Factors Related to the Incidents of Travelers' Diarrhea in International Travelers in The Jimbaran Area, Sub-District of South Kuta, Badung Regency

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Abstract Travelers' diarrhea (TD) is the most frequent health problems experienced by foreign tourists visiting Bali. Several factors can affect TD incidence in tourists such as age, gender, origin of tourists, eating habits, length of stay, and hand washing behavior. This study aims to determine the factors associated with the incidence of travelers' diarrhea in foreign tourists in the Jimbaran area, South Kuta Sub-District, Badung Regency. This research is a quantitative research, a descriptive type of correlative research with a retrospective approach. Samples were taken at 4 hotels in Jimbaran using simple random sampling technique in order to obtain a sample of 374 tourists. Based on the results of the study, it was found that the majority of foreign tourists visiting the Jimbaran area were adult, female, mostly from Australia, and mostly experienced health complaints of travelers' diarrhea. Most of the 221 tourists who experienced travelers' diarrhea were caused by consuming 203 foods (91.9%) from outside the hotel. The results of the Chi-Square statistical test showed that there were significant differences in the incidence of travelers' diarrhea between the ages of children under five, children, adolescents, adults, and the elderly ($p = 0.001$; $\alpha = 0.05$). However, there was no significant difference in the proportion of travelers 'diarrhea between female tourists and male tourists ($p = 0.069$; $\alpha = 0.05$) and there was no significant difference in the proportion of travelers' diarrhea between tourists from the continents of Asia, Africa, America, Australia and Europe (p value = 0.899; $\alpha = 0.05$).

***Index Terms*— Travelers' Diarrhea, International Travelers**

I. INTRODUCTION

Other potential that Bali has as a tourist attraction is its culinary attraction. While enjoying Bali's cuisine, foreign guests will be served will various kinds of processed food or traditional foods with uniques flavor, which are satisfying and memorable in their journey in Bali [1].

Although, the truth is that Balinese traditional food does not quite good in regards to processing food. Based on the survey, from 528 kinds of Balinese traditional food, only 9,47% have good nutritional value and actually edible [2]. It can be proven from the sampling from a few Balinese traditional food and it can be concluded hat all of the tested food has *coliform* bactery.

This condition is proven to be significant to the traveler' health. Some cases that has been reported shows that the most frequent cases are diarrhea in travalers [3].

Diarrhea in travelers often called as travelers' diarrhea or *Bali Belly* [4]. Travelers' diarrhea is defined as defecation with the liquid consistency of more than three times per 24 hours, as well as one additional symptom like abdominal cramps, rectal tenesmus, nausea, vomiting or fecal urgency and fever with ≥37,5°C temperature [5].

The high number of diarrhea incident to the foreign tourist can affect two things, which are tourism areas and the foreign tourist itself. For the tourism areas, this incident can affect the number of foreign tourist visits and indirectly affects the economy of Balinese. While for the foreign tourist, it can make the time and schedule of their journey ineffective. Besides, the after-effect diarrhea complication can also happen after they got back to their own country. Patient with a history of diarrhea can keep complaining of persistent or intermittent gastrointestinal symptops, abdominal pain or bloating and even irritable bowel syndrome [6].

A control study to 137 foreign tourists that visit Bali through Ngurah Rai International Airport shows that the diarrhea risk factor of foreign tourist in Bali includes age, gender, origin country, and food consumption habit [7]. Preliminary studies have been carried out in four hotels in Jimbaran, South Kuta District, Badung Regency. The reason the writers choose the location in Jimbaran is because almost as much as 33 tourism objects in Badung Regency is located in Jimbaran, South Kuta District [8]. The chosen hotel provides medical services in the form of clinics to the foreign tourists which travel and stay in the hotel. Almost every year on each hotel clinic, there were 632 complains from foreign tourist with various medical problem. Based on the interview with the doctor and the nurse in charge, the most frequent complain is traveler diarrhea.

Based on this, it is important to identify the factors that related to the TD in foreign tourist, which consists of age, gender, origin country, and food consumption habit. This is important as a nurse job, in terms of tourism nursing, needs to identify the dangerous potential identification, and the analysis of tourism health risk, either related to the tourism journey or the activity of the offered tourism packages. So that it can be used as a basis in conducting preventive and promote approaches to reduce the risk of disease events before or during a tour.

II. METHOD

This research is a quantitative research, correlative descriptive research type with a retrospective approach.

The population in this research is the foreign tourist in the hotel in Jimbaran, South Kuta District, Badung Regency. The sampling technies is *Simple Random Sampling*, hence based on the calculation, there is 374 samples. The collected data is a secondary data, obtained from a medical recors of foreign tourists in four Jimbaran area hotel clinic, South Kuta district, Badung Regency. The research was conducted for a month, from March until April 2019.

There were two variables involved in this study. The dependent variable was travelers' diarrhea, while the independent variable was incidence in tourists such as age, gender, origin of tourists, eating habits.

Univariate analysis was carried out to determine the frequency description of the diarrhea travelers' incidents in foreign tourists, which is age, gender, origin country, and food consumption location. The bivariate analysis used was the Chi-Square statistical significance test to assess the difference in the proportion of connection between each variable with the connection significance at the degree of rejection $\alpha = 5\%$ ($p < 0.05$). If in this test the value of $p < 0.05$ is obtained, then Ho is rejected, which means that statistically there is a significant connection between each variable with the incidence of travelers 'diarrhea in foreign tourists.

This research has passed the ethical test of the Research Ethics Committee of the Faculty of Medicine of Udayana University/Sanglah Hospital 1391/UN14.2.2.VII.14/LP/2019.

III. RESULT

A. Foreign Tourist Characteristics in Jimbaran Area, South Kuta District, Badung Regency

TABLE I DISTRIBUTION OF RESPONDENTS BY TOURIST CHARACTERISTICS (AGE, GENDER, AND COUNTRY OF ORIGIN) IN THE JIMBARAN AREA, KUTA SELATAN DISTRICT, BADUNG REGENCY IN 2018 (N = 374)

Variable		Frequency (n)	Percentage (%)
Age			
	Toodlers (0-4 years old)	30	8
	Kids (5-11 years old)	38	10,2
	Teenagers (12-25 years old)	55	14,7
	Adult (26-45 years old)	160	42,8
	Elderly (46-75 years old)	91	24,3
	Total	**374**	**100**
Gender			
	Male	166	44,4
	Female	208	55,6
	Total	**374**	**100**
Country Origin			
	Afrika	3	0,8
	Amerika	20	5,3
	Asia	97	25,9
	Australia	201	53,7
	Eropa	53	14,2
	Total	**374**	**100**

Table 1 shows that the majority of foreign tourists visiting Jimbaran Area, Kuta Selatan District, Badung Regency are adults (26 - 45 years) with 160 tourists (42.8%), female with 208 tourists (55.6 %), and the majority are from the continent of Australia with 201 tourists (53.7%).

B. Travelers' Diarrhea Incident in Foreign Tourists in Jimbaran Area, South Kuta District, Badung Regency

TABLE II RESPONDENTS DISTRIBUTION BY INCIDENT OF TRAVELERS' DIARRHEA IN JIMBARAN AREA, SOUTH KUTA DISTRICT, BADUNG REGENCY IN 2018 (N = 374)

Variable		Frequency (n)	Percentage (%)
Travelers' Diarrhea			
	Yes	221	59,1
	No	153	40,9
	Total	**374**	**100**

Based on table 2 it is known that the majority of foreign tourists in the Jimbaran Area, Kuta Selatan District, Badung Regency in 2018 experienced diarrhea travelers' health complaints as many as 221 tourists (59.1%).

C. Location of Food Consumption in Foreign Tourists Who Experience Diarrhea Travelers' Incident in Jimbaran Area, Kuta Selatan District, Badung Regency

TABLE III RESPONDENT DISTRIBUTION WHO HAVE DIARRHEA TRAVELERS' INCIDENT BY LOCATION OF FOOD CONSUMPTION IN JIMBARAN AREA, KUTA SELATAN DISTRICT, BADUNG REGENCY IN 2018 (N = 221)

Variable	Frequency (n)	Percentage (%)
Food Consumption Location		
Outside of Hotel	203	91,9
Inside the Hotel	18	8,1
Total	**221**	**100**

Table 3 shows that out of 221 tourists who experienced travelers' diarrhea, most of them were caused by consuming food from outside the hotel, namely 203 tourists (91.9%).

D. Relationship of Age, Gender, and Country of Origin with the Incident of Travelers' Diarrhea in Foreign Tourists in Jimbaran Area, Kuta Selatan District, Badung Regency

TABLE IV. RESPONDENT DISTRIBUTION FREQUENCIES BASED ON AGE, GENDER AND COUNTRY OF ORIGIN WITH DIARRHEA TRAVELERS' OCCURRENCE IN FOREIGN TOURISTS IN JIMBARAN AREA, KUTA SELATAN DISTRICT, BADUNG REGENCY IN 2018 (N = 374)

Travelers' Diarrhea						
	Yes		**No**		**Total**	**p value**
	n	**%**	**n**	**%**		
Age						
Toodler	9	30	6	70	15	0,001
Kid	10	26,3	28	73,7	38	
Teenager	37	67,3	18	32,7	55	
Adult	117	73,1	43	26,9	160	
Elderly	48	52,7	43	47,3	91	
Total	**221**	**59,1**	**153**	**40,9**	**374**	
Gender						
Male	89	53,6	77	46,4	166	0,069
Female	132	63,5	76	36,5	208	
Total	**221**	**59,1**	**153**	**40,9**	**374**	
Country Origin						
Asia	57	58,8	40	41,2	97	0,889
Africa	1	33,3	2	66,7	3	
America	12	60	8	40	20	
Australia	121	60,2	80	39,8	201	
Europe	30	56,6	23	43,4	53	
Total	**221**	**59,1**	**153**	**40,9**	**374**	

Based on table 4 it is known that the proportion of foreign tourists age who experienced travelers' diarrhea was mostly adults who were 117 tourists (73.1%). Statistical test results show that there is a significant difference in the proportion of travelers' diarrhea between toddlers, children, teenager, adults, and the elderly ($p = 0.001$; $\alpha = 0.05$). The analysis result of the connection between gender and travelers' diarrhea shows that the proportion of tourists who experience diarrhea travelers is a mostly female tourist, as many as 132 tourists (63.5%). Statistical test results show that there is no significant difference in the proportion of travelers' diarrhea incident between female tourists and male tourists (p value = 0.069; $\alpha = 0.05$). The highest proportion of foreign tourists experiencing travelers' diarrhea was tourists from the Australian continent, which was 121 tourists (60.2%). Statistical test results showed that there was no significant difference in the proportion of travelers' diarrhea incidents between tourists from the continents of Asia, Africa, America, Australia and Europe (p value = 0.899; $\alpha = 0.05$).

IV. Discussion

Based on the statistical tests results, it was found that the distribution of respondents who experienced travelers' diarrhea based on the location of food consumption was largely due to consuming food outside the hotel. The foods and drinks that are considered unhygienic and purchased outside the hotel during their tourist visits to an area cause tourist who suffer from susceptibility to diarrheal diseases. Susceptibility of diarrhea to tourists is also likely due to the unclean process of cooking [9].

However, it was also found that there are 8.1% of tourists who experience travelers' diarrhea as a result of consuming food prepared by the hotel. This is likely due to errors in the processing of food prepared by the hotel [10].

Although five-star hotels do have a lower incidence of diarrhea compared to three-and four-star hotels (Incident rates of 0-3.3% per week) [11]. The incident of travelers' diarrhea due to food prepared by the hotel may also be caused by the hygiene of the places previously visited by tourists, duration of exposure to traditional foods, and the use of hand in processing and serving food [7].

In this study it was found that there was a significant difference in the proportion of travelers' diarrhea between toddlers, children, teenagers, adults, and the elderly (p value = 0.001; $\alpha = 0.05$). After further analysis it is known that the proportion of the number of tourists who experience the incidence of travelers' diarrhea with the three highest being in adulthood (26 - 45 years) as many as 73.1%, adolescents (12-25 years) as many as 67.3%, and the age of the elderly (46 - 75 years) as many as 52.7%.

It is also supported by the results of the study which states that the most influenced factor in the incident of travelers' diarrhea is the age of tourists [12]. Poor personal hygiene habits are in the range of teenagers and adults (21-40 years), who do travels at certain times [13]. Whereas elderly who are vulnerable to travelers' diarrhea are generally because in the elderly there will be immune suppression (weakened immunity) and decreased gastric acidity so that there is a higher risk of infection with organisms that are sensitive to acids such as Salmonella and Campylobacter [14].

In this study, the results of statistical tests indicate that there is no significant difference in the proportion of travelers' diarrhea incidents between female tourists and male tourists ($p = 0.069$; $\alpha = 0.05$). Men and women did not show a significant difference in the incident of travelers' diarrhea. It is proven from the results of other studies that show that there is no significant difference between hand washing and hygiene habits between female and male tourists before experiencing travelers' diarrhea [15].

However, if analyzed further it is known that the female sample has a 1.5 times greater risk of experiencing travelers' diarrhea than the male sample. Female tourists tend to have

more gastrointestinal health problems such as diarrhea in clinics or hospitals than male tourists [16]. In general, during travelling women tourists tend to do more behaviors that increase the risk of getting pathogens that cause gastrointestinal disorders such as trying traditional foods and following cooking class [17]. This is because coliform bacterial infections such as *Shigella spp* and *Salmonella spp* are more susceptible to female tourists. This is because biological differences in the serum of men have been found to be significantly more effective in killing bacteria such as *Eschercia coli*, *Enteribacter arogenes*, *Shigella spp*, *Salmonella spp*, and *Virbrio cholereae* than serum in women's bodies [18].

In this study, the results of statistical tests show that there is no significant difference in the proportion of travelers' diarrhea events between tourists from the continents of Asia, Africa, America, Australia, and Europe ($p = 0.899$; $\alpha = 0.05$). This is probably due to the fact that the origin country of tourists does not affect the incident of travelers' diarrhea because although personal hygiene behavior from tourists is already good, diarrhea is caused by the sanitation hygiene from the environment where tourists try cuisine or traditional food. The behavior of washing hands or using hand sanitizers will have an effect if this behavior is carried out by people who prepare food or sellers who sell food in tourist areas as well as tourists who will consume it [7]. If this habit is only carried out by tourists who will consume food it is likely not to have an impact. Hence this is what makes that there is no significant proportion difference between the incidents of travelers' diarrhea and the country origin.

However, after further analysis, it was found that the highest proportion of tourists who experienced the travelers' diarrhea were from Australia which were 121 tourists (60.2%), tourists from Asia were 57 tourists (58.8%), and the third number of tourists coming from Europe were 30 tourists (56.6%). The highest number of tourist's country origin who experienced travelers' diarrhea came from Europe (37.6%) and Australia (31.9%) [7]. Tourists from advanced countries who visit the tropical country do have a higher number of travelers' diarrhea incident [19]. This is because tourists from advanced countries are rarely exposed to bacteria that cause infections so they do not have immunity to diseases including diarrhea.

V. Conclusion

Based on the results of the study, it was found that the majority of foreign tourists visiting the Jimbaran were tourists who were adults, female, came from Australian continent, and most of them experienced travelers' diarrhea. Out of the 221 tourists who experienced travelers' diarrhea, most of them are aused by consuming food o outside the hotel, which is 203 tourists (91.9%). The Chi-Square statistical test results showed a significant difference in the proportion of travelers 'diarrhea between toddlers, children, teenagers, adults, and the elderly (p value $= 0.001$; $\alpha = 0.05$). But there is no significant difference in the proportion of travelers' diarrhea between female tourists and male tourists (p value $= 0.069$; $\alpha = 0.05$) and there is no significant difference in the incidence of travelers' diarrhea between tourists who come from the Asian continent, Africa, America, Australia and Europe ($p = 0.899$; $\alpha = 0.05$).

It is hoped that health workers and hotel clinics will continue to provide health facilities for foreign tourists who visits Bali and can provide additional information in the form of health education which can be assited by the use of media in the form of leaflets which contain conditions and characteristics of foods that are safe for consumption, first-aid if exposed to travelers' diarrhea, the symptoms of early travelers' diarrhea, and many others. It is also hoped that the tourism organizers can arrange an innovation for traditional food sellers by providing a certificate of eligibility (safety food) which of course has received a previous assessment from the relevant agencies so that the traditional culinary is safe for consumption and foreign tourists are more protected from travelers' diarrhea. Also, to further researchs, being able to conduct research on the incidents of travelers' diarrhea in a wider scope such as conducting primary data collection and adding factor analysis related to the incidents of travelers' diarrhea.

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