilgrimage, health conditions, and health preparation. The findings were presented with the AOR, 95% CI and p-value. The study found that Thai pilgrims aged 60 and older were likely to have health threats at 1.26 times greater than those aged 20–59. (AOR=1.26, 95% CI=1.17–2.22, p-value=0.014). Additionally, Thai pilgrims who had 10 or more days of pilgrimage were likely to have health threats at 1.63 times greater than those with less than 10 days of pilgrimage (AOR=1.63, 95% CI=1.01–2.82, p-value=0.042).

Furthermore, Thai pilgrims having had expenses of less than 40,000 Baht for the pilgrimage were likely to

have health threats at 1.94 times greater than those having had expenses of 40,000 Baht or more (AOR=1.94, 95% CI=1.16–3.16, p-value=0.011). Moreover, Thai pilgrims who had health conditions were likely to have health threats at 3.29 times greater than those without health conditions (AOR=3.29, 95% CI=2.03–5.38, p-value<0.001). Finally, Thai pilgrims with low or moderate levels of health preparation were likely to have health threats at 1.63 times greater than those with high levels of preparation (AOR=1.63, 95% CI=1.01–2.63, p-value=0.044).

Table 5 Factors associated with health threats of Thai pilgrims during a pilgrimage to the sacred Buddhist places in India by using multiple logistic regressions (n=404)

Variables	Binary logistic regressions			Multiple logistic regressions		
	COR	95% CI	p-value	AOR	95% CI	p-value
Gender						
Female	1.27	0.83–1.95	0.275	1.07	0.65–1.77	0.780
Male	1.00			1.00		
Age (years)						
≥60	1.75	1.14–2.69	0.010*	1.26	1.17–2.22	0.014*
20–59	1.00			1.00		
Marital status						
Married	1.26	0.83–1.90	0.268	1.17	0.73–1.89	0.517
Single/separated/divorced	1.00			1.00		
Education level						
Less than bachelor degree	1.59	1.01–2.50	0.043*	1.54	0.89–2.67	0.123
Bachelor degree or higher	1.00			1.00		
Monthly income (Baht)						
<30,000	1.23	0.82–1.83	0.323	1.03	0.63–1.68	0.918
≥30,000	1.00			1.00		
Occupation						
Unemployed	1.13	0.67–1.88	0.652	1.01	0.48–1.84	0.859
Employed	1.00			1.00		
Health insurance						
Self-payment/private insurance	2.20	1.26–3.87	0.006*	1.80	0.95–3.41	0.072
Having health insurance	1.00			1.00		
Travel insurance						
No	1.04	0.65–1.67	0.869	1.37	0.78–2.41	0.272
Yes	1.00			1.00		
History of pilgrimage trips						
No	1.36	0.91–2.04	0.140	1.12	0.70–1.79	0.631
Yes	1.00			1.00		

Table 5 (continued)

Variables	Binary logistic regressions			Multiple logistic regressions		
	COR	95% CI	p-value	AOR	95% CI	p-value
Characteristics of pilgrimage						
Backpacker	1.24	0.71–2.17	0.448	1.03	0.52–1.90	0.944
Group trip	1.00			1.00		
Duration of pilgrimage (day)						
≥10	1.65	1.04–2.61	0.034*	1.63	1.01–2.82	0.042*
<10	1.00			1.00		
Number of sacred Buddhist places						
4 Places	1.07	0.66–1.71	0.792	1.42	0.81–2.50	0.220
1–3 Places	1.00			1.00		
Receiving information on pilgrimage						
No	1.11	0.74–1.66	0.606	1.03	0.64–1.64	0.917
Yes	1.00			1.00		
Accommodation in India						
Hotel/guest house	1.24	0.81–1.90	0.315	1.19	0.71–1.99	0.506
Thai temples	1.00			1.00		
Obtaining data before traveling						
No	1.01	0.67–1.52	0.957	1.01	0.60–1.53	0.870
Yes	1.00			1.00		
Expenses for pilgrimage						
<40,000	2.07	1.37–3.13	<0.001*	1.94	1.16–3.16	0.011*
≥40,000	1.00			1.00		
Health conditions						
Yes	3.41	2.20–5.28	<0.001*	3.29	2.03–5.38	<0.001*
No	1.00			1.00		
History of COVID-19 infection						
No	1.13	0.72–1.78	0.602	1.43	0.84–2.45	0.815
Yes	1.00			1.00		
Prepared with medications products						
No	1.05	0.69–1.61	0.812	1.03	0.64–1.68	0.892
Yes	1.00			1.00		
Health preparation						
Low/ moderate	1.70	1.12–2.57	0.012	1.63	1.01–2.63	0.044*
High	1.00			1.00		
Sources of food during pilgrimage						
Purchased personally/self-prepared	1.21	0.55–2.68	0.636	1.45	0.53–3.97	0.471
Prepared by the tour/Thai temples	1.00			1.00		
Health check-up before three months						
No	1.01	0.63–1.51	0.969	1.35	0.84–2.16	0.218
Yes	1.00			1.00		

*explain the asterisk in the table

COR=crude odds ratio, AOR=adjusted odds ratio, CI=confidence interval

Discussion

This study included 404 Thai pilgrims having gone on a pilgrimage to the sacred Buddhist places in India. During their trip, the majority of them experienced health threats (61.4%). The findings of the present study were consistent with a study conducted by Olanwijiitwong et al., which found that 52.0% of them experienced health threats during their trip¹⁴. Similarly, in the study of Andanigoudar and Bant, it was found that 41.5% of the participants reported health threats; the most common being fever, upper respiratory symptoms, and diarrhea¹⁸. Additionally, the findings of this study were also inconsistent with Rajasekharan et al., wherein only 43.4% of pilgrims experienced health threats during their pilgrimage²³. However, they were consistent with the study of Stefanati et al., which demonstrated that 46.0% experienced illness during or following their travels²⁴.

These findings could be explained in that when going on a pilgrimage to the sacred Buddhist places in India, various health threats might arise due to different reasons. Firstly, as a Buddhist pilgrim seeking to make merit and worship the Buddha, one must be prepared to encounter cultural differences, travel difficulties as well as health threats. The prolonged duration of the pilgrimage can also cause health threats, such as muscle pain, knee pain, dizziness, and fatigue, especially when it involves full-day schedules²⁵. Secondly, the pilgrimage is typically scheduled from November to March, which is the winter season, requiring Thai pilgrims to adapt to colder weather. This adaptation may lead to health threats, such as fever, stuffy nose, runny nose, cough, and headaches²⁶.

Additionally, it should be noted that India is known for its high air pollution level, which can pose a threat to respiratory health due to the presence of both large particulate and fine particulate matter (PM 2.5). Exposure to PM 2.5 can cause immediate irritation of the respiratory tract, leading to symptoms such as coughing, sore throat,

and shortness of breath. Moreover, long-term exposure to PM 2.5 can increase the risk of cardiovascular diseases; including heart attacks and strokes²⁷. During the pilgrimage to the sacred Buddhist sites in India, Thai pilgrims may additionally face health threats, such as nasal congestion, eye irritation, difficulty breathing, and allergies²⁸. Fourthly, during the pilgrimage, Thai pilgrims consume unfamiliar foods that are cooked in different ways from Thai cuisine that may contain unfamiliar ingredients and seasonings. This can lead to food poisoning or gastrointestinal issues^{29,30}.

This study investigated the factors that contributed to the health threats experienced by Thai pilgrims during their pilgrimage to sacred Buddhist places in India. The findings revealed that age was a significant factor in the health threats encountered by the pilgrims (p -value=0.014). This was consistent with a study conducted by Stefanati et al. This study examined the health risks and behaviors of travelers and found that age was a risk factor for health threats during travel²⁴. These findings may be explained by the physical, mental, and social changes that occur with aging, such as physical decline, limitation in bodily functions, deteriorating health conditions, chronic illnesses, weakened immunity, limited self-care abilities and decreased mobility.³¹ This could be one of the reasons why this age group was more prone to health threats during pilgrimages. Compared to other age groups, it was found that older pilgrims might encounter more health threats during their pilgrimage³².

Additionally, the duration of the pilgrimage was associated with health threats of Thai pilgrims during their pilgrimage (p -value=0.042). This was consistent with a study conducted by Stefanati et al. which found that the duration of travel and occupation were risk factors for health threats during travel²⁴. This finding could be explained in that the duration of the pilgrimage can affect health threats of Thai pilgrims in several ways. Firstly, physical fatigue: the longer duration of the pilgrimage typically involves extended

periods of sitting, walking, standing, and physical exertion³³. This can lead to fatigue, muscle strain, joint pain, as well as other physical discomforts, especially for elderly pilgrims or those with pre-existing health conditions. Secondly, the journey to each of the sacred Buddhist places in India involves navigating rough roads, poor road conditions, heavy traffic and long distances between each place. This often results in long travel times, which can cause motion sickness, headaches, muscle aches, insomnia, gastrointestinal issues, or urinary problems, especially for those who spend extended periods on buses or in cars³⁴.

Expenses for pilgrimage were also associated with the health threats of Thai pilgrims during their pilgrimage (p -value=0.011). This was consistent with a study conducted by Aldossari et al., which showed that the expenses of the pilgrimage were associated with health threats among Thai pilgrims³⁵. The data may explain in that Thai Buddhists with higher incomes tend to opt for well-organized tour groups that offer comprehensive tour packages, including food, accommodation, hotels and travel insurance. This makes it more convenient for them to undertake religious pilgrimages³⁶. In addition, people with higher incomes often take care of their health before embarking on such journeys, by undergoing health check-ups or getting vaccinated³⁷. As a result, individuals with higher incomes have more options for self-care during pilgrimages and are less likely to experience health threats.

Health conditions were associated with the health threats of Thai pilgrims during the pilgrimage (p -value<0.001). Similarly; Kunwar demonstrated that individuals with health conditions are at a higher risk of experiencing health threats during pilgrimages³⁸. This was also consistent with the study of Geary and Shinde, which studied the ritual ecology of sacred sites in the Indo-Gangetic Region and visualized that health conditions may cause health threats during the pilgrimage¹⁹. This also could be explained in that health

conditions can potentially impact the health threats of Thai pilgrims during their pilgrimage in several ways. Firstly, individuals with health conditions may have compromised immune systems or underlying health conditions that make them more susceptible to infections, injuries, or other health complications during their pilgrimage³⁹. Secondly, physical limitations: some health conditions may cause physical limitations or disabilities, affecting mobility and increasing the risk of accidents or injuries⁴⁰. Thirdly, pilgrimages to remote or rural areas may have limited access to healthcare facilities or medical services. Individuals with health conditions may face challenges in accessing appropriate medical care or medications to manage their condition effectively. Moreover, health conditions may exaggerate the findings mentioned on accessibility to healthcare facilities.

Health preparation was associated with the health threats of Thai pilgrims during their pilgrimage (p -value=0.044). The findings of the present study are similar to the research conducted by Olanwiji Wong et al, which found that the incidence of health threats among these tourists may be associated with the lack of proper health preparation before traveling¹⁴. Similarly, Aziz et al. indicated that health preparedness may affect health threats during the pilgrimage, and good preparation for health can reduce health threats during pilgrimages³³.

These findings might demonstrate that failure to prepare for health, such as being unfit, having medical conditions, not bringing necessary medication, skipping check-ups and not exercising, can lead to health threats. In addition, insufficient preparation in terms of information before the journey may also result in health threats, as adjustments cannot be made concerning accommodation, food, air quality, distance and environmental conditions. Conclusively, health readiness is crucial for planning and reparation before any journey and can reduce the risks of health threats, both during the journey and upon returning from India.

During the study, a sample of pilgrims having visited sacred Buddhist sites in India experienced health threats that required hospitalization. Most of these pilgrims stayed in Thai temples and were admitted to either; Wat Thai Buddhagaya Hospital or the Royal Thai Monastery Kushinara Hospital. When visiting sacred Buddhist sites in India, pilgrims may also face additional risks, such as animal exposure, road traffic injury, physical injury, or trauma. Therefore, it is important to exercise caution while going on a pilgrimage. In summary, going on a pilgrimage can be seen as a way to improve oneself spiritually and personally by practicing Buddhist teachings with devotion. It is necessary to prepare for the pilgrimage in all dimensions of health, including physical, mental, and social health. By taking a holistic approach to health, we can integrate health promotion concepts to prevent any health threats that may arise during pilgrimages to the sacred Buddhist places in India.

Limitations of this study were related to the study design, which could not establish the cause-effect relationship, as the factors and outcomes were measured simultaneously within the same period. Additionally, the results of this study may not explain the causal relationship between the variables examined. Therefore, a cohort study design would be useful for future research, so that more implications will be better justified. Moreover, these findings cannot be applied to other groups of Thai tourists traveling to destinations beyond sacred Buddhist places in India. This includes tourists who prefer backpacking, eating street food, and engaging in adventurous activities, which may encounter different health threats.

Conclusion

This study visualized the factors associated with health threats of Thai pilgrims during a pilgrimage to the sacred Buddhist places in India. The duration and costs of

pilgrimage should be suitable for Thai pilgrims; especially for those aged 60 and above with health conditions. Before embarking on a pilgrimage, it is crucial to make necessary health preparations. Before embarking on a pilgrimage, it is recommended to have a comprehensive physical check-up and to maintain a regular exercise routine. Individuals with chronic illnesses should consult their doctors to determine if they are fit for long-distance travel. Upon returning from the pilgrimage, if any symptoms or health issues develop, they should promptly seek medical attention for evaluation and treatment so as to prevent any further complications. The study's practical implication indicates the findings of this study can be utilized to develop programs and innovations that enhance the well-being of Thai pilgrims during their pilgrimages as well as to prevent and control potential health impacts. For future research, it is recommended to use qualitative research methods to study the health threats of Thai pilgrims. This approach will help explore beliefs, attitudes, perceptions, and underlying factors related to health preparedness and problems.

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Conflict of interest

There are no potential conflicts of interest to declare.

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