

Tour leaders with detailed knowledge of travel-related diseases play a key role in disease prevention

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Abstract

In Taiwan, group tours are a popular mode of international travel; hence, group tour leaders must ensure traveler safety and health. This study identified factors influencing tour leaders' willingness to recommend pretravel medical consultation and vaccination.

A cross-sectional questionnaire survey was administered to tour leaders from January 2011 to December 2012. Multivariate logistic regression analyses were performed to estimate the odds ratios of having a positive attitude and willingness based on different knowledge scores of the tour leaders after adjustments for age, sex, education level, and seniority.

Tour leaders with a more detailed knowledge of both travel-related infectious and noninfectious diseases demonstrated a higher willingness to receive vaccination. They believed that consultation at travel clinics before travel can improve travelers' health ($P < .05$).

This study supports the importance and effectiveness on educating tour leaders' knowledge about travel-related diseases to improve health care for travelers.

Keywords: infectious disease, pretravel immunizations, pretravel medical consultation, travel

1. Introduction

According to the most recent World Tourism Barometer of the United Nations World Tourism Organization, the number of international tourist arrivals reached 1235 million in 2016, indicating a 3.9% increase compared with 2015 and a considerable increase compared with 2001 (675 million).^[1] While traveling abroad, 20% to 64% of international travelers encounter some health problems.^[2,3] Moreover, some new or reemerging infectious diseases can spread through travel.^[4,5] For instance, imported malaria cases occur every year in the United States, typically from returning travelers and immigrants from endemic countries.^[6]

In Taiwan, group tours are a popular method of international travel. Group tour leaders are responsible for helping tourists understand the culture of the region of travel and ensuring their safety and health. Thus, the knowledge and attitude of the tour

leaders regarding travel-related diseases play a key role during travel.

Pretravel medical consultation in travel clinics can aid travelers in managing potential health concerns they might encounter during their trip. The consultation includes trip plan assessment, potential health hazard identification, and counseling for promoting travel risk awareness.^[7,8] Travel clinics also provide appropriate pretravel immunizations and prophylactic medications against diseases such as malaria and acute mountain illness. This consultation has gradually become an essential part of primary care. However, according to official statistics of the Centers for Disease Control and the Tourism Bureau, the Ministry of Transportation and Communication in Taiwan, numbers of outbound travelers during January 2014 to December 2015 are 25,027,611. Only 22,788 tourists visited travel clinic before traveling abroad.^[9] Herck et al^[10] found that <60% of travelers seek health advice before travel; of them, only 26% seek travel health advice from travel clinics. The habit of receiving pretravel medical consultation needs to be inculcated among travelers. This study surveyed the knowledge and attitude of tour leaders regarding travel-related diseases and identified the factors influencing their willingness to recommend pretravel medical consultation.

2. Materials and methods

This was a cross-sectional questionnaire survey study of tour leaders. The National Taiwan University Hospital conducted educational seminars on travel medicine from January 2011 to December 2012. The Tourism Bureau, the Ministry of Transportation and Communication, and the Centers for Disease Control or other public units sent official invitations to travel agencies and tour leaders to participate in the seminars. Although the travel leaders were not randomly selected, they were nationally representative. Tour leaders who attended these

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seminars were enrolled for this study. The questionnaire was self-administered and anonymous; completed questionnaires were collected before the seminars commenced. The questionnaire was modified from our previous studies published in the *Journal of Travel Medicine*.^[11,12] It included questions regarding demographic characteristics of the tour leaders, such as age, sex, education level, and seniority. Furthermore, a total of 16 common travel-related diseases were included in the questionnaire to analyze that whether a tour leader ever encountered each disease when leading a tour. The questionnaire also evaluated the knowledge of tour leaders through 32 questions on 8 health topics, namely meningococcal meningitis, malaria, yellow fever, rabies, hepatitis A, heat stroke, dengue fever, and the associated laws and regulations. Each question was scored 1 point for a correct response, with an aggregate score of 32 points; the questions tested the respondents' knowledge regarding the epidemiology, medication, and vaccine of the aforementioned travel-related diseases. Moreover, 10 agree–disagree questions were used to assess the respondents' attitude toward travel medications and their willingness to recommend pretravel medical consultation. The study was approved by the Research Ethics Committee of National Taiwan University Hospital.

Multivariate logistic regression analyses were performed to estimate the odds ratios (ORs) of having a positive attitude and willingness based on different knowledge scores of the tour leaders after adjustments for age, sex, education level, and seniority. $P < .05$ was considered statistically significant. Statistical analyses were performed using SPSS (version 16; SPSS Inc., Chicago, IL).

3. Results

A total of 339 questionnaires were collected and analyzed. Demographic data are shown in Table 1. In total, 46.6% of the respondents were men, whereas 53.4% were women. Their mean (\pm standard deviation [SD]) age and tour leading experience were 44.2 (\pm 13.60) and 3.0 (\pm 5.87) years, respectively. Most of them had a college degree or above (86.7%). Furthermore, their mean knowledge score was 22.87 \pm 6.60.

The results of the survey of tour leaders' attitude and practice are presented in Table 2. Most tour leaders showed positive attitudes toward pre-exposure vaccination (88.5%), and most would ask group travelers to receive vaccination (80.8%) before entering a region that is experiencing an infectious disease

Table 1
Demographics of respondents.

Items	Number	Percentage	Mean (SD)
Sex			
Male	158	46.6	
Female	181	53.4	
Age, y			44.2 (13.6)
Education level			
No formal education	0		
Primary school	2	0.6	
Junior high school	1	0.3	
Senior high school	42	12.4	
University	240	70.8	
Master	54	15.9	
Seniority			3.0 (5.9)
Knowledge scores			22.87 (6.60)

SD = standard deviation.

Table 2
Respondent's attitude and practice survey.

Items	Number	Percentage
Q1. If the tour location is an infectious disease-epidemic area, I would like to receive vaccination.		
Agree	300	88.5
Disagree	39	11.5
Q2. I agree that tourism practitioners should be responsible for travelers' health.		
Agree	260	76.7
Disagree	79	23.3
Q3. I think travel clinics can improve travelers' health.		
Agree	293	86.4
Disagree	46	13.6
Q4. There is no need to visit travel clinic before traveling abroad.		
Agree	33	9.7
Disagree	306	90.3
Q5. I think that current traveler training requires improvement.		
Agree	267	78.8
Disagree	72	21.2
Q6. I would ask tour group members to receive vaccination before entering an infectious disease-epidemic area.		
Agree	274	80.8
Disagree	65	19.2
Q7. I will recommend this training course to other tour leaders.		
Agree	296	87.3
Disagree	43	12.7

epidemic. The majority of tour leaders agreed that they should take responsibility for travelers' health (76.7%), and most believed that travel clinics can improve travelers' health (86.4%). However, 9.7% of tour leaders still regarded visiting a travel clinic before traveling abroad to be unnecessary. In addition, 21.2% of the respondents did not believe that the current traveler training requires improvement.

Experiences with disease while leading a group tour are presented in Table 3. Motion sickness, animal or insect bites, food poisoning or gastrointestinal problems, sunburn, and trauma are the 5 travel-related diseases that most tour leaders encountered, and among the respondents, 64.9%, 58.8%, 58.4%, 55.5%, and 54.6% encountered these 5 problems, respectively. Stroke, psychological problems, pregnancy consultations, heart disease,

Table 3
Diseases encountered when leading a group tour.

	No (%)	Yes (%)
Trauma	45.4	54.6
Slight burns and scalds	68.3	31.7
Food poison and gastrointestinal problem	41.6	58.4
Fever	50.2	49.8
Heart disease	67.1	32.9
Stroke	80.8	19.2
Drug consultation	48.2	51.8
Pregnancy consultation	68.	32
Jet lag	48.8	51.2
Motion sickness	35.1	64.9
Chronic disease	53	47
Skin disease	54	46
Altitude sickness	54.4	45.6
Animal or insect bite	41.2	58.8
Sunburn	44.5	55.5
Psychological problem	74.7	25.3

Data were expressed as percentages.

Table 4
Significant predictive knowledge questionnaire items related to the attitude toward travel-related disease.

	OR	95% CI	P*
Q1 [†]	1.10	1.05–1.15	<.001
Q2 [†]	1.04	1.01–1.08	.043
Q3 [†]	1.09	1.04–1.14	<.001
Q4 [†]	0.99	0.94–1.05	.74
Q5 [†]	1.09	1.05–1.14	<.001
Q6 [†]	1.06	1.02–1.10	.006
Q7 [†]	1.04	1.00–1.07	.043
Q8 [†]	1.07	1.02–1.12	.004

Q: Question; Q1: If the tour location is an infectious disease-epidemic area, I would like to receive vaccination; Q2: I agree that tourism practitioners should be responsible for travelers' health; Q3: I think travel clinics can improve travelers' health; Q4: There is no need to visit travel clinic before traveling abroad; Q5: I think that current traveler training requires improvement; Q6: I would ask tour group members to receive vaccination before entering an infectious disease-epidemic area; Q7: I will recommend this training course to other tour leaders. CI=confidence interval, OR=odds ratio.

* P value was calculated using the multivariate logistic regression.

[†] Items with a P value <0.05.

and chronic disease were encountered by 19.2%, 25.3%, 32.0%, 32.9%, and 47% of tour leaders, respectively.

No age or sex difference was noted in the attitude of the respondents regarding travel-related diseases. The average knowledge scores in the agree and disagree groups were 23.32 to 23.79 and 18.44 to 21.37, respectively ($P < .05$), indicating that more detailed knowledge is strongly correlated with a more positive attitude.

After adjustments for age, sex, education level and seniority, the multiple logistic regression analysis results revealed that tour leaders having higher knowledge scores for both travel-related infectious and noninfectious diseases demonstrated increased willingness to receive vaccination (OR=1.10, 95% confidence interval [CI]=1.05–1.15) and to ask their group members to receive vaccination before a trip (OR=1.06, 95% CI=1.02–1.10). Moreover, these respondents demonstrated higher potential to take responsibility for travelers' health (OR=1.04, 95% CI=1.01–1.08), as well as believed that the currently used traveler training requires improvement (OR=1.09, 95% CI=1.05–1.14) and that consultation at the outpatient department of travel clinics before a trip can improve travelers' health (OR=1.09, 95% CI=1.04–1.14) (Table 4).

4. Discussion

Group tours are a popular method for international travel among Taiwanese people, and they have become increasingly prominent in specific international market segments.^[13,14] The quality and experience of tour guides and the safety of the tour are important factors influencing the choice of package tour.^[15] Several previous studies have demonstrated that the tour leader is a crucial factor affecting tourism during a package tour. Their performance directly determines tourists' satisfaction with the guiding service^[14,16]. Wong and Lau^[17] revealed that before joining a group tour, Hong Kong tourists seldom research their destination, indicating their reliance on tour leaders. Tourists' attachment to a tour leader may affect their travel decision-making. Yen et al^[18] believed that attachment to a tour leader has a positive influence on tourists' behavior. Therefore, a tour guide's knowledge and attitude about the destination and travel-related diseases will directly or indirectly influence the tour safety. However, to the best of our knowledge, few studies have focused

on tour leaders' knowledge of and attitude toward travel-related diseases.^[19]

In the general population, awareness of the risks of travel-related diseases is insufficient. Approximately 40% of European travelers could not correctly assess the risk of infectious diseases.^[20] However, risk perception is a crucial factor for self-protection.^[21] Pretravel medical consultations are crucial for travelers to increase their awareness of travel health risks. Tafuri et al^[22] demonstrated that pretravel medical consultations are associated with disease prevention during trips. In a 5-year analysis of European surveillance data, malaria was diagnosed in patients receiving pretravel consultations significantly less often than in those not receiving pretravel consultation. Such consultations are also associated with reduced proportionate morbidity for acute hepatitis, HIV, and animal bites requiring postexposure rabies prophylaxis.^[5] Moreover, pretravel medical consultations can increase vaccination compliance (>80%) and improve health behavior, particularly by changing behaviors related to foodborne diseases and insect repellent use.^[23,24]

Sources of pretravel health advice include the internet, television, newspapers, tour leaders, travel agents, and pharmacists. Some studies have revealed that the internet is the most common source of pretravel health advice.^[25,26] The study performed by Al-Abri et al among travelers at Muscat International Airport showed that only 22.5% had obtained pretravel health advice; their primary source was the internet (39.1%). However, pretravel health advice was not a significant predictor of knowledge scores or attitude toward travel medicine.^[25] This result may indicate that some sources of pretravel health advice may provide inadequate or inappropriate information regarding travel-related diseases and vaccinations. Access to reliable and systematically organized travel health-related information is vital.

We reported that college students in Taiwan planning to study in the United States demonstrated a positive attitude toward receiving meningococcal vaccination^[11]; however, their knowledge of meningococcal disease was poor. We also revealed that tour leaders' knowledge of rabies was relatively poor, implying insufficient public education regarding rabies.^[27] A systematic review identified a general lack of knowledge among travelers regarding the most frequent travel-associated infections and related preventive measures.^[19] Between 20% and 80% of travelers do not attend a travel health consultation before departure.^[28] Among travelers at Boston Logan International Airport traveling to low- or low-middle income countries, LaRocque et al^[26] reported that less than one-third had visited a travel medicine specialist. Asian travelers showed a lower willingness to receive pretravel health advice or vaccination than did Western travelers.^[29] Chen et al^[30] noted that >60% of tourist who returned to Taiwan with malaria during 2002 to 2013 had not received pretravel medical consultation. Therefore, educating travelers about travel-related diseases and increasing their willingness to visit the outpatient departments of travel clinics before traveling is paramount.

A previous study showed that depending on the destination, 22% to 64% of travelers suffered from some illness during their trip.^[28] The current study revealed that 54.6% to 64.9% of tour leaders have encountered problems such as motion sickness, animal or insect bites, food poisoning or gastrointestinal problems, sunburn, and trauma among their group members during a tour (Table 3). Although some of these illnesses are mild and noninfectious, some tour leaders encountered problems arising from particular populations. Stroke, psychological

problems, pregnancy consultations, heart disease, and chronic diseases such as diabetes mellitus were encountered by 19.2%, 25.3%, 32%, 32.9%, and 47% of tour leaders, respectively. Our study revealed that a high value should be placed on enhancing tour leaders' knowledge about travel-related health problems because they will experience various types of illnesses when leading a tour. Furthermore, previous studies have shown that specialist medical advice is beneficial for travelers who are immunocompromised,^[31,32] those with underlying chronic disease,^[33,34] women who are pregnant,^[35] and young children.^[36] Therefore, tour leaders should emphasize the importance of pretravel consultations to their tour members.

Our study revealed that tour leaders with more detailed knowledge regarding both travel-related infectious and noninfectious diseases demonstrated a higher potential to take responsibility for travelers' health (OR=1.04, 95% CI=1.01–1.08); such tour leaders also believed that pretravel consultations at the outpatient departments of travel clinics can improve travelers' health (OR=1.09, 95% CI=1.04–1.14). Therefore, tour leaders with detailed knowledge of and better attitudes toward travel-related diseases can effectively connect travelers and the outpatient departments of travel clinics. The leaders can deliver correct travel information to travelers and encourage them to seek professional pretravel advice from travel clinics.

The appropriate vaccination of international travelers is vital. Many outbreaks of vaccine-preventable diseases are associated with travel. The most common risk factor for hepatitis A is international travel.^[37] Moreover, 90% of the cases of typhoid fever in the United States between 2007 and 2011 occurred in travelers returning from overseas.^[38] Travelers may demonstrate a low willingness to undergo immunization if they lack knowledge of the concerned disease, do not seek travel advice, or are not recommended to receive the vaccination during consultation.^[39–41] Our study demonstrated that more detailed knowledge of travel-related diseases among tour leaders is a predictive factor of receiving pretravel immunization. Such leaders showed a higher willingness to receive vaccination (OR=1.10, 95% CI=1.05–1.15) and to ask their group members to receive vaccinations before a trip (OR=1.06, 95% CI=1.02–1.10).

This study has some limitations. First, the tour leaders who attended the education seminar may have had substantially more interest in travel health, implying a selection bias. This suggests that the willingness to recommend or visit pretravel medical consultation may be even lower in the general population, thus warranting more concern. Second, because a cross-sectional design was implemented in this study, we did not establish a causal relationship among knowledge, attitude, and willingness. However, this study can be a reference for tour leaders' education seminars in the future.

5. Conclusions

Tour leader is a crucial factor in affecting tourism during the whole package tour. Our investigation revealed that tour leaders having higher knowledge scores regarding travel-related diseases demonstrated a higher willingness to ask their group members to receive vaccination before a trip. They had a higher potential to take responsibility for travelers' health and believed that consultation at the outpatient department of travel clinics before a trip can improve travelers' health. Therefore, tour leaders may play a critical role in improving travelers' health during a trip and reiterating the importance of travel clinics. Both the Taiwan government and medical community should increase emphasis

on tour leaders' knowledge regarding travel health to promote health care for travelers. Furthermore, this type of survey can be administered in other countries since group tours become more and more popular internationally. The results of this study can provide new insights for disease prevention.

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