

Behaviors and Perceptions of Japanese Tourists Affecting Diarrheal Illness and Health Care Need Assessment: A Questionnaire Study

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Abstract

Objectives: To measure the prevalence rate of, and determine the association between food and drink related behaviors and diarrheal illness among Japanese tourists, and assess their health care needs.

Methods: Eligible Japanese tourists (1,480) aged ≥ 15 years traveling in Chiangmai Province in the north, Ayutthaya Province in the center, Kanchanaburi Province in the west, Pattaya City in the east, and Krabi Province in the south of Thailand were enrolled in the study. Of these tourists, 1,318 consented to participate in this study and completed questionnaires in Japanese, giving a response rate of 89.1%.

Results: Among these Japanese tourists 21.3% had diarrheal illness, and of these tourists, 5.0% had classical travelers' diarrhea (TD), 11.8% had mild TD, 3.3% had good food and drink related behaviors, and 75.4% had moderate level of perception of diarrhea related to drinking and eating. Multiple logistic regression analysis indicated three significant diarrheal illness predictors: large number of previous visits to Thailand, longer stay in Thailand, and the experience of visiting other countries. Furthermore, 56.9% suggested providing an adequate number of toilets at tourist destinations; 53.9% suggested providing a 24-hour emergency call facility for a public ambulance; and 51.9% suggested providing garbage bins and garbage disposal facilities at tourist destinations.

Conclusions: TD still affects experienced Japanese tourists who visit Thailand. Although the proportions of the good levels of food and drink related behaviors were low, there were indications that Japanese tourists perceived the risk of contracting TD.

Key words: behaviors, perceptions, Japanese tourists, traveler's diarrhea

Introduction

Thailand attracts many tourists annually. Each year, about 1 million Japanese tourists visit Thailand. Japanese are the second leading tourists in Thailand, second to Malaysia (1). The number of Japanese tourists temporarily decreased because of the outbreaks of severe acute respiratory syndrome (SARS) in early 2003 and "avian flu" in early 2004, but increased again due to the good effective control of emerging disease outbreaks in Thailand and the recovery of the Japanese economy (1, 2).

Travelers' diarrhea (TD) is the most common infectious disease among tourists who travel from developed to developing countries. Although TD is a self-limiting illness, it destroys vacations, business trips, or honeymoons (3).

Several previous clinical-based studies have been focused on identifying etiologic/pathogens, i.e., bacteria, parasites, protozoa and viruses that cause diarrhea (4–6). Risk factors and seasonal variations in the etiology of diarrhea at various destinations have also been investigated (3, 5–9). Despite the large number of Japanese tourists traveling to Thailand each year, relatively little is known about their level of risk awareness, care in food and drink selection and consumption, or how well they prepare for their journeys in terms of their health needs. Information on these factors is essential to assist health providers and organizations who are responsible for health and tourism to develop and prioritize health services for Japanese tourists. So far, only one domestic study has been conducted to

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assess the incidence of TD among Japanese visiting Bangkok, Thailand (10). Therefore, in this survey, we aimed to measure the prevalence rate of, and determine the associations between general characteristics, behaviors and perceptions related to food and drink consumption and diarrheal illness of Japanese tourists, and assess their health care needs.

Materials and Methods

Study site and population

This study was carried out in five attractive provinces of Thailand, i.e., Chiangmai Province in the north, Ayutthaya Province in the center, Kanchanaburi Province in the west, Pattaya City in the east, and Krabi Province in the south of Thailand. Participants were recruited through a convenience sampling of Japanese tourists who visited the study areas between July 2003 and February 2004. Sample size was estimated using a single proportion formula with 95% confidence interval (CI). Sample size calculation was based on an expected TD prevalence of 36.3% among Japanese tourists (11). Precision was set at 2.45%, and the calculated sample size was 1480. An approximate convenience sample of 300 Japanese tourists per study province was recruited using the following criteria: age ≥ 15 years and have stayed in Thailand for at least 3 days; only one member was recruited if the tourists traveled as one family group. Expatriate residents of Thailand or those who could not communicate verbally in Japanese or English were excluded from the study. Participants completed a questionnaire (translated into the Japanese language) while traveling independently or in a tour operation. Questionnaires were distributed to Japanese tourists at guest houses/hotels/entertainment places and tour agencies while they went aboard their coaches. Research assistants coordinated with the staff of the guest houses, hotels and tourist guides in collecting completed questionnaires before the tourists left the study areas. Accordingly, the response rate was high, at 89.1%. Data were collected from the five study areas in July 2003, after the SARS problem had been resolved. However, the research team in the southern province only started collecting data in late October 2003, because tourism was disrupted by SARS outbreak. The highest number of tourists in Thailand is observed from October to February, peaking in December. Tourist arrivals begin to fall in March during the low-tourism season, pick up in July and August, and fall again in September (12). Therefore, it took 3–4 months to collect data for each study area. Summer or the hot and dry season in Thailand is from March to June. The study protocol was approved by Mahidol University Ethics Committee and the Tourism Authority of Thailand (TAT). Verbal consent was obtained from each Japanese tourist.

Operational definitions

Classical TD refers to the passing of ≥ 3 unformed stools every 24 hour, with at least one associated symptom (i.e., abdominal cramps or pain, nausea, vomiting, fever, or bloody stool). Moderate TD refers to the passing of 1–2 unformed stools with at least 1 additional symptom or more unformed stools without additional symptoms. Mild TD refers to the passing of 1–2 unformed stools without additional symptoms (13).

Research instrument

The study research instrument was a self-administered questionnaire consisting of five parts: Part 1 consisted of 12 items concerning travel characteristics, including previous visits to Thailand, journey type, information received, length of stay, health insurance, illness and treatment for the trip, and place suspected of contracting diarrhea. Part 2 consisted of behaviors and perceptions related to food and drink consumption while in Thailand, and included 13 rating-scale items. The positive items were scored as 0=never, 1=sometimes, 2=often, and 3=always. Total possible scores ranged from 0 to 39. The Cronbach's alpha was 0.742. Part 3 consisted of 14 rating-scale items for measuring the perceptions of the Japanese tourists, which included food and drink selection and consumption during their travel in Thailand. The positive items were scored as 1=disagree, 2=uncertain, or 3=agree. Total possible scores ranged from 14 to 42. The Cronbach's alpha was 0.817. A score $\leq 60\%$ of the total score was classified as "need for improvement level", 61–79% was "moderate level", and $\geq 80\%$ was a "good level" of food and drink consumption and perception of diarrhea. Part 4 consisted of 14 rating-scale items for assessing Japanese tourists' health care needs while traveling in Thailand. Each item was rated as low, moderate, or high. Part 5 consisted of seven items related to baseline characteristics, i.e., age, sex, occupation, reason for visiting Thailand, and accommodation.

Statistical analysis

Data entry and analysis were performed using the Statistical Program for the Social Sciences (SPSS) for Windows Version 11.5 (14). Descriptive statistics was used to describe the characteristics of all studied variables. Multiple logistic regression analysis was used to obtain odds ratios and 95% confidence intervals (CI), to determine the associations between participants' age, sex, duration of stay, journey type, information received, behaviors and perceptions related to food and drink consumption and TD development. The level of significance was set at $p < 0.05$.

Results

Baseline for Japanese tourists

Of the 1,480 Japanese tourists enrolled, 1,318 consented to participate in the study, giving a response rate of 89.1%. Of these, 40.0% were < 30 years. All participants' ages ranged from 15 to 70 years, with a mean \pm SD of 37.3 ± 14.1 years; 59.8% were male and 37.0% were employees. In total, 73.1% visited Thailand for vacation and 69.5% stayed in a hotel. Overall, 68.8% previously visited Thailand, 30.0% visited at least two times, whereas 88.9% visited other countries; 67.1% arranged their own trip, and 77.2% stayed in Thailand for less than 10 days; 77.7% had health insurance; 76.7% received information about Thailand from the following: Thai Embassy (92.5%), tour agency (63.1%), and the Internet (59.6%). Information given regarding Thailand was in terms of geography and climate (79.1%), types of drinking water (72.7%), food consumption (70.0%), and socio-cultural aspects (63.3%).

Diarrhea episode, its associated symptoms and treatment

During their stay in Thailand, 37.3% of the 1318 Japanese tourists reported having one or more of the following illnesses: stomach ache (17.8%), headache (16.1%), and itch (13.1%). Moreover, 21.3% contracted TD; of these, 5.0% had classical TD and 11.8% had mild TD (Table 1). The prevalence of TD among the five study areas was quite similar as follows: 18.9% (53/280) in Kanchanaburi Province, 20.7% (58/280) in Ayutthaya Province, 21.1% (48/228) in Krabi Province, 22.4% (65/290) in Chiangmai Province, and 23.8% (57/240) in Pattaya City. Among 281 Japanese with TD, 44.5% had one or several associated symptoms as follows: stomach ache (44.5%), nausea/vomiting (23.1%), fever (16.4%), and headache/dizziness (14.9%). Concerning self-treatment, 54.4% took medicine that they had brought from Japan, 27.4% rested without any treatment, 17.8% visited a clinic or a hospital, and only 13.9% took oral rehydration salts (ORS), as shown in Table 2. Approximately half of those with TD reported that their suspected causes of diarrhea were from the following: food (57.7%), drinking water/other drinks (51.8%), and vegetables/fruit (51.2%) bought from street vendors (Table 3).

Food and drink related behaviors

Overall, only 3.3% had good levels of food and drink related behaviors, whereas 65.3% had need for improvement level of these practices. The first three behaviors always shown by Japanese tourists were the following: buying a sealed bottle of drinking water (71.3%), washing hands after using the toilet (70.5%), and bringing a sealed bottle of drinking water wherever they went (38.8%). The first three behaviors

that they never show while traveling in Thailand were the following: eating food only from a Japanese restaurant (50.8%), having all meals at a restaurant (37.4%), and washing and peeling all fruits by themselves (35.7%). The details are shown in Table 4.

Perceptions related to diarrhea

Overall, 75.4% of the Japanese tourists had moderate level of perception related to diarrhea and 18.6% had need for improvement level. The first three poor perceptions that needed improvement were the following: 39.1% disagreed that drinking fresh fruit juice can cause diarrhea; 27.5% agreed that if they take their meals only in a clean-looking restaurant, they will not get diarrhea; and 24.9% disagreed that diarrhea can be prevented by washing hands properly (Table 5).

Health care need assessment

The top five health-related needs highly of the Japanese tourists were the following: providing adequate number of toilets at tourist destinations (56.9%); availability of a 24-hour emergency call facility for a public ambulance (53.9%); providing garbage bins and disposal facilities at tourist destinations (51.9%); presence of English-speaking health staff in hospitals or health facilities (46.3%); and English/Japanese brochure on local endemic diseases and their prevention (45.4%).

Factors associated with development of diarrhea

Univariate analysis revealed that five variables are statistically associated with the development of diarrhea

Table 1 Types of illness among 1,318 Japanese tourists during their stay in Thailand

Illness	Number	%
Having illness ^a	491	37.3
Fever	144	10.9
Headache	212	16.1
Flu-like symptoms	40	3.0
Stomach ache	234	17.8
Nausea/vomiting	114	8.6
Itch	173	13.1
Diarrhea	281	21.3
Classical TD	66	5.0
Moderate TD	59	4.5
Mild TD	156	11.8

^a multiple responses.

Table 2 Associated symptoms and treatment among 281 Japanese tourists with diarrhea

Item	Number	%
Associated symptoms ^a		
Stomach ache	125	44.5
Nausea/vomiting	65	23.1
Fever	46	16.4
Headache/dizziness	42	14.9
Weakness	37	13.2
Cramps	2	0.7
Treatment ^a		
Self-treatment	153	54.4
Rest without treatment	77	27.4
Visit clinic or hospital	50	17.8
Take ORS (Oral Rehydration Salts)	39	13.9
Other treatments	12	4.3

^a multiple responses.

Table 3 Suspected causes of diarrhea among 281 Japanese tourists

Suspected cause ^a	Total	Market		Street vendors		Hotel/restaurant	
		n	%	n	%	n	%
Food	168	27	16.1	97	57.7	44	26.2
Drinking water/drink	110	27	24.5	57	51.8	26	23.6
Vegetables/fruit	43	15	34.9	22	51.2	6	14.0
Other causes	23	18	78.3	1	4.3	4	17.4

^a multiple responses.

Table 4 Practices for good drinking and eating choices of 1,318 Japanese tourists (%)

Item	Always	Often	Sometimes	Never
Try some local food never tasted before	14.7	25.3	41.2	18.8
Choose to dine at restaurant or hotel with a “Standard Food Certificate”	13.2	22.8	26.6	37.4
Choose only drinking water certified by the “Food and Drug Administration Office”	32.5	21.2	17.9	28.4
Wash hands before meal	31.6	25.9	29.8	12.7
Wash hands after using toilet	70.5	17.2	8.0	4.3
Buy drinking water in sealed container	71.3	18.9	5.4	4.4
Bring drinking water in sealed bottle with you whenever you go out	38.8	25.5	23.6	12.1
Drink fresh juice from a hotel/clean restaurant only	24.1	22.1	30.0	23.8
Wash and peel all fruits yourself before eating	18.4	19.2	26.6	35.7
Eat fresh vegetables or salad from a hotel/clean restaurant only	26.0	22.6	27.7	23.7
Take hot and spicy food	13.0	32.9	40.4	13.8
Choose to eat only familiar food items	8.1	34.8	39.4	17.7
Choose to eat food from Japanese restaurant	3.2	12.7	33.3	50.8

Table 5 Perceptions of diarrhea among 1,318 Japanese tourists (%)

Item	Agree	Uncertain	Disagree
If you dine in a hotel only, you will not get diarrhea	30.3	45.9	23.8
If you dine only in a clean-looking restaurant, you will not get diarrhea	27.5	46.8	25.6
If you always drink water in sealed container, you will not get diarrhea	41.5	39.2	19.3
The use cold/hot towels to clean hands before eating is a sufficiently good practice to prevent diarrhea	14.9	51.7	33.3
Raw food, such as, fresh vegetables and fruits, can cause diarrhea	42.9	44.5	12.6
Drinking fresh fruit juice can cause diarrhea	8.6	52.3	39.1
Eating well-done local food will not cause diarrhea	14.7	59.5	25.8
Diarrhea can stop you from having fun while traveling	65.5	21.1	13.3
Diarrhea affects electrolyte imbalance and dehydration	22.8	60.7	16.5
Severe diarrhea can cause death	40.4	42.8	16.8
Diarrhea can be prevented by washing hands properly	21.3	53.8	24.9
A person who is healthy will not get diarrhea	11.5	43.9	44.6
Most food offered to tourists by a street vendor is hygienic	5.7	42.0	52.3
It is hard to find a place to wash hands before having meals	39.7	40.8	18.5

among Japanese tourists. The significant predictors were as follows: male tourists (OR=1.41, 95%CI 1.07–1.88), independent travel group (OR=3.35, 95%CI 2.33–4.82), having the experience of visiting other countries (OR=3.36, 95%CI 1.78–6.48), larger number of previous visits to Thailand (OR=2.18, 95%CI 1.30–3.65 for 1 time vs 0 time; p for trend <0.001), longer duration of stay in Thailand (OR=1.45, 95%CI 1.01–2.07 for 6–9 days vs 3–5 days; p for trend <0.001). Good food and drink related behaviors and the perception of diarrhea showed a near significant association with the development of diarrhea (Table 6).

To adjust for all the other variables affecting the occurrence of diarrhea among the Japanese tourists, eight variables (Table 6) were simultaneously analyzed by multiple logistic regression analysis. The results indicate that three following variables are statistically significantly associated with the development of TD among the Japanese tourists: larger number of previous visits to Thailand (adjusted OR=1.79, 95%CI 1.01–3.28 for 1 time vs 0 time; p for trend <0.001); longer stay in Thailand (adjusted OR=1.66, 95%CI 1.09–2.52 for 6–9 days vs 3–5 days; p for trend <0.001); and the experience of visiting other countries (adjusted OR=2.51, 95%CI 1.12–5.62), as shown in Table 7.

Discussion

In this study, the overall TD prevalence rate was 21.3%. TD was classified into three categories according to the classification of Steffen (13); 5.0% of the Japanese tourists had classical TD, 4.5% had moderate TD and 11.8% had mild TD. The overall TD prevalence rate was almost the same as the finding of 21.1% (69/327) by Mitsui et al. (10). However, it was considerably lower than that in the study of Howteerakul et al. (11) (21.3% vs 36.3%). One possible reason was that the TD prevalence rate in the study of Howteerakul et al. (11) might have been overestimated because the study was conducted during the peak diarrhea season in Thailand, namely, April and May. In addition, their study was conducted in a seaside area, where international tourists tended to consume seafood that may cause TD.

The effect of repeated experiences of visiting Thailand was also investigated and the results revealed that the more the Japanese tourists visit Thailand, the greater their risk of contracting TD. This may be explained by the observation that those who frequently visit Thailand have become familiar with Thai foods and drinks, and other things, such as culture and climate. This familiarity with Thai foods makes them feel

Table 6 Prevalence and crude odds ratios (ORs) of diarrheal illness by general characteristics, behaviors and perceptions related to food and drink

Variable	Total	Diarrheal illness		OR	95%CI
		n	%		
Age (year)					
<20	49	6	12.2	1.00	
20–24	257	64	24.9	2.38	0.92–6.53
25–29	253	59	23.3	2.18	0.84–6.01
30–39	291	57	19.6	1.75	0.67–4.81
40–49	179	53	29.6	3.01	1.14–8.40
50+	289	42	14.5	1.22	0.46–3.40
Sex					
Male	768	182	23.7	1.41	1.07–1.88
Female	550	99	18.0	1.00	
Journey type					
Independent	884	238	26.9	3.35	2.33–4.82
Group tour	434	41	9.9	1.00	
Experience of visiting other countries					
Yes	1171	269	23.0	3.36	1.78–6.48
No	147	12	8.2	1.00	
Number visits to Thailand^a					
0	445	36	8.1	1.00	
1	236	38	16.1	2.18	1.30–3.65
2	196	51	26.0	4.00	2.44–6.55
3–5	222	73	32.9	5.57	3.50–8.87
6–9	85	26	30.6	5.01	2.71–9.23
10+	134	57	42.5	8.41	5.05–14.04
Duration (days) of stay in Thailand^a					
3–5	578	76	13.1	1.00	
6–9	440	79	18.0	1.45	1.01–2.07
10–19	142	42	29.6	2.77	1.76–4.38
20–29	44	18	40.9	4.57	2.28–9.14
30+	114	66	57.9	9.08	5.70–14.51
Level of behaviors (food and drink consumption)^a					
Need for improvement	860	220	25.6	2.18	0.91–5.22
Moderate	414	55	13.3	0.97	0.39–2.40
Good	44	6	13.6	1.00	
Level of perceptions of diarrhea^b					
Need for improvement	245	68	27.8	2.65	1.29–5.44
Moderate	994	203	20.4	1.77	0.90–3.49
Good	79	10	12.7	1.00	

^a p for trend <0.001. ^b p for trend=0.006.

that trying local foods, or buying foods and drinks from street vendors is safe. This familiarity could reduce awareness of the potential consequences of these foods and drinks. The effects of the frequency of visiting the same country or the same place have never been investigated to date; most studies have shown the effects of the duration of stay rather than the effects of the frequency of visiting the same destination.

Longer stay also increased the risk of contracting TD. The Japanese tourists who stayed longer had a greater risk of contracting TD than those who stayed for shorter periods. This result confirmed the result of the study of Cobelens et al. (15) of a cohort of 743 Dutch short-term travelers (1–6 weeks) to various subtropical areas. The study of Cavalcanti et al. (8) in Brazil showed the same result, that is, a longer stay in the

Table 7 Crude and adjusted odds ratios (ORs) of diarrheal illness among 1,318 Japanese tourists by multiple logistic regression

Variable	Crude		Adjusted ^a	
	OR	95%CI	OR	95%CI
Number of visits to Thailand^b				
0	1.00			
1	2.18	1.30–3.65	1.79	1.01–3.28
2	4.00	2.44–6.55	3.50	1.93–6.34
3–5	5.57	3.50–8.87	4.17	2.34–7.45
6–9	5.01	2.71–9.23	3.91	1.92–7.95
10+	8.41	5.05–14.04	7.02	3.71–13.26
Duration (days) of stay in Thailand^b				
3–5	1.00			
6–9	1.45	1.01–2.07	1.66	1.09–2.52
10–19	2.77	1.76–4.38	2.22	1.31–3.76
20–29	4.57	2.28–9.14	4.34	2.01–9.36
30+	9.08	5.70–14.51	5.30	3.07–9.15
Experience of visiting other countries				
No	1.00			
Yes	3.36	1.78–6.48	2.51	1.12–5.62

^a Adjusted for all other variables in the model. ^b p for trend <0.001.

destination resulted in more TD among visitors of Fortaleza City. Longer stay could increase the risk of exposure to food and drink contaminated with TD enteropathogens.

The Japanese tourists who had several travel experiences abroad had greater risk of contracting TD than those who had never traveled abroad. This result is consistent with that of Cobelens et al. (15) but it differed from that of Kean (16), who observed that the repeated experiences of visiting tourists suffer less TD than neophytes. Also, Angst and Steffen (17) reported that the repeated experiences of visiting tourists might eat and drink more carefully. The Japanese tourists who had several experiences of traveling abroad were at a higher risk than those who only traveled to Thailand directly as their first experience of traveling abroad. Therefore, these experienced Japanese tourists were quite familiar with food and drink outside their native country and might have become careless. Dichotomous, or yes/no type questions for assessing travel experience without obtaining the duration of travel might be another reason explaining the differences.

Regarding the food and drink related behaviors of the Japanese tourists, only 13.2% always ate in a restaurant and 32.5% always drank water from a sealed bottle. Approximately 31.6% always washed their hands before meals. These behaviors might have resulted in less concern about contracting TD, as hand washing was specially written in many guidebooks distributed to the tourists. “Where to eat” or “food and drink” information was also included. For the overall behavior, the Japanese tourists had only 3.3% good behaviors for food and drink consumption. Univariate analysis showed no significant association between these tourists’ food and drink behaviors and the development of TD. Nevertheless, those who had need for improvement level behaviors were more likely to get TD, although the OR CI included 1. This result is similar to that of Mattila et al. (18), who reported that among 933 adult Finnish tourists visiting Morocco, 45.0% made five or more

dietary errors during the trip. They also found it difficult to comply with dietary recommendations. However, there was no significant association between the number of dietary errors and the incidence of TD. The findings of this study differed from those of the prospective study of tourists to Sri Lanka by Kozicki and Steffen (16), which showed a strong association between dietary errors and the incidence of diarrhea.

In relation to food and drink consumption perceptions related to diarrhea and diarrheal illness, in this study, 41.5% agreed that if they always drank water from a sealed container, they would not get diarrhea. The Japanese tourists might have doubted the quality of water in sealed containers. Only 42.9% of the respondents agreed that eating raw food, fresh vegetables and fruits is a potential cause of diarrhea. This may indicate lesser awareness of the risk of eating raw or fresh food, which might be contaminated by washing or handling. About 40.4% understood that severe diarrhea could cause death, although they might not have known the reaction mechanism of the human body once severe diarrhea occurs in that diarrhea results in electrolyte imbalance. Only 21.3% agreed that diarrhea can be prevented by washing hands properly. This result was consistent with the Japanese tourists' practice, as only 31.6% always washed their hands before meals. In addition, the study showed that 39.7% perceived that it is hard to find a place to wash hands before eating, which became a problem in preventing diarrhea. Univariate analysis revealed that the Japanese tourists with the need for improvement level of perception had 2.65-fold higher risk of contracting TD than those with good level of perception.

There was no report on the association between perception level and diarrheal illness. However, the "Health Belief Model" indicated that people will behave according to what they perceive (19, 20). Poor perception regarding diarrhea may lead to low compliance with dietary recommendations for travelers.

The proportions of good level of perception were extremely low in terms of food and drink consumption behaviors and different perceptions of diarrhea related to drinking and eating scales. Two possible reasons may explain this. Firstly, the content of both scales may be based on the Thai context. Secondly, most Japanese tourists never think that TD can be prevented by washing hands before meals, because TD is thought to be caused by eating contaminated food materials and/or unhygienic food preparation by the cook. The Japanese tourists were informed that some foods and drinks are contaminated and unhealthy in Thailand, particularly those from street vendors, which may be dangerous for their health (although actually this is not necessarily true). Therefore, the Japanese tourists may think that the most important way to prevent TD is to select a good dining place. In addition, the proportion of the Japanese tourists who dined in a restaurant was quite low, and consequently, the frequencies of good level of perception for the two scales were extremely low in this study.

TD is a self-limiting symptomatic disease and specific treatment is often unnecessary (21–23). Most adults who experience TD episodes can be rehydrated by taking ORS or drinking soup and sugar-flavored mineral water and eating salty crackers. In this study, the proportion of Japanese tourists who

took medicine brought from Japan was quite high (54.4%). Therefore, it must be clear for travelers when to take their own medicine and when to seek medical assistance.

The top five health care needs among the Japanese tourists were the following: adequate number of toilets at tourist destinations; availability of a 24-hour emergency call facility for a public ambulance; provision of garbage bins at tourist resorts; presence of English-speaking health staff in hospitals or health facilities; and English/Japanese brochure on local endemic diseases and their prevention. Several public health programs and activities have been implemented in tourist-attracting areas since 2000, particularly during the outbreaks of SARS in early 2003 and "avian flu" in 2004, mainly within the public sector boundary. The Thai Ministry of Public Health (MOPH) serves as the prime agency in ensuring the good health of international tourists and the Thai population (25, 26); some examples of these programs are "Clean Food Good Taste", "Clean Public Toilet" and providing a 24-hour emergency call facility for ambulance services with emergency medical equipment. In Thailand, people use only Thai which is the official language, and English is used mostly in academic institutions. However, it is now accepted in Thailand that English is necessary for communication with people from other countries. There is also a need for health staff to be trained in English. Information in the Japanese language is sometimes available in some tourist destinations, but it is mostly on historical places and not on health-related topics.

The questionnaire used in this study was written in Japanese and the research assistant was a Japanese, and this could have reduced miscommunication in completing the questionnaire. The limitations of this investigation included the following: 1) all TD cases were based on self-reports without any confirmation by fecal examination of the etiology of the TD whether bacterial or parasitic enteropathogens. Furthermore, the risks of TD varied by season, but the data were collected at only one time-point. Thus, there is room for the misclassification of some cases; 2) the cross-sectional study design means that the ability to make causal inferences from the results is limited; 3) the small sample size had larger variances than the reference population. Therefore, the high prevalence of TD observed in this study must be interpreted with caution, and it is unclear whether these findings could be generalized for all Japanese tourists visiting Thailand. These findings need to be confirmed through prospective studies with more representative settings and sample sizes.

In conclusion, TD still affects experienced Japanese tourists who visit Thailand. Although the proportions of the good levels of food and drink related behaviors were low, there were indications that Japanese tourists perceived the risk of contracting TD. Organizations responsible for health and tourism should work hand-in-hand to solve these problems. Continuous spot checks of the cleanliness of various foods and drinks from street vendors, restaurants and hotels should be conducted. Health advice for travelers before they travel still remains very important, although 96–98% of travelers do not usually follow the recommended advice (9, 16). Japanese tourists should be advised how to properly select healthy and uncontaminated food and drink, to avoid eating raw or under-

cooked seafood, and to drink water preferably from sealed drinking bottles. When diarrhea does occur, they should know how to use ORS or other fluid replacements properly, and when to seek medical treatment.

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