Analysis of The Existence of Bacteria and Bathers Behavior At Tanjung Bayang Beach Kota Makassar

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ABSTRAK

Contamination of sea water by pollutants is a public health problem in various parts of the world, and bathing in polluted water usually creates the danger of contracting an infection. Humans can be exposed to various microorganisms that cause disease in recreational waters. This study aims to analyze the presence of bacteria and visitor behavior at the Tanjung Bayang Beach in Makassar City. This study aims to determine the presence of bacteria in seawater with visitor activity in Tanjung Bayang Beach, Makassar City. This study uses an observational analytic method with a descriptive approach. The sample object in the study consisted of 5 sample points with 3 repetitions. The method of sampling the subjects in this study was done by Stratified Random Sampling. The results showed that the other activity most visitors performed was playing sand with a number of 78 respondents (37.1%), the overall sea water samples of Tanjung Bayang beach in Makassar City were taken containing bacteria at five sampling points for three consecutive weeks, swimming activities experiencing health problems, which amounted to 102 respondents (48.6%), the most health problems were itching by 43 respondents (20.5%), swimming visits to Tanjung Bayang beach visitors with the most number was once a month, amounting to 60 respondents (28.6%) and the frequency of Swimming Visits on the Visitors of Tanjung Kota Makassar Beach which shows that the length of time swimming visitors at the Tanjung Bayang Beach Makassar City with the most number is 1-2 hours, amounting to 92 respondents (43.8%).

INTRODUCTION

Beach is a popular place throughout the world as a tourist destination that can be visited for recreation, especially during the holiday season. The beach is the first place people think of visiting while enjoying vacation time. The beach is a natural environment that offers many recreational opportunities that can be done by both local and international tourists (Pascoe, 2019). Every year, there are an estimated 22.2 million tourist visits to freshwater and marine beaches in the United States (Houston, 2008; Massinai et al., 2019). In the UK it is estimated that more than 20 million people visit the beach

each year to spend vacation time for various reasons (Dilnessa et al., 2016).

The beach is a recreational place to do lots of fun things. Beach activities can include diving, snorkeling, swimming and bathing, fishing, surfing, sunbathing and watching the sunset (Massinai et al., 2019). Swimming is the most common water recreation activity and involves contact with the whole body with water and has health benefits. However, besides the health benefits derived from swimming and water recreation activities, water quality makes people face different health risks. This health risk can be associated with exposure to chemical and bacterial contaminants (Jang et al., 2018). Based on research conducted by Elliott et al (2018), an estimated 4.7 million people visit the beach every year to walk and watch the sunset, 11.7 million people do water sports, and 181.5 million people swim in beach visits bbevery year. Swimming is classified as an activity with high intensity physical activity.

The swimmer's behavioral activity while in the water is an important aspect in determining their health risk. These behaviors include the type of immersion (partial or total), length of swimming and the amount of water ingested (Dufour et al., 2017). Research conducted by DeFlorio-Barker et al (2018), found that children aged 6-12 years swallowed water while swimming an average of 36 ml of water (90th percentile = 150 ml), whereas adults aged ≥35 years ingest 9 ml of water (90th percentile = 64 ml) per swimming activity. Swallowing water while swimming has been linked to acute outbreaks of digestive diseases caused by viruses, protozoa, and bacteria (Dorevitch et al., 2011). Exposure to water while swimming in recreational areas is associated with an increased risk of acute gastroenteritis which results in disturbed daily activities with the highest risk and burden that can be transmitted to children (Arnold et al., 2016).

Contamination of sea water by pollutants is a public health problem in various parts of the world, and bathing in polluted water usually creates the danger of contracting an infection. Exploration of microbes as microorganisms in sea waters can be done and used as information on environmental conditions. Several kinds of microbes are used as parameters such as water pollutant indicator bacteria, heterotrophic bacteria, halotolerant bacteria and sulfur bacteria from geothermal sources in Sabang waters. Microbiological parameters as bioindicator of water pollutants is one of the biological pollutants in the form of microorganisms originating from domestic waste, sewage treatment industry, garbage and livestock waste (Dakka et al., 2018).

Humans can be exposed to a variety of disease-causing microorganisms in aquatic recreation area. A meta-analysis found that the risk of diarrhea for not swimmers is 35/1000, which increased to 59/1000 after a swim at the beach where fecal indicator bacteria / Fecal Indicator Bacteria (FIB) Enterococcus spp. exceed 35 CFU / 100 mL water (Arnold et al., 2016). Pathogenic bacteria can cause diarrhea, abdominal pain, cramps, nausea, and vomiting in humans (Ahmed et al., 2018)

Since the 1950s, many epidemiological studies conducted worldwide to evaluate the relationship

between water quality recreation and health conditions are adverse, including eye infections, skin irritation, infection of the ear, nose, and throat irritation, respiratory symptoms and gastrointestinal (GI) (Soller et al., 2010). This study aims to analyze the presence of bacteria and visitor behavior on Tanjung Bayang Makassar.

METHOD

Research Design and Location

This study was an observational study with descriptive analytic approach. The research location is in the Tanjung Bayang Coast Makassar. The study was conducted every day over three weeks of the week on 22 September 2019, September 29, 2019 and October 6, 2019 at Tanjung Bayang Makassar.

Population and Sample

The population object of this research is the sea water in the coastal recreational Tanjung Bayang Makassar. The population of subjects in this study were all visitors Tanjung Bayang beach recreation area of Makassar. The subjects in the study population is an estimate of the number of visitors that data based on secondary data obtained from the LPM Tanjung Bayang. Objects in the study sample consisted of five sample points with three repetitions. Point determination technique using purposive sampling method, the sampling is based on a particular judgment made by the researchers themselves, based on the characteristics or properties of the previously known populations. The sampling method subjects in this study conducted by Stratified Random Sampling.

Data Collection

Data sources used in this study were obtained directly by conducting interviews with visitors to Tanjung Bayang beach by using a questionnaire that was created by researchers for sample subjects. Meanwhile, data on the amount of bacterial concentration was obtained through examinations at the Laboratory of Microbiology, Faculty of Medicine, Hasanuddin University.

Data Analysis

The collected data related to the concentration of bacteria and the activity of the respondent will be analyzed descriptively and written in the tables of frequency distribution then narrated.

RESULTS

Table 1 shows the characteristics of respondents in other activities while visiting Cape Coast shadow of Makassar in addition to swimming is a walk/ family events, sunbathing, playing speed boat/ banana boat, play sand and more (look for shells). Another visitors activity do the most is playing sand were 78 respondents

Table 1 Characteristics of Respondents according to other activities while visiting Tanjung Bayang Beach, Makassar City

Type Activities	Frequency	
	n	%
The streets / Family Events	39	18.5
Sunbathe	58	27.6
Play Speed boat / banana boat	34	16.2
Playing with sand	78	37.1
more	1	0.5

(37.1%) and the least to do besides swimming is playing a speed boat/banana boat were 34 respondents (16.2%) after any other activity (searching for clams) with the number 1 respondents (0.5%).

Table 2 Bacteria Concentration in Tanjung Bayang Beach Sea Water Samples

Sample point	Type of bacteria	
	Gram (+)	Gram (-)
Point I		
Week I	*Bacillus Sp*	*Enterobacter agglomerans*
Week II	*Staphylococcus aureus*	-
Week III	*Bacillus Sp*	-
Point II		
Week I	*Bacillus Sp*	-
Week II	*Bacillus Sp*	-
Week III	-	*Enterobacter agglomerans*
Point III		
Week I	-	*Enterobacter agglomerans*
Week II	*Staphylococcus aureus*	-
Week III	*Staphylococcus aureus*	-
Point IV		
Week I	*Bacillus Sp*	-
Week II	*Staphylococcus aureus*	-
Week III	*Bacillus Sp*	*Enterobacter agglomerans*
Point V		
Week I	*Bacillus Sp*	-
Week II	*Staphylococcus aureus*	-
Week III	*Bacillus Sp*	-

Table 2 shows the concentration of bacteria in seawater samples Tanjung Bayang Makassar City soit can be seen that the overall sample of sea water beach of Tanjung Bayang taken Makassar City containing the bacteria at five sampling points for three consecutive weeks, both gram-positive (+) and gram negative (-). Gram positive (+) contained in seawater samples, namely Bacillus and Staphylococcus aureus Sp. While gram-negative (-) contained in seawater, which is Enterobacter agglomerans. The bacteria are found in all the sampling point, even the bacteria in all type not detected in every week, time of sampling.

Table 3 Distribution of Visitor Health Problems due Activities Swimming in Tanjung Bayang Makassar City

Health problems	Frequency	
	n	%
Yes	102	48.6
No	108	51.4

Table 3 Distribution of Visitor Health Problems due Activities Swimming in Tanjung Bayang Makassar City showed that there Tanjung Bayang beach visitors of Makassar doing activities such as swimming experiencing health problems, namely by 102 respondents (48.6%) and who do not have health problems, namely of 108 respondents (51.4%).

Table 4. Distribution of Health Impaired Visitors type Tanjung Bayang Makassar City which shows that the complaints most felt by beachgoers Tanjung Bayang Makassar City after doing activities such as swimming is itching by 43 respondents (20.5%), Red-eye by 39 respondents (18.6%), Hearing Loss by 11 respondents (5.2%), respiratory disorders by 4 respondents (1.9%), and other health disorders by 5 respondents (2.4%).

Table 4 Distribution of Health Impaired Visitors type Tanjung Bayang Makassar City

Type Health Problems	Frequency	
	n	%
Itchy	43	20.5
Hearing disorders	11	5.2
Respiratory disorders	4	1.9
Red eye	39	18.6
more	5	2.4

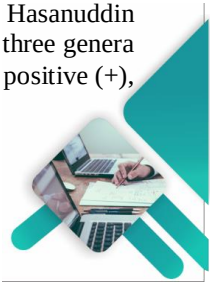
Table 5. Frequency Distribution Visits Visitors Cape Coast Swim in Makassar City showed that the frequency of visits to swim beachgoers Tanjung Bayang at most once a month, which amounted to 60 respondents (28.6%). Frequency of visits to swim at least once in 6 months, as many as 17 respondents (8.1%). whereas the frequency of visits to swim more highly variable, which were 51 respondents (24.3%) with the frequency of visits 1 time in 3 months (1.0%), 1 time in 2 months (0.5%), 2 times a month (7.0%), 2 times a week (0.5%), two times a year (12.9%), three times a month (2.9%), three times a month (2.9%), three times a year (2.4%), and 4 times a year (1.4%). Distribution of Frequency of Visits Visitors Cape Coast Swim in Makassar City which indicates that the long time visitor swim at Tanjung Bayang Makassar city with the most number is 1-2 hours, which amounted to 92 respondents (43.8%). For a long time swimming the least is 15-30 minutes, which is 28 respondents (13.3%). The time to swim with a time of 31-60 minutes totaling 52 respondents (24.8%), while the length of time to swim more, consists of 2 hours (2.4%), 3 hours (12.4%), 4 hours (1.0%), 5 hours (0.5 %), and 6 hours (1.0%).

Table 5. Distribution of Health Impaired Visitors type Tanjung Bayang Makassar City

Visitor Behavior	n	%
Frequency of Visits Swim		
Once in a week	35	16.7
Once a month	60	28.6
Once in 6 months	17	8.1
Once in 1 year	47	22.4
more	51	24.3
Period of Activities Swimming		
15-30 minutes	28	13.3
31-60 minutes	52	24.8
12 hours	92	43.8
more	38	18.1

DISCUSSION

Based on research and examination conducted on seawater samples taken at five sampling points in the coastal waters of Tanjung Bayang, Makassar City in the Microbiology Laboratory of the Faculty of Medicine, Hasanuddin University, found as many as three genera of bacteria consisting of gram positive (+),



namely Bacillus sp and gram-negative (-), Staphylococcus aureus and Enterobacter agglomerans. The number of bacterial colonies was observed for three consecutive weeks. The highest number of bacterial colonies is at the sampling points II, III, and IV. While the number of bacterial colonies is at least at the point of collection until I and V.

The prevalence of pathogenic bacteria in recreational water has attracted a lot of attention from researchers around the world. Research has found that public baths are a place to produce a large number of microbes that can cause illnesses related to contamination from swimmers related to the quality of water microbes, even in the absence of fecal contamination point sources (Elmir et al., 2007).

This study is in line with research conducted by Saraswadewi et al (2016), in which bathing pool is where most contaminated with bacteria, with the bacterial genus, the Enterococcus, Streptococcus, Pseudomonas, Enterobacter, Bacillus and Listeria. Another study conducted by Rahmaningsih et al (2017), in coastal waters in the District Jenu Tuban, found that there are seven bacterial isolates belonged pathogenic bacteria such as Staphylococcus aureus, Pseudomonas aeruginosa, Pseudomonas pseudomelle,

Enterobacter aglomerans and Vibrio Chorela and bacteria non-pathogenic, ie Nitrobacter sp and Bacillus subtilis in coastal waters taken at a distance of 1 m, 10 m and 100 m from surface point.

The analysis showed 210 respondents were interviewed, 102 of them suffered health problems as a result of swimming (48.6%). Researchers in the United States estimated that the health burden of illness associated with swimming at two popular beaches in California, the US exceeded US $ 3.3 million per year. The annual cost for each type of illness associated with swimming at the two beaches, namely gastrointestinal diseases amounting to US $ 1,345,339; Acute respiratory disease of US $ 951 378; ear complaints of US $ 767 221; eye complaints of US $ 304 335 (Dakka et al., 2018). Since the 1950s, many epidemiological studies conducted worldwide to evaluate the relationship between water quality recreation and health conditions are adverse, including eye infections, skin irritation, infection of the ear, nose, and throat irritation, respiratory symptoms and gastrointestinal (GI) (Soller et al., 2010).

Various diseases are caused by the presence of bacteria in the water at Tanjung Bayang be dangerous for visitors. Health problems experienced are itching, hearing loss, respiratory problems and red eyes. Based on the results of research conducted visitor activity in Tanjung Bayang pool at most that once in a month (28.6%), with the longest duration that during1-2 hours (43.8%). In addition to swimming the visitors who visit in Tanjung Bayang alsoperform other activities such as sightseeing or family events, sunbathing, playing speed boat / banana boat and sand play. But other activities that most visitors do is sunbathe (27.6%).

Marine scientist at the National University of Singapore (NUS) found more than 400 different species of bacteria in 275 pieces mikroplastik collected from

three beaches in Singapore at Lazarus Island, Sembawang Beach and Changi Beach. In the study by NUS scientists have plastic pieces each measuring less than 5mm. During the study which lasted all of six months, the team attempted to examine a collection of bacteria on mikroplastik collected from the coastal area of Singapore. Using DNA tracing techniques, the scientists discovered bacteriaPhotobacterium rosenbergii often associated with coral bleaching and disease. The research team also found marine Vibrio species - known as the main cause wound infections in humans and Arcobacter species of bacteria known to cause gastroenteritis (nausea, vomiting, diarrhea, abdominal cramps, or sometimes fever) (Ekowati, 2019).

Global Report of City Tourism reported that the number of visits worldwide reached 1.4 billion in 2018 and is predicted to reach 1.8 billion in 2030. In Europe, tourist arrivals increased by 6% from 2017 with the number of visits reached 713 million by 2018. In Africa showed an increase of 7% in 2018 with the number of tourist visits is expected to reach 67 million tourists. Meanwhile, the number of visits beach in Asia increasing by 6% in the number of tourists reached 343 million people in 2018 (UNWTO, 2019).

Based on data from the Department of Tourism of Makassar (2019), shows that from 2015 to 2018 an increase in the number of foreign tourists and domestic tourists. In 2018, there were 5,461,677 the number of visits increased by 274 156 from the number of visits in 2017 Scenic coastal and beach is a type of tourism that is quite attractive for sightseeing and recreation. Tamalate District which is located south of the center of Makassar has a coastal tourism to be developed. Coastal tourist locations contained in the region include Wind Mamiri Beach and Tanjung Bayang (Fadlin, 2015). Pantai Tanjung Bayang is the most crowded places with more visitors during the holidays, because of the entry fee that is affordable and easy access. The increase in tourist arrivals should be offset by better management of recreational areas that are safe for the visitors. However, the lack of consistency in the monitoring of coastal water quality, which leads to inadequate basic information that may make it difficult to estimate the health risks that may occur in the future will come (Derraik, 2002).

Implementation of environment-friendly tourism development and adapted to unique and local conditions, success can be measured through a process of sustainable socio-cultural identity and involve the local community, the cycle of natural resources and environmental sustainability, and economic processes that can provide benefits in a sustainable manner. If the approach of ecotourism are applied with both the tourism industry has the potential to provide a positive impact for the environment through the efforts of environmental protection and conservation so that tourism can be a source to finance the protection of environmental resources and enhance the economic value of natural resources or the environment, as well as empowerment in the social field and the culture around it (Scheyvens, 2000).

CONCLUSION AND SUGGESTION

Based on the results of research and discussion it can be concluded that the

bacteria found in the samples of sea water in Tanjung Bayang based on examination results. Swimming activities conducted in Tanjung Bayang long enough and the duration of a visit quite a lot. The results also show that many health problems complained of itching. It is expected that beach visitors Tanjung Bayang Makassar city to pay more attention to swimming activity performed and caution against contamination which may occur that could have an impact on health and to the LPM Tanjung Bayang that if it were to continue working together with local communities to maintain the cleanliness and the environment Tanjung Bayang beach recreation area of Makassar.

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