



Analysis of the Availability of Mosque Sanitation Facilities in the Tsunami Green Area as an Alternative Place for The Final Evacuation of the Tsunami Disaster in Padang City

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ABSTRACT

The city of Padang as one of the areas in West Sumatra which is in a coastal area is very prone to tectonic earthquakes with the potential for tsunamis, it is very necessary to have high preparedness to deal with it. One of the things that must be prepared is the evacuation site the end, which is a temporary residence for disaster victims. One alternative that can be used as a final evacuation site is a mosque. This study aims to prepare mosque sanitation facilities in the tsunami green area. The measurement of the preparedness of mosque sanitation facilities is seen from observations, in the form of a checklist table filled out by researchers in 29 mosques that are the object of study. With a descriptive type of research, to see an overview of the condition of mosque sanitation facilities. Based on the results of research and discussion, it can be concluded that from the 29 mosques studied, all mosques were obtained in the category of sanitation, construction, toilets and latrines, lighting and ventilation conditions of mosques in city of Padang. While 17 mosques (58.6%) are located close to Jalan Raya, there are 25 mosques (86.2%) with courtyards in good condition, there are 28 mosques (96.6%) with good waste management, 13 mosques (44.8%) using water sources from PDAM and there are 28 mosques (96.6%) that have wastewater disposal in good condition. This can be used as an evacuation site, so the main thing that must be done is to maintain the sanitary condition of the mosque so that it is maintained and can become a proper evacuation site.

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INTRODUCTION

The 1797 Sumatra earthquake was the first of a series of major earthquakes that occurred on part of the Sumatra segment on the [Sunda megathrust fault](#) (1). The location of West Sumatra is in the central western part of Sumatra Island, has a lowland on the West coast and a volcanic plateau in the Eastern region formed by Bukit Barisan (2). An earthquake in 1797 triggered a [tsunami](#) wave that caused severe damage in the [city of Padang](#). Areas that have experienced earthquake disasters will have a chance that the disaster will repeat itself. Therefore, it requires a high level of vigilance and good disaster preparedness(1). The city of Padang divides the tsunami danger zone into 3 zones based on the distance between the land and the coastline, namely the red zone, yellow zone, and green zone (3). The red zone is a zone that has a high level of danger, the yellow zone has

a moderate level of danger, and the green zone has a low level of danger. In the event of a tsunami, people in the red zone will evacuate to shelters or temporary evacuation sites. Meanwhile, all public facilities and houses of residents who are in high and moderate danger zones are predicted to be severely damaged. Furthermore, disaster victims who survived at the time of the tsunami occurred, will be evacuated to the final evacuation site until the recovery process is complete(4).

The Padang City Government has prioritized 4 final evacuation points, namely in Clove Field, Padang Besi SPN Field, Lubuk Minturun Field, and Andalas University campus. In addition to the Andalas University campus, the planned final evacuation site is vacant land which of course requires resources that must be met such as tents, electricity, water, and latrines. The supply of resources owned by the Padang City government is very limited compared to the amount

needed to make the field the final evacuation site (4). The conversion of public buildings is currently used as an evacuation building shortly after the disaster is very plural in Indonesia(5). In disaster management, locations that can be used as temporary residences or shelters are public buildings such as mosques, schools, markets or government offices that do not have a high level of confidentiality. School buildings and government offices will generally have more important archives when compared to mosques, while markets will have less good water and sanitation when compared to mosques (6).

The mosque is a closed room so refugees do not need to set up tents as shelter. Mosques that allow them to be used as final evacuation sites must be prepared as well as possible to be able to accommodate disaster victims who are displaced if an earthquake has the potential for a tsunami to occur. The mosque in Padang City has acted as a temporary evacuation site. The factors that encourage mosques to act as disaster information centers and temporary evacuation sites are because residents feel safe and comfortable in mosques, high public trust in information from mosques, the availability of supporting facilities such as electricity, clean water, places of worship, places of negotiation, toilets, and rest areas for temporary evacuation places, the existence of facilities and infrastructure as information centers, the existence of mosque administrators who manage information and temporary evacuation sites and there is a policy from the Padang City Government that provides support for mosques as information centers and temporary evacuation sites (7). In this case, the managers/administrators of these places of worship need and urgently need to be given knowledge about environmental health related to public places (places of worship) to support efforts to improve environmental health through basic sanitation efforts, environmental quality control of public places, including environmental pollution control(8).

RESEARCH METHODS

This research is descriptive analysis which is a study conducted to see an overview of the condition of mosque sanitation facilities in the Tsunami Green Area in Padang City. This research was carried out from June to November 2021 which was carried out in 29 mosques in the Tsunami green arena in Padang City. In this study, the object was the sanitation facilities of the Mosque in the Tsunami Green Area in the City of Padang. Primary data, these data are obtained directly from the object of study. Secondary data, these data are obtained from the literature relating to the study.

RESEARCH RESULTS

A. Sanitary Condition of the Mosque

Table 1. Frequency Distribution based on Sanitary Conditions of Padang City Mosque

Sanitsi Mosque	Frequency	%
Bad	0	0
Enough	0	0
Good	29	100
Sum	29	100

The results of the research obtained were that all mosques that were examined had the sanitary condition of the mosque in the category of good sanitation.

B. Location of Mosque with Highway

Table 2. Frequency Distribution based on the Location of the Padang City Mosque

Location of the Mosque	Frequency	%
Near	17	58,6%
Far	12	41,4%
Sum	29	100

The results of the study obtained were that from the 29 mosques examined, there were 17 mosques located close to the highway and 12 mosques located far from the highway.

C. Mosque Construction

Table 3. Frequency Distribution based on Padang City Mosque Construction

Mosque Construction	Frequency	%
Good	29	100
Bad	0	0
Sum	29	100

The results of the research obtained were dari 29 mosques that were inspected all mosques had good construction conditions. Starting from the condition of the floor that is easy to clean, flat and waterproof surfaces, the condition of the walls of the mosque, roof, stairs and ceiling of the mosque.

D. Mosque Courtyard

Table 4. Frequency Distribution by Padang City Mosque Page

Mosque Courtyard	Frequency	%
Good	25	86,2
Bad	4	13,8
Sum	29	100

The results of the research obtained were dari 29 mosques which were examined there were 25 mosques with good mosque yard conditions.

E. Waste Management

Table 5. Frequency Distribution based on Mosque Waste Management in Padang City

Waste Management	Frequency	%
Good	28	96,6
Bad	1	3,4
Sum	29	100

The results of the research obtained were dari 29 mosques which were inspected by 28 mosques with good waste management systems. This assessment is based on the availability of a sufficient number of bins, materials from trash cans, waste collection systems and free from vectors. Mosques that have poor waste management have

shortcomings in the number of bins they have, and do not have a regular waste transportation system.

F. Clean Water Source

Table 6. Frequency Distribution based on Mosque Clean Water Sources in Padang City

Water Source	Frequency	%
TAPS	13	44.8
Drilled Wells	7	24.1
Dug Wells	7	24,1
Dug Wells and PDAM	1	3,4
Rivers and PDAMs	1	3,4
Sum	29	100

The results of the research obtained were from 29 mosques that were examined, there were 13 mosques that used clean water sources from PDAM and 16 other mosques used clean water sources from drilled wells, dug wells and rivers. The source of clean water has been tested for physical, chemical, and biological parameters of water.

G. Wastewater Disposal

Table 7. Frequency Distribution based on Mosque Wastewater Discharge in Padang City

Wastewater Disposal	Frequency	%
Good	28	96,6
Bad	1	3,4
Sum	29	100

The results of the study obtained were that 29 mosques where 28 mosques had good wastewater disposal. Mosques that have poor wastewater discharge are caused because they do not have a wastewater disposal system.

H. Toilets and Latrines

Table 8. Frequency Distribution based on Toilets and Mosque Latrines in Padang City

Toilets and Latrines	Frequency	%
Good	29	100
Bad	0	0
Sum	29	100

The results of the study obtained were dari 29 mosques that were checked all mosques had good toilet and latrine conditions. The good condition of the toilets and latrines in the mosque is seen based on the cleanliness of the toilets, floors, separate latrines, there is a septic tank, free from vectors.

I. Lighting

Table 9. Frequency Distribution based on Mosque Lighting in Padang City

Lighting	Frequency	%
Good	29	100
Bad	0	0
Sum	29	100

The results of the study obtained were that 29 mosques that were examined all masijids had good lighting

conditions. The good lighting conditions are bright and not glare.

J. Ventilation Conditions

Table 10. Frequency Distribution based on Mosque Ventilation Conditions in Padang City

Ventilation Conditions	Frequency	%
Min ventilation area. 15% floor area	28	96,6
Using air conditioning. Fan Exhauster	29	100

The results of the study obtained were that 29 mosques were inspected all mosques had good ventilation conditions. The good ventilation condition is to have a min natural ventilation area. 15% floor area and has also used air conditioning ventilation. Fan Exhauster.

DISCUSSION

A. Sanitary Condition of the Mosque

One of the places that must organize sanitation of public places is the mosque, because it is one of the places of worship that is crowded with people, which if not sanitary will have a negative impact on the health of its visitors. If the sanitation of the mosque is not qualified, it will potentially become a medium of disease transmission and may cause new problems in the surrounding environment (9). As according to Algamar, one place that is widely chosen is the mosque, especially the nearest mosque in the event of a disaster. (21)

Based on the results of the assessment of sanitary inspections of places of worship (Mosques) according to Kepmenkes 288 concerning guidelines for the health of public facilities and buildings in 2003, most mosques in the green zone of the tsunami and earthquake disaster in Padang City (29 mosques or 100%) are in good sanitary condition. According to Martias, who said the unqualified sanitary condition of the mosque can potentially become a medium of disease transmission and can cause new problems in the surrounding environment, and vice versa. (22)

B. Location of the Mosque

Based on the results obtained from the 29 mosques examined, the distance between the mosque and the highway is within 5 meters, with a short distance of 7 mosques, a long distance of 9 mosques, and a distance between the mosque and the highway in 5 meters totaling 13 mosques. Based on Kepmenkes 288 / MENKES / SK / III / 2003 concerning Health requirements for places of worship (Mosques), the location or location of a good mosque is not in the wind direction and far from sources of pollution such as smoke, odor and other contamination (10).

C. Mosque Construction

Based on the results obtained from 29 mosques inspected, all mosques have good construction conditions. Starting from the floor condition that is easy to clean, flat and waterproof surfaces. The condition of walls of the mosque is clean, waterproof, and light-colored. The condition of roof and gutters of the mosque did not leak and

there was no stagnant water. Stairs in mosques have a minimum step width requirement of 30 cm, a maximum step height of 20 cm, there are handrails, the width of the stairs is >150 cm. The construction of these 29 mosques is said to be a good category because it is in accordance with the guidelines for the health of public facilities and buildings based on the Decree of the Minister of Health No.288 of 2003. Therefore, with good mosque construction, it can be an alternative place for final evacuation in the event of a tsunami disaster later. However, for development in mosque construction, it is still very necessary because there are still many less extensive mosque collaterals and also the institutional orientation of disaster management in Indonesia, in general, is still more focused on handling emergency response and not yet on the aspects of disaster prevention and risk reduction. (24)

D. Mosque Courtyard

Based on the results obtained from 29 mosques inspected 25 mosques or 86.2% with good mosque yard conditions. A good mosque yard based on the Decree of the Minister of Health No. 288 of 2003 on the fence section is to have a strong fence. In the courtyard, there is a clear batar boundary and on the mosque lawn there is a large parking space. The good category here is that the mosque yard is not hollowed out and has dense soil so that later when it rains there is no puddle of water on the mosque lawn. This is supported by research conducted by Eko Sugiarto on the Sanitation Review of the Fatimatuzzahra Mosque, North Purwokerto District, Banyumas Regency in 2013, stating that it must be clean and there is no stagnant water (11).

E. Waste Management

Based on the results obtained from 29 mosques inspected, 28 mosques or 96.6% with a good waste management system. This assessment is based on the availability of a sufficient number of bins, the material for manufacturing bins is strong, rust-resistant, waterproof and has a lid. There is a routine waste transportation system and trash cans that are free from vectors and misses. Mosques with poor waste management have shortcomings in the number of trash cans they have, most trash cans do not have lids and do not have a regular waste transportation system. Conditions like this, namely not having regular transportation of garbage will result in a buildup of the amount of garbage, which will later be scattered in the mosque environment and look shabby and cause air pollution, which causes an unpleasant smell. According to Chandra (2007) good solid waste management has several stages, namely collection and storage at the source place then the transportation stage (12).

F. Clean Water Source

Of the 29 mosques inspected, there are 4 types of clean water sources used, namely PDAMs, drilled wells, dug wells and rivers. 13 of the 29 mosques have clean water sources from PDAMs. The 4 types of clean water sources have been tested for physical, chemical, and biological parameters of water. The test results show that they meet the requirements of environmental health quality standards for water media for sanitary hygiene purposes on physical and chemical parameters in Permenkes No. 32 of 2017.

Water for sanitary hygiene purposes is also used to maintain individual hygiene such as bathing, and

toothbrushes, as well as for washing foodstuffs, tableware and clothing. In addition, water for sanitary hygiene purposes can be used as raw drinking water(13). The criteria for clean water are not cloudy, colorless, tasteless, odorless, has a neutral pH, does not contain toxic chemicals, low hardness, and does not contain pathogenic bacteria (14). In disaster evacuation, a building can be declared feasible if it has a sufficient supply of clean water of at least 15 liters per person per day(5). The role of water as one of the inseparable parts of the concept of sanitation and hygiene is because water is support for human health, besides that it is also a supporter of the concept of good sanitation and hygiene (15).

G. Wastewater Disposal

Based on the results obtained from 29 mosques that were checked for wastewater management, they have met wastewater conditions based on permenkes No. 288 of 2003 concerning guidelines for the health of public facilities and buildings (places of worship). Ablution activities and activities in the bathroom are activities that can produce waste in the mosque. The greater the number of pilgrims, of course, the greater the liquid waste produced(16). The condition of liquid waste management in the green zone mosque of Padang city, wastewater disposal is separated with rainwater sewers, sewage flows smoothly, and sewers are closed.

H. Toilets and Latrines

Based on the results obtained from 29 mosques that were checked the condition of toilets and latrines in mosques in the good category in the range of 67-100%. Most of the mosques are in the green zone of the city of Padang with clean and odorless conditions. 27 mosques or 93.1% with floor conditions on latrines and urinals have met the requirements of being impermeable to water cane from ceramics, having a slope towards the sewer. And 29 mosques or 100% of mosques located in the green zone of the city of Padang have separate latrines between men and women, there are saptictanks and are free from vectors and longings. According to Alamsyah, the use of MCK facilities at worship sites can greatly help the community in the surrounding environment, especially for economically weak communities who have not had access to clean water facilities. (23)

I. Lighting

Based on kepmenkes No. 288 of 2003 concerning guidelines for the health of public facilities and buildings based on the results obtained from 29 mosques inspected all mosques have met the lighting requirements on mosque buildings with bright light conditions and no glare. Lack of light can result in eye fatigue, in completing tasks, complaints of soreness in the eye area and headaches around the eyes, over a long period of time causing damage to the eye senses and mental fatigue(17).

To maximize natural lighting in mosques, especially in mosques that are in densely populated neighborhoods, it is better to arrange the type and size of the openings. In openings with a clear glass type that includes quite a lot of light, you should use a size of 2:3 opening and wall ratio or 1:1 ratio. In openings with a relatively light-blocking type of window film, we recommend using a ratio size of 3:2 or more than that(18).

J. Ventilation Conditions

Based on Kepmenkes No. 288, the requirement for natural ventilation in mosque buildings is with a minimum of 15% floor area. Of the 29 mosques inspected, there are 28 mosques or 96.6% that have natural ventilation areas with a minimum of 15% of the floor area and all mosques have also used air conditioning ventilation. Fan Exhauster. In the context of a building, ventilation is the alternation of dirty air in a room with clean air. While natural ventilation is the process of changing the air of the room by fresh air from outside the room without including mechanical equipment (19). According to Notoatmojo (2007) ventilation functions to protect the room from bacteria, especially pathogenic bacteria and keep it at optimum humidity. Poor air circulation can result in the risk of breeding grounds for pathogenic bacteria and disruption of the comfort of mosque users because the temperature and humidity are not optimal (17).

K. Availability of Mosque Sanity Facilities as an Alternative to Evacuation

In Law No. 24 of 2007 Preparedness is a series of activities carried out immediately at the time of a disaster to reduce the adverse impacts caused by a disaster. Disasters can result in people being homeless. Victims who are homeless need temporary housing. Temporary residences commonly used by the community are places of public facilities such as places of worship and school buildings (20).

According to the Handbook of Temporary Evacuation Sites from UNHCR (2011), there are several requirements for temporary shelters, including that the shelter should be in an area that is free from all disaster threats, bebas from internal and external security disturbances, jauh from disaster-prone areas, so that the community feels comfortable, a da land use rights or places that are clear / licensed / or agreed upon by various parties, diutamakan the results of coordination with the government and local communities, mhave easy access to clean water, health services including by raga, bebas from the threat of security disturbances both internal and external, te for dirty water disposal, garbage disposal or other residues from refugee activities, b ukan is an endemic/disease area, a man is accessible for women and children, bukan is a conservation or protected area, metode shelter does not violate local culture, s The truck is stable, so it can protect refugees from the heat of sunlight, angina and cold, and can provide standard basic facilities for basic needs, especially for soup kitchens, sanitation and rest areas (7).

Mosque is a sacred place that in everyday life is used as a place of worship. With the tsunami and earthquake in Aceh in 2005, mosques became strategic places for disaster evacuation. This change in conditions changes the mindset of the community where mosques are not only used as places of worship, but when disasters occur. Likewise, mosques are inseparable from the availability of supporting facilities such as electricity, clean water, places of worship, places of negotiation, toilets, and good resting places. (21)

CONCLUSIONS AND SUGGESTIONS

Based on the results of research and discussion, it can be concluded that from the 29 mosques studied, all mosques were obtained in the category of sanitation, construction, toilets and latrines, lighting and ventilation conditions of mosques in the city of Padang. While the location of the

mosque is mostly located close to Jalan Raya, the mosque yard is mostly in good condition, waste management is mostly with a good system, clean water sources use more water sources from PDAM and for wastewater disposal most of them are already in good condition. This can be used as an evacuation site, so the main thing that must be done is the maintenance of the sanitary condition of the mosque so that it is maintained and can become a proper evacuation site.

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