Jurnal Ilmiah Wahana Pendidikan, Juli 2024, 10 (13), 1077-1082
DOI: https://doi.org/10.5281/zenodo.13606957
p-ISSN: 2622-8327 e-ISSN: 2089-5364
Accredited by Directorate General of Strengthening for Research and Development
Available online at https://jurnal.peneliti.net/index.php/JIWP

The Influence of Noise Levels from Residents' Activities in the Andalas Traditional Market Area, Gorontalo City

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Received: *3 Juni 2024*
Revised: *18 Juni 2024*
Accepted: *28 Juni 2024*

Abstract

Noise problems caused by crowded urban markets make it difficult for people to find a quiet location. Andalas has many settlements, especially in the market area, which is located in urban areas and on the edge of the highway, which is also close to the market. This study aimed to determine the effect of market noise on health. The noise levels were measured using a sound meter measuring instrument, which was measured in three places: a clothing store, a fish store, and a public parking lot. Hypothesis testing was done using the chi-square statistical test with a 95% confidence level (p = 0.05).

Keywords: *Noise, Sound Meter, Public Health*

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How to Cite: *Meidji, I., Demulawa, M., & Jayadi, H. (2024). The Influence of Noise Levels from Residents' Activities in the Andalas Traditional Market Area, Gorontalo City. Jurnal Ilmiah Wahana Pendidikan, 10(13), 1077-1082. https://doi.org/10.5281/zenodo.13606957*

INTRODUCTION

The increasing population changes many activities in urban areas. In addition to being influenced by rapid population growth, changes in population mobility are also influenced by increased socio-economic activities in urban areas (Balirante et al., 2020). Excessive population growth will have negative environmental consequences, including increased environmental noise due to changes in population mobility. One of the environmental pollution factors is noise. The increase in services and infrastructure that support the increasing human needs in urban areas also affects noise levels (Setyowati, 2014). The World Health Organization (WHO) states that noise is any sound that is unnecessary and negatively impacts a person's quality of life, health, and well-being. Sounds that are too loud cause noise. This noise is a threat to the environment. Unwanted sounds produced by businesses or activities at a specific volume and frequency are called noise. The presence of noise, such as deafness or hearing loss, is one of the health problems that can be caused by it (Babisch, 2022; Hustim & Fujimoto, 2012).

The increasing number of vehicles and rapid population growth also affect noise levels. The increasing number of vehicles on the highway will cause many problems that disturb the community and add to the environmental burden. The increasing noise and noise pollution caused by the increasing number of vehicles is felt in the environment near the highway. The noise produced by motor vehicles, both two-wheeled vehicles, four-wheeled vehicles, and heavy vehicles, is caused by the sound produced by the horn, the gas pedal that experiences excessive pressure, and the exhaust used for racing purposes. Noise is produced by all vehicles, but the source and volume of noise vary greatly depending on the type of

vehicle. This potential will have an impact on the acoustics of the living environment. Heavy traffic will be disturbing for a long time. Noise pollution can be caused by market activities, manufacturing machines, airports, and other noise sources (Setiawan, 2010). The market, as a center of trade and services, supported by the increasing number of cars people use, is expected to cause uncontrolled noise. In a market, many sellers and buyers meet to make transactions for buying and selling goods and services. This buying and selling transaction is usually called trade. Our daily lives involve trade. This trade is based on the desire of buyers to meet their needs (Rusmayanti et al., 2021).

Measurement of noise levels in the market can be done to find out how much noise is generated by market activities and the effects it produces. Noise levels are the subject of many studies. Thus, the louder the sound produced, the louder the noise level. Noise occurs when surrounding sound sources increase regularly, and the sound becomes unwanted or undesirable. The noise level in the general environment changes constantly, so it must be checked and evaluated every 24 hours. The recommended noise level in the market is 70 dB (Umiati, 2012). A tool that can be used to measure noise levels physically is a sound level meter. This tool has a working mechanism that can capture changes in air pressure when objects move, which then moves the indicator meter (Harahap, 2016).

The density of activity in public places can cause tolerable and intolerable noise. According to research by Ninda Ramita and Rudy Laksmono (Ramita & Laksmono, 2011), noise levels that exceed the threshold cause communication disorders, rest time disorders, sleep disorders, work activity disorders, adverse effects on unborn babies, decreased human hearing function, and decreased environmental quality. According to research conducted by Ahmad Styvani Alfiyanul Mukhlishin (Mukhlishin, 2020), noise in the Krian Market in Sidoarjo is caused by trade, industrial, and traffic activities, and noise that exceeds the threshold can endanger the surrounding community. These negative impacts include market environmental pollution, disrupting community activities, disrupting sleep, disrupting concentration, and even various physical and mental problems.

Based on above, noise levels should be measured in markets and other public places. As a fairly large shopping center in Gorontalo, the Andalas traditional market can certainly produce quite high noise levels. This is because the market is a culinary center in the middle of Gorontalo city, so many people come when it is their turn to open. Therefore, this study aimed to determine the noise level in the Andalas Market area. The intensity of the noise measurement results was analyzed using the chi square statistical test so that the degree of confidence was obtained to find out how noise levels affect community activities in the Andalas Market area, and how noise affects people and the environment in the Andalas Market area.

RESEARCH METHOD

This research was conducted on Saturday, March 18, 2023. This research began with determining the location of data collection from noise sources. Based on the results of the preliminary survey, the location chosen as the research location was the Wednesday and Saturday market located in Tapa, Sipatana District, Gorontalo Regency.

The location of the Wednesday and Saturday market was chosen because it is close to residential areas and also the location of the road shoulder that is often passed. After all, it is a transportation route connecting the Andalas-Tapa road. At this research location, there are 2 points that can also be called points that cause above average noise: a place selling clothes and a place selling fish.

Figure 1. The location of research data collection located at Andalas Market, which is marked with a red mark

The materials and tools used are:

1. Sound meter application to collect research data.
2. Meter to measure distance.
3. Google Earth will be used to determine the data collection location.
4. Stopwatch to calculate time.
5. Laptop to store the data obtained.
6. Stationery to write data that has been obtained in the field.

This research was conducted using the direct observation method in the field (direct observation). To use the sound meter application by placing the tool precisely 2 meters from the noise source at each location.

The data collection process was carried out for 6 hours, and data collection was carried out every 30 minutes. This data collection started from 06.00-12.00 WITA. Because data collection was taken every 30 minutes, 12 data were obtained for 1 data collection point.

RESULTS AND DISCUSSION

The measurement of noise levels at the Andalas Saturday market lasted for 6 hours (06.00-12.00 WITA), as seen in Table 1, and has varying noise levels where the noise level at the clothing sales place at around 09.00 - 09.30 WITA has the highest noise value of 84.3 dB and the slightest noise at 11.30 - 12.00 WITA with a noise value of 42.3 dB (Figure 2).

From the curve model below (Figure 2), it can be seen that the noise level in the Andalas market exceeds the noise level that should be received by the human hearing sense. This curve also has several incidents where the noise level fluctuates, decreasing or increasing, and this can be caused by several factors, including the number of people coming and going and the number of vehicles.

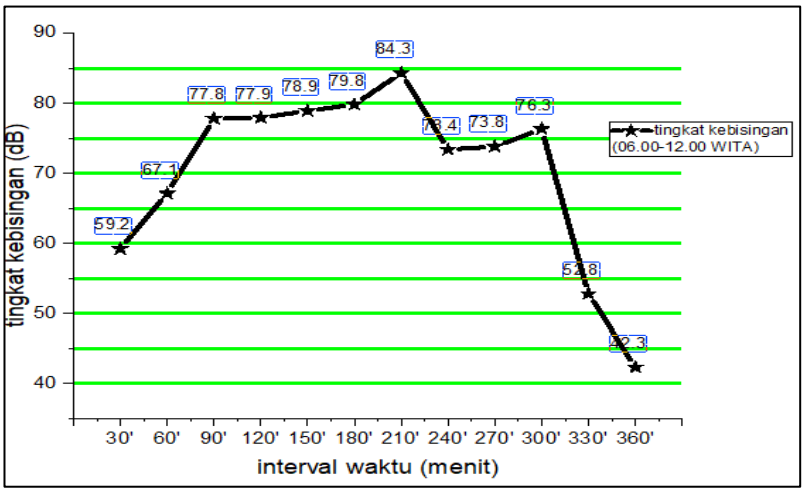

Figure 2. Curve model of noise level data taken in the research Area at the clothing sales place

Noise level measurements at Andalas Market also occurred at the fish sales place. The measurements used a sound meter. Data collection took place for five hours, namely from 06.00 to 12.00 WITA (Table 2).

The noise levels obtained from the research location at the fish sales place varied, with the highest noise level occurring at 09.00 - 10.00 WITA, with a value of 70 dB, and the lowest noise level occurring at 10.30 - 12.00 WITA, with a value of 50 dB (Figure 3).

The curve model plotted from the research results shows that the noise level at Andalas Market, precisely at the fish sales place, experienced a fluctuating value; the number of activities from the community caused this. When there is an increase in noise levels, the location where the data was taken has many people carrying out fish buying and selling activities, in contrast to conditions with low noise levels, where this incident is influenced by the number of community activities, where at that time many people have gone home, and the consequence is that there will be a decrease in selling and buying activities.

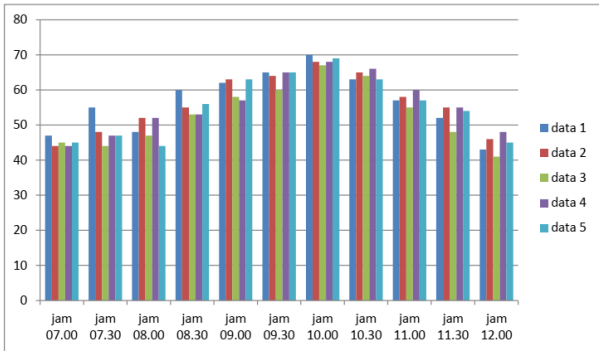

Figure 3. Curve model of noise level data taken in the research area at the fish sales point

Table 1. Time of research data collection at the clothing sales point

Time	Information
06.00-06.30	This noise comes from the voices of traders preparing their sales areas.
06.30-07.00	This noise comes from visitors who have arrived at the data collection location and the voices of sellers setting up their sound to promote their merchandise.
07.00-07.30	Caused by loudspeakers by traders and also buyers who are at the location.
07.30-08.00	Caused by loudspeakers by traders and also buyers who are at the location.
08.00-08.30	The noise is currently decreasing because the previously used loudspeakers are no longer used because the power supply to them has been cut off. This noise is only felt by the shouts of traders and visitors.
08.30-09.00	The noise has decreased to the 60s due to the reduction in traders using loudspeakers to promote their merchandise, so this noise only comes from buyers and traders shouting far from the data collection location.
09.00-09.30	This noise has increased significantly because visitors are getting more crowded, and all the loudspeakers are being used.
09.30-10.00	This noise comes from the sound of music, the voices of sellers promoting their merchandise, and visitors passing by.
10.00-10.30	The noise is still the same as in the previous period, which comes from the sound of music and the voices of traders using loudspeakers to promote their merchandise.
10.30-11.00	This noise has decreased because the sound source only comes from music using loudspeakers.
11.00-11.30	This noise comes from the voices of visitors and traders, some of whom have started to tidy up their merchandise.
11.30-12.00	This noise only comes from music played using loudspeakers, traders arranging their merchandise, and the sound of vehicles coming in and out.

Table 2. Time of research data collection at fish sales points.

Time	Information
06.00-06.30	This noise comes from the voices of traders who are preparing their sales areas.
06.30-07.00	This noise comes from buyers who are starting to arrive.
07.00-07.30	Noise caused by sellers offering their wares.
07.30-08.00	Noise comes from the music of the Cabo clothes traders and the voices of traders next to the fish sales area.

CONCLUSION AND SUGGESTIONS

The study measuring noise in the Andalas market was conducted at 2 points with time variations every 30 minutes and was conducted for 6 hours (06.00-12.00 WITA). The first location showed that the noise level in the Andalas market varied from the lowest, 42.3 dB, to the highest, reaching 84.3 dB. This is different from the second location, where the measurement results showed that the lowest noise level reached 50 dB and the highest noise level reached 70 dB. This difference is influenced by the use of sound systems (loudspeakers) used by clothing sellers to carry out these activities. The effect of noise on physiological disorders is that some

people feel very disturbed and become dizzy so it can also affect performance and concentration when making purchases. The noise level in Andalas market on Saturdays at the fish sales place is quite high and can cause health problems. Therefore, it is necessary to take action to reduce noise in the market and socialize traders and visitors about the importance of maintaining environmental cleanliness and arranging merchandise so as not to disturb the surrounding environment.

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