

Characteristics of Traveler's Diarrhea in Foreign Traveler's Visiting Beaches in Badung Regency, Bali

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ABSTRACT

Traveler's Diarrhea (TD) is a common infectious disease impacting travelers from developed countries who visit developing countries, such as Indonesia. Reporting of Traveler's Diarrhea (TD) cases in Indonesia is still low, especially in Bali. This study aimed to describe the characteristics of Traveler's Diarrhea (TD) in foreign travelers visiting beaches in Badung Regency, Bali. This study used cross sectional descriptive method in collecting data. The population was all foreign travelers visiting eight beaches in Badung Regency, Bali. In this study 61 respondents were selected using a purposive sampling technique. Data collection involved a questionnaire and analyzed using univariate statistics. The majority of respondents were European females (70,5%), aged 26-35 (41%), from Germany (11,5%), visiting Bali for tourism (80,3%), their first time in Southeast Asia (47,5%) and Bali (45,9%). Predominant diarrhea characteristics included 3-4 bowel movements per day (75,4%), loose stool consistency (59%) accompanied by abdominal cramps (41%), lasting 1-7 days (96,7%), a single episode (73,8%). Most managed Traveler's Diarrhea (TD) with medication (63,2%) and continued their travels (80,3%), consumed vegetable salad (50,8%), consumed overnight food (91,8%), consumed raw meat (80,3%) and drank tap water (95,1%). This study suggest that Traveler's Diarrhea (TD) is prevalent among foreign travelers visiting beaches in Badung Regency, Bali with key factors being the absence of pre-travel

consultations, consumption of drinks with ice and vegetables salad.

Keywords: Traveler's Diarrhea, TD, Foreign Traveler, Characteristic

INTRODUCTION

Traveler's Diarrhea (TD) is the most common infection acute gastrointestinal diseases by travelers from high income countries, like America and Europe visiting middle-low-income countries, especially with the characteristics of tropical and subtropical climates. A study explained that 10-60% of travelers had a high risk of experiencing traveler's diarrhea when they visited Africa, Latin America and The Indian subcontinent; 8-15% had an intermediate risk when they visited Russia, The Middle East, China, and Southeast Asia; and lower than 4% had a low risk when they travelled between two areas with low Traveler's Diarrhea (TD) incidence, such as the United States, Canada, New Zealand, Europe, Japan, and Australia.^[1-4] In 2012, it was estimated that more than 84 million travelers worldwide visited various countries in Southeast Asia. This high number is thought to have increased the incidence of traveler's diarrhea especially in Southeast Asia. A study conducted in Bangkok, Thailand in 2010-2011 found that Indonesia had the second highest prevalence of traveler's diarrhea after Vietnam.^[5] This was supported by the existence of Bali

Island as one of the destinations for foreign travelers visiting Indonesia.

Based on data from Bali Provincial Statistics Agency for Air and Water Transportation in 2017 it was reported that there were 5,317,800 foreign passengers arrived in Bali by air. This number increased from the previous year, which was 4,928,907 passengers.^[6] A major referral hospital in Denpasar also reported that in 2016, there were 1,571 cases of traveler's diarrhea out of 3,698 cases diarrhea at the time.^[7] In July 2022, it was also recorded that 250,415 foreign travelers had arrived in Bali from a total of 1,390 flights that had resumed operations.^[8] Given these conditions, the incidence of traveler's diarrhea cases is likely to increase.^[9] Studies on traveler's diarrhea have been conducted in many countries. However, research on traveler's diarrhea in Indonesia still limited. One of the studies is about the characteristics that are closely related to the ease of traveler to experience diarrhea. Some studies abroad have mentioned that environmental factors, such as sanitation and hygiene of the destination area visited, and host factors (traveler), such as gender, age, and length of stay, play important role in the susceptibility of a traveler to experience diarrhea. This study aims to describe the characteristics of traveler's diarrhea that occurred in foreign travelers visiting the beach in Badung Regency, Bali, so that preventive measures can be optimized based on these characteristics through preparations for travelers before, during, and after visiting Bali ^[10].

MATERIALS & METHODS

Study Design

This research is a descriptive observational study that uses a cross-sectional method. The study was conducted from October 15th to November 15th 2023 by foreign travelers visiting Batu Bolong Beach, Bingin Beach, Double-Six Beach, Dreamland Beach, Melasti Beach, Mengiat Beach, Nyang-Nyang Beach, and Suluban Beach in

Badung Regency, Bali who agreed to participate as research subjects.

Samples

The sample was taken using a purposive sampling technique, which is all respondents during the research period who met the inclusion criteria. The inclusion criteria included all foreign travelers visiting beaches in Badung Regency, Bali, who had been confirmed through their passports during the research period, experienced diarrhea, were able to speak English, and filled out the questionnaire completely. The sample size in this study was 61 people.

Data Collection

Data collection was conducted through the completion of a questionnaire consisting of three sections: demographic characteristics, diarrhea characteristics, and traveler perception and behavior characteristics related to traveler's diarrhea. A short interview between the researcher and the respondent was also conducted to obtain more detailed information or if there were any questions that were skipped or not understood by the respondent. The questionnaire used in this study was a questionnaire from a traveler's diarrhea study conducted in Thailand in 2015 by Kittittrakul et al.^[5]

STATISTICAL ANALYSIS

The data that had been collected were than processed and analyzed univariately to find the mean and standard deviation using the IBM SPSS Statistic Version 27 application and presented in the form of tables and graphs accompanied by descriptive narration.

RESULT AND DISCUSSION

Several tourist destinations in Badung Regency, North Bali, namely Batu Bolong Beach, Bingin Beach, Double-Six Beach, Dreamland Beach, Mengiat Beach, Melasti Beach, Nyang-Nyang Beach, and Suluban Beach, were chosen by the author as research locations because of the high

number of travelers who are concentrated in this area and have obtained permission from the village and beach management. The large number of foreign travelers who come to the tourist area in Badung Regency, Bali, is due to several reasons, namely : (1) The development of very attractive tourist attractions, such as the kecak dance performance that is often held in the area of Batu Bolong Beach; (2) Many interesting spots to enjoy the sunset; (3) Many spots for surfing and snorkeling for travelers in the area of Nyang-Nyang Beach, Bingin Beach, Suluban Beach, and Dreamland Beach; (4) The availability of adequate facilities and accommodation, such as many resorts,

villas, five-star hotels, and cafes with food from various countries that can be found on all of these beaches; (5) Very close to I Gusti Ngurah Rai Airport, making it easily accessible for travelers.^[11,12]

Characteristic of Respondents

The distribution of the demographic characteristics of respondent in this study is divided into aged, gender, region of origin, the main purpose of travel to Bali, experience of coming to Bali, number of countries visited in Southeast Asia, and how long they have been staying in Bali. The distribution of demographic characteristic can be seen in Table 1.

Table 1 Th Distribution of The Demographic Characteristic of Travelers

Variable	Proportion (%)
Age	
17-25	24 (39.3%)
26-35	25 (41.0%)
36-45	8 (13.1%)
46-55	2 (3.3%)
56-65	2 (3.3%)
Sex	
Male	18 (29.5%)
Female	43 (70.5%)
Region of Origin	
North America	5 (8.2%)
Europe	51 (83.6%)
Asia	3 (4.9%)
Africa	1 (1.6%)
Oceania	1 (1.6%)
Number of Countries Visited in Southeast Asia	
1 Negara	29 (47.5%)
2 Negara	10 (16.4%)
3 Negara	4 (6.6%)
> 3 Negara	8 (29.5%)
First Time Traveler to Bali	
Yes	36 (59.0%)
No	25 (41.0%)
Duration of Stay in Bali (days)	
1-7	7 (11.5%)
8-14	14 (23.0%)
15-21	10 (16.4%)
22-28	2 (3.3%)
> 28	28 (45.9%)
The Main Purpose of Travel to Bali	
Tourism	50 (82%)
Business	3 (4.9%)
Visiting Friends and Relatives	3 (4.9%)
Education/Research	3 (4.9%)
Others	2 (3.3%)

Age is a significant factor in the occurrence of traveler's diarrhea in travelers, with the highest incidence occurring in young adults. In this study showed that there were five age groups found in the respondents, namely the respondents were dominated by the age

group of 26-35 years (young adults) as many as 25 people (41%). This finding is in line with the study conducted by Masyeni et al., and the study conducted by López-Vélez et al., that traveler's diarrhea is often experienced by foreign travelers of young

adult and children age with one of the causes is that they are not alert in avoiding unhygienic food and drinks and they like to try new things or have a high sense of adventure.^[9,13]

The majority of respondents in this study were female as many as 43 people (70.5%) and the rest were male as many as 18 people (29.5%). This finding is in line with the study conducted by Widiarsani that most foreign travelers who experienced diarrhea during their stay in Bali were women with one of the causes being their habit of trying traditional Balinese food and attending various cooking classes in Bali.^[14] However, different research results were reported by Yamakawa et al., that the risk of men experiencing traveler's diarrhea is higher than that of women, one of the reasons being that men are more likely to engage in actions that are risky for the occurrence of traveler's diarrhea, such as consuming food or drinks that are not hygienic.^[15]

This study showed that most of the respondents who experienced traveler's diarrhea came from Europe, as many as 51 people (83.6%), followed by North America as many as 5 people (8.2%), Asia as many as 3 people (4.9%), Africa as many as 1 person (1.6%), and Australia and Oceania as many as 1 person (1.6%). This finding is in line with the results of the study conducted by Masyeni et al., that foreign travelers who experienced traveler's diarrhea were mostly from Europe.^[9] In addition, the study conducted by Bodhidatta et al. and the study conducted by Sharma et al. also mentioned that travelers from countries in North America ranked second as travelers with a high risk of experiencing diarrhea during traveling to Southeast Asia.^[16,17] Specifically, the majority of travelers in this study were from Germany (11.5%), followed by France (8.2%), the United Kingdom (8.2%), the United States of America (6.6%), and the Netherlands (6.6%). Meanwhile, other travelers came from Poland (4.9%), Portugal (4.9%), Russia (4.9%), Spain (4.9%), Sweden

(4.9%), Hungary (4.9%), Austria (3.3%), Denmark (3.3%), Mexico (1.6%), New Zealand (1.6%), Norway (1.6%), Slovakia (1.6%), South Africa (1.6%), South Korea (1.6%), Switzerland (1.6%), Syria (1.6%), Turkey (1.6%), Canada (1.6%), Estonia (1.6%), Finland (1.6%), Iran (1.6%), and Ireland (1.6%).

This study is also showed that the purpose of the travelers coming to Bali was mostly tourism, as many as 49 people (80.3%) and the rest were for work or business interests, visiting friends or family, education or research, and others. This finding is also in line with the research by Wahyuni et al., that most travelers who come to Bali are for tourism, while others come to meet family members or friends.^[7] The same thing was also conveyed in previous research that Bali is one of the most visited tourist destinations (tourism) in Asia by foreign travelers from Europe and America, because of several reasons such as the strong and preserved Balinese tradition and culture, the natural beauty that is very suitable for hobbies such as hiking, snorkeling, diving, as well as the well-maintained security and the many adequate accommodation and transportation facilities at relatively affordable prices make them comfortable traveling in Bali.^[18,19]

From the many foreign travelers who come to Bali, this study found that 59% were first-time visitors to Bali, and the other 41% had visited Bali before. This suggests that there are a significant number of travelers who have never been to Bali. This is different from the findings of Sutama, who reported that most foreign travelers to Bali have visited Bali 6-9 times.^[20] The association between diarrhea and traveler's previous travel experience abroad needs to be evaluated, because this study found that 59% of travelers with diarrhea were first-time visitors to Bali. A different result was reported by another study that found that travelers who visited countries with a moderate risk of traveler's diarrhea and had previous travel experience abroad were at a higher risk of experiencing traveler's diarrhea than travelers who had no previous

travel experience abroad. This is closely related to the development of the body's immunity to pathogens in the country that the traveler previously visited.^[15] However, both travelers who visited Bali for the first time and travelers who visited more than once are at risk of experiencing diarrhea. This can be caused by external factors such as seasonal changes, the destination having poor sanitation, or internal factors from the individual, such as not seeking information about health problems in the destination. In addition, the traveler's travel history to other countries in Southeast Asia also needs to be known to assess the risk of the traveler experiencing diarrhea during travel. This study found that most travelers were visiting Southeast Asia for the first time, namely Bali, Indonesia, with a percentage of 47.5% (29 people). Then, 29.5% (18 people) had visited more than three countries in Southeast Asia, and the rest had visited two to three countries, one of which was Indonesia. This result is in line with the research by Leung et al., that travelers from developed countries with a history of previous travel to developing countries, then returning to travel to other developing countries, the risk of experiencing traveler's diarrhea will be lower. This is partly due to

the body's immune system that has been formed due to exposure to pathogens that cause diarrhea in the previous country.^[21] This study also found that the majority of foreign travelers who visited Bali and experienced diarrhea were long-term travelers, meaning that they had been in Bali for more than 1 month (>28 days) with a percentage of 45.9% (28 people). This is in line with previous research by Porter et al., that travelers with a long travel duration are at a higher risk of experiencing diarrhea, partly due to individual factors, such as taking medication that is not appropriate for the cause of diarrhea, making it easier to experience recurrent diarrhea.^[22]

Characteristics of Diarrhea Experienced by Respondents

The distribution of the diarrhea characteristics of respondent in this study is divided into frequency of defecate in one day, duration of diarrhea, number of diarrhea episodes, the characteristics of diarrhea based on Bristol-Scale, accompanying symptoms during diarrhea, action to stop diarrhea and the impact of diarrhea. The distribution of diarrhea characteristic can be seen in Table 2 and Table 3.

Table 2 Distribution of Frequency of Defecate, Duration and Episodes of Diarrhea, Bristol Scale, Action to Stop Diarrhea, and Impact of Diarrhea

Variable	Proportion (N)	Percentage (%)
Frequency of Defecate in One-Day during Diarrhea (times/day)		
3-4	46	75,4%
5-6	7	11,5%
7-8	3	4,9%
9-10	2	3,3%
>10	3	4,9%
Diarrhea Complaint Lasted in Days		
1-7	59	96,7%
8-14	1	1,6%
15-21	1	1,6%
22-28	0	0%
>28	0	0%
Diarrheal Episodes (episode)		
1	45	73,8%
2	13	21,3%
3	3	4,9%
>3	0	0%
The Characteristics of The Diarrhea-Bristol Scale)		
Separate hard lumps, like nuts (hard to pass)	0	0%
Sausage-shaped but lumpy	1	1,6%
Like a sausage but with cracks on its surface	0	0%
Like a sausage or snake, smooth and soft	3	4,9%
Soft blobs with clear-cut edges (passed easily)	7	11,5%
Fluffy pieces with ragged edges, a mushy stool	14	23,0%

Watery, no solid pieces. Entirely liquid	36	59,0%
Action to Stop Diarrhea		
Taking personal medication that they brought before travelling	38	62,3%
Going to the doctor	6	9,8%
Hospitalization in a hospital	1	1,6%
Do not take any medication	16	26,2%
Impacts of Diarrhea		
Had to delay (post-pone) travel	2	3,3%
Had to cancel the travel plans	9	14,8%
Continue travel	50	82,0%

Diarrhea is a gastrointestinal infection symptom characterized by the excretion of watery or liquid feces that occurs 3 or more times per day or more with or without accompanying prodromal symptoms such as abdominal pain, nausea, vomiting, chills, or fever. In general, diarrhea is divided into three types based on the duration of occurrence, namely acute diarrhea (occurs <14 days), persistent diarrhea (occurs 14 days-1 month), and chronic diarrhea (occurs >1 month). Acute diarrhea is also divided into two types based on the consistency of feces and the presence or absence of blood in the feces, namely acute watery diarrhea and acute bloody diarrhea.^[23] Most cases of traveler's diarrhea are acute diarrhea that can resolve on its own within 4-5 days. However, in some cases, diarrhea can last up to 14 days (persistent diarrhea) or more than 1 month (chronic diarrhea). This type of diarrhea is at high risk of experiencing complications such as Irritable Bowel Syndrome (IBS), sepsis, malabsorption.^[24,25] As shown in Table 1, 46 travelers (75.4%) had a frequency of 3-4 bowel movements per day. This condition is classified as acute diarrhea. These results are similar to a study by Yamakawa et al. that most travelers who went to countries with a medium risk or went to countries with a high risk of traveler's diarrhea, both experienced diarrhea with a duration of 3-4 bowel movements per day.^[15] The frequency of bowel movements was also followed by the number of episodes of diarrhea. The result

of this study, it was found that 73.8% of travelers experienced 1 episode of mild diarrhea and most of it occurred in the first week after arriving in Bali. However, based on a study by Steffen, the risk of travelers experiencing traveler's diarrhea still exists for several weeks or even several years after recovering from traveler's diarrhea.^[26] Furthermore, this study also found that 96.7% of travelers experienced diarrhea with a duration of 1-7 days. These results are similar to a study by Fernandez et al. that 40.5% of 111 travelers experienced diarrhea with a duration of 2-4 days. This indicates that most cases of traveler's diarrhea that occur in foreign travelers are mild acute diarrhea, because it lasts ≤ 2 weeks with mild symptoms.^[27] Based on Table 1, it was found that 75.4% of the accompanying symptoms felt by travelers during diarrhea were abdominal cramps, only 14.75% of travelers experienced diarrhea without any other accompanying symptoms. These results differ from a study conducted by Fernandez et al. that 91.9% of travelers experienced watery feces (liquid) without any accompanying symptoms and only 5.4% of travelers experienced diarrhea accompanied by fever.^[27] A study conducted by Yezli et al. also reported similar results to Fernandez et al. that 51.9% of 133 travelers with diarrhea, the majority only experienced watery feces without any other prodromal symptoms.^[28]

Table 3 Distribution of The Symptoms that Accompanied Diarrhea

Variable	Proportion (N=61)		Percentage (%)
	Yes	No	
Abdominal cramps	46	15	75,4%
Fever	11	50	18%
Nausea	12	49	19,7%
Vomitting	10	51	16,4%

Shivering	6	55	9,8%
No accompanying symptoms	9	52	14,8%

The variation in symptoms that appear in travelers during diarrhea is closely related to the pathogenesis and etiology of the diarrhea. Most cases of traveler's diarrhea are acute noninflammatory diarrhea, where in terms of pathophysiology, this type of diarrhea occurs due to the release of enterotoxins by bacteria or viral infections that then irritate the intestinal epithelial cells, so the intestines will secrete excessive fluid. This will cause symptoms of watery feces that can be accompanied by nausea, vomiting, or abdominal pain. Meanwhile, in some cases it is classified as acute inflammatory diarrhea, which occurs due to disruption of the protective layer and damage to tissues in the intestines due to the invasive process carried out by infectious pathogens, so symptoms such as fever, tenesmus, abdominal pain, and bloody diarrhea appear.^[4,29]

There are various efforts that a traveler can take to overcome diarrhea that they experience during travel. Based on the Table 2, most of 62.3% of travelers overcame diarrhea by taking medicine that they brought before traveling. Based on the results of interviews conducted by the researcher with travelers, most of them brought prophylactic drugs. Only a small number traveler brought antibiotics and anti-helminth antibiotics and anti-helminths such as metronidazole or albendazole. This result is aligns to a study conducted by Stoney et.al of 164 travelers who experienced diarrhea during travel and had previously received anti-diarrhea drugs at the time of pre-travel consultation, 75 people (46%) consumed at least one drug that had been prescribed during traveling.^[30] Based on guidelines issued by CDC and ACG for the prevention of diarrhea in travelers, antibiotic prophylaxis such as rifaximin or rifamycin SV can be given.

Then for therapy, in mild type diarrhea can be given loperamide, in moderate type diarrhea can be given Azithromycin 500 mg (1x1) for 3 days or if allergic to azithromycin or floroquinolone group, can be given rifaximine 200 mg (3x1) for 3 days and in severe type diarrhea can be given antibiotics in the form of azithromycin 500 mg (1x1) for 3 days or ciprofloxacin 500 mg (2x1) for 3 days or rifaximin 200 mg (3x1) for 3 days with added loperamide as adjuvant therapy.^[31,32]

Based on the Table 2, in this study was also reported that 82% of travelers could continue traveling, despite experiencing diarrhea. The remaining 14.8% of travelers decided to cancel the plans that had been made and another 3.3% travelers postponed their travel plans. Different results were reported by Chen et al. that of 309 travelers who were sick during traveling, 18% decided to cancel the plan to be carried out, 7% chose to postpone the plan that had been prepared, and the rest decided to go to the doctor or seek input from non-medical people. These differences in results may be due to the severity of the illness experienced by the traveler.^[33]

Traveler Perception and Behaviors Related to Traveler's Diarrhea

The perceptions and behaviors of travelers that can increase the risk of traveler's diarrhea in this study were assessed by asking about their history of pre-travel consultation before traveling, preparation of bringing diarrhea medication before traveling, hand washing habits before eating, habits of consuming drinks with ice cubes, habits of consuming vegetable salads, street food, leftover food, uncooked meat, and tap water. The results of this study as presented in Table 4

Table 4 Distribution of Traveler's Perception and Behaviors Related to Traveler's Diarrhea

Variable	Proportion (%)	
	Yes (%)	No (%)
Perception of Travelers		
Pre-travel Consultation Before Travelling	23 (37,7%)	38 (62,3%)

Behavior of Travelers		
Carried Medication for Diarrhea	47 (77%)	14 (23,0%)
Washed Hands Before Eating Food	49 (80,3%)	12 (19,7%)
Drank Beverages with Ice-Cube	43 (70,5%)	18 (29,5%)
Ate Salad Vegetables	31 (50,8%)	30 (49,2%)
Bought Food from A Street Vendor	15 (24,6%)	46 (75,4%)
Ate Food from A Previous Male	5 (8,2%)	56 (91,8%)
Ate Uncooked Meat	12 (19,7%)	49 (80,3%)
Consume Tap Water	3 (4,9%)	58 (95,1%)

The study found that 62.3% of foreign travelers did not undergo pre-travel consultation and 37.7% did pre-travel consultation. This result shows that many travelers still do not understand the importance of pre-travel consultation before traveling. The same was reported by Tan et al., in which their study found that most travelers with a tourism purpose did not undergo pre-travel consultation compared to travelers with a business, education, or volunteer purpose. This is because most organizations, offices, or campuses require all members or participants to undergo pre-travel consultation before they engage in activities planned at the destination.^[34] The same study by Kwon et al. also reported that in South Korea, although the government has stipulated that all travelers should undergo pre-travel consultation at least 21 days before departure, in reality, most travelers prefer to undergo pre-travel consultation less than 14 days before departure. This makes it so that even though the travelers have undergone pre-travel consultation, their immunity after receiving certain vaccines or therapies is not fully formed. It can also be seen that not all travelers fully understand pre-travel consultation.^[35] The same study by Jegede et al. also confirms that the large number of travelers who do not undergo pre-travel consultation makes them unable to know about endemic diseases at the destination and the lack of preparation in terms of health such as getting vaccinations or prescribing certain medications to prevent infection or illness during travel.^[36] In addition, it was reported by Ariawan et al. and Khan et al. that many factors influence travelers to undergo or not undergo pre-travel consultation, such as age, travel purpose, and previous travel history.^[37,38]

The behavior of travelers regarding the preparation of medication before traveling, this study shows that the majority of travelers have brought medication especially for diarrhea by 47 travelers (77%) and the rest did not bring by 14 travelers (23%) before they went to Bali. Based on the results of interviews with respondents, it was found that these travelers, although they did not come to the clinic for pre-travel consultation, had previously accessed information about Bali-belly (another term for traveler's diarrhea in Bali) through the internet. From this information, they decided to buy diarrhea medication as a form of anticipation. This is in line with the results of research conducted by Jegede et al. that there are two main sources for a traveler to get information about the destination they are going to, namely through social media or websites that can be easily accessed using a smartphone and going to a clinic for consultation.^[36] A similar study by Nascimento et al. mentions that travel agents also play an important role in providing detailed information about the needs required by a traveler before traveling to the destination they are going to, if the traveler uses the services of an agent.^[39] The behavior of hand washing in this study shows that the majority of travelers, namely 80.3% (49 people), always try to wash their hands before eating. This result is in line with the research of Ani & Suwiyoga and the research of Teshoma et.al that most travelers have the habit of washing their hands before they consume food and this is said to be effective in preventing diarrhea.^[40,41] However, the results of this study differ from the research by Sharma et al. that hand washing after using the toilet is a more significant protective factor against the risk of travelers experiencing diarrhea

compared to hand washing or no hand washing before eating.^[16] This is because hand washing with antiseptic liquid or soap after using the toilet can reduce the risk of contamination by bacteria or viruses that can enter the body through the fecal-oral route.^[42] Thus, it can be concluded that hand washing is one of the personal hygiene that must be considered by every individual. Several studies have shown that hand washing is a form of prevention against infectious diseases, such as diarrhea. In addition to hand washing, you can also do hand-rubbing before or after touching something or before or after doing something.^[43,44]

Then regarding the sanitation and hygiene of food and water consumed by travelers, where in this study it was found that the majority of travelers have the habit of consuming drinks with ice cubes were 43 people. Based on the results of interviews also conducted by the researcher, a small portion stated that they knew that the ice cubes that were often served were made from unclean water, so they decided to avoid them. However, most travelers did not worry because they had brought diarrhea medication as a precaution. The results of this study are similar to Wahyuni et al. and Stoney et al. that most travelers who experienced diarrhea have the habit of consuming drinks with ice cubes.^[7,30] The recommendation not to consume ice cubes has actually been issued by the CDC as a form of anticipation of diarrhea in travelers. This is because not all ice-cubes are made from clean water and cooked well, which can be seen from the shape of the ice-cubes.^[31]

The results of this study showed only 3 travelers (4.9%) had the habit of consuming tap water, while 58 travelers (95.1%) did not consume tap water. In the interview results, they said they only consumed bottled water that was standardized and tap water was only used for brushing their teeth. Similar results were also shown in a study conducted by Kuenzli et al., where of the total 178 travelers with 68 travelers who

experienced diarrhea, 55 travelers did not consume tap water, while 13 others consumed tap water.^[45] This can happen because foreign travelers have searched for and obtained information about the quality of water in Indonesia which is not yet fit for consumption and can only be used for bathing and toilet.

Travelers who had the habit of consuming vegetables salad in this study were 50.8% (31 people). This result is in line with research by Jaita et al. and Kłodkowska et al., which states that one of the factors that contributes greatly to the incidence of diarrhea is the habit of travelers who like to consume vegetables salad when traveling.^[46,47] Several other studies have also reported that most of the *E. coli* bacteria, which is the most common agent causing diarrhea, is found in raw vegetables and fruits. In addition to *E. coli*, other species such as *Shigella*, *Salmonella*, *Giardia duodenalis* and *Enterocytozoon bieneusi*, are also common.^[41,48,49]

In this study, it was found that 80.3% of travelers did not consume uncooked meat, because based on the interview results, most of them were vegan or vegetarian. In addition, they also said that consuming uncooked meat or meat that is not cooked perfectly is dangerous for health, because the bacteria inside it does not die. They also said that they were not sure about the sanitation of the water used to process the raw meat so that it remained fresh and safe even without cooking. Meanwhile, 19.7% of travelers often consume uncooked meat, such as sushi, sashimi, and so on. This result is in line with research by Kuenzli et al. that of 68 travelers who experienced diarrhea, only 23.53% of travelers consumed uncooked meat.^[45] This illustrates that consuming uncooked meat does not become a major risk factor for diarrhea in travelers. However, based on the guidelines and travel medicine experts, it is recommended to avoid consuming undercooked foods, including uncooked meat, as an effort to minimize the occurrence of diarrhea.^[43,50]

This is because uncooked meat, such as fish,

can contain ciguatoxin or maitotoxin, shellfish can contain okadaic acid toxin, beef, pork, and chicken can contain *Salmonella*, *E. coli*, *Yersinia*, *Campylobacter*, or *Clostridium perfringens* bacteria that can cause diarrhea.^[31]

In this study, it was found that of the 61 travelers who experienced diarrhea, 46 travelers (75.4%) did not consume street food and 51 travelers (91.8%) did not consume leftover meals. Similar research conducted by Sharma et.al that consuming street food is one of the risk factors that contributes significantly to the occurrence of traveler's diarrhea in 115 foreign travelers in Thailand.^[16] Similar findings were also reported by Wahyuni et al. that there are two main risk factors that cause diarrhea in foreign travelers, namely consuming street food and consuming roasted pork.^[7] Then, another similar study by Farnham et al. reported that leftover meals are one of the inappropriate eating and drinking habits that contribute to digestive system problems, such as diarrhea in travelers visiting China, Peru, and Tanzania.^[51]

CONCLUSION

The demographic characteristics of 61 foreign travelers were as follows: 70.5% were female, 41% were aged 26-35 years, and 83.6% were from European countries. The majority came to Bali for tourism (80.3%) and 45.9% had been in Bali for more than one month (>28 days). Additionally, 47.5% had never been to a country in Southeast Asia before.

The diarrhea characteristics of 61 foreign travelers were as follows: 75.4% had a bowel movement frequency of 3-4 times per day, 96.7% experienced diarrhea for 1-7 days, 73.8% experienced one episode of diarrhea, and 41% had abdominal pain. Additionally, 62.3% of travelers treated their diarrhea by taking anti-diarrhea medication that they had prepared before travelling, and 82% of travelers were able to continue travelling even though they had diarrhea.

The behavioral and perceptual characteristics of 61 foreign travelers were as follows: 37.7% of travelers had a pre-travel consultation before travelling, 77% of travelers brought medication to prevent traveler's diarrhea, 80.3% of travelers always washed their hands before eating or drinking, 70.5% of travelers often consumed drinks with ice cubes, 50.8% of travelers consumed vegetable salads, 24.6% of travelers often bought food from street vendors, 8.2% of travelers often consumed food that had been overnight, 19.7% of travelers often consumed raw or undercooked meat, and 4.9% of travelers often consumed tap water.

Declaration by Authors

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