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Analysis of noise level in the aroepala food city area in Makassar

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Abstract. The development of various kinds of food court concepts such as the availability of wi-fi facilities, live-music / music concerts that are rapidly increasing can have an impact on the environment. One parameter of environmental pollution is noise. This study aims to analyze the noise level and the perception of visitors and the public. This research was conducted in Aroepala Food City, which provided live music/ live music. Noise measurement was carried out by five observation points in ten minutes per hour for ten hours, and questionnaires were distributed to one hundred respondents. Likert scale for the calculation of the questionnaire score, followed by a simple linear regression analysis to look for the influence of music concert noise and interference. The results of this study indicate the existence of a music concert/ live music has a significant influence on the noise level around Aroepala Food City with an average noise intensity exceeding the quality standard. Based on the results of simple linear regression analysis shows that there is a positive influence of noise level on noise disturbance perceived by visitors and the community above fifty percent.

1. Introduction

Along with the rapid economic growth, from time to time, businesses in the food and beverage sector have a tendency to continue to increase, both in terms of quantity and quality. Food or beverage business encompasses a variety of forms and concepts that are often referred to as food courts.

The development of various kinds of food court concepts such as the availability of wi-fi facilities, live-music / music concerts that are rapidly increasing can have an impact on the environment. One parameter of environmental pollutants is the noise caused by the sound of music and vehicles used by visitors, both private vehicles and public transportation. Facilities and infrastructure of life that support human life used by urban communities contribute to noise levels [1,2].

The center of the trade and service industry, which is supported by transportation facilities that tend to grow rapidly, is feared to produce uncontrollable noise [3,4]. One example of the construction of a new food court in Makassar is in Aroepala Food City. Based on the background above, this paper aims to analyze the noise level in the Aroepala Food City area and analyze the perceptions of visitors and surrounding communities.

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2. Literatur Review

2.1. Noise

Noise, according to the Decree of the State Minister for the Environment Number: KEP-48 / MENLH / 11/1996, is an unwanted sound from a business or activity at a certain level and time that can cause disturbance to human health and environmental comfort.

2.2. Noise mapping and contour

Mapping is interpreted as a visual depiction that produces a map, while noise mapping means a visual depiction of the level of noise generated at each point of observation where this measurement will produce a noise contour map.

2.3. Instrument test

The instrument test is divided into two. First, the validity test is intended to ascertain how well an instrument measures the concept that should be measured. The reliability of the instrument is the clarity or accuracy of the measuring instrument.

2.4. Regression analysis and correlation

Correlation and regression both have a very close relationship. Every regression must have a correlation, but the correlation is not necessarily followed by regression. The correlation that is not followed by regression is the correlation between two variables that do not have a casual/causal relationship or a functional relationship. It must be based on theories or concepts about these two variables to determine whether the two variables have a tangled relationship or not.

3. Research methods

3 .1. Research sites

The research location is in the Aroepala Food City Area on Jalan Aroepala and the distance of the observation points taken from the source (stage). Observation point 1 is right in front of the stage of the audience area, observation point 2 is in the backstage area, observation point 3 is outside the food court precisely on the road where it represents the volume of traffic going, observation point 4 is in the residential area right behind the area of the food court area, and point five is in the parking lot. For the location of observation points, the distance is in Figure 1 and Table 1.

Figure 1. Location map of the aroepala food city.

Table 1. The distance of observation points to the source (Stage).

No	Distance (m)	Lintang	Bujur
point 1	9	-5.173763°	119.454928°
point 2	27	-5.173819°	119.455230°
point 3	40	-5.173788°	119.454655°
point 4	21	-5.173572°	119.455076°
point 5	50	-5.173486°	119.454642°

Based on pictures and tables in the second location above observation points, 1 and 2 are in the Aroepala food city area where point 1 is in the visitor area right in front of the stage, so it is close to the speaker position while for point 2 is in the visitor area near the toilet but far away from the speaker stage. At observation point 3 is on the Aroepala road shoulder area where this place is access to the Aroepala area and observation point 4 is in a green complex housing where the position of this point is taken because it is right behind the dividing wall of Aroepala Food City tenants, and the last observation point is point 5 is in the parking area.

3.2. Measurement tool

1. Sound level meter (SLM) Tenmars TM-103, Tripod, and Smartphone types are performed when taking noise level data.
2. The questionnaire, the distribution of the questionnaire was distributed to each observation point, and each point was distributed by 20 respondents.

3.3. Data collection technique

The data collection stage is as follows:

1. Noise measurement using SLM and Smartphone with the Decibel X Pro application and then calibrated.
2. Analyzing the effect of music concerts on noise levels where calculation stages such as LI, L10, L50, and L90 are calculated to get the daily equivalent noise level (LAeq, day).
3. We are analyzing the effect of music concerts on noise levels using the paired sample t-test with the help of the SPSS program.
4. The surfer 12.0 noise level distribution pattern method is used to determine the noise spread pattern that occurs at the measurement location then the distribution of noise points and contours is made using the Surfer 12.0 program.
5. It is analyzing the perception of the level of noise disturbance from the analysis of the results of the questionnaire data processed using the Microsoft Excel program and the SPSS program so that it can analyze the statistical test questionnaire's perception of disturbance of the audience and surrounding residents.

4. Results

4.1. Noise level

The noise level between there is no live music, and the presence of live music has a sign at each different point [5]. Observation points 1 and 2 are of significant significance because these two points are within the Aroepala Food City area in the visitor area where it is close to the music source. At point 3 has a small difference this results because the observation point is outside the area that is the shoulder of the road so that the influence of the traffic volume generated from vehicle noise, exhaust and horn has been large causing the noise level to rise slightly when the music goes on. At observation point 4 is on a residential street where the noise level when there is no music is 60.55 dB, and there is music going up to 64.01 dB with the category having a small significant level this is because point 4 is outside the area and there is a wall blocking the place that. Observation point 5 is known there is

almost no difference between the existence of live music and no live music this is because point 5 is in the parking lot was far from the source and volume of traffic so that the resulting noise level comes from the source itself, it can be said point 5 is not influenced by the source of music and traffic. The noise level before live music and during live music can be seen in Figure 2.

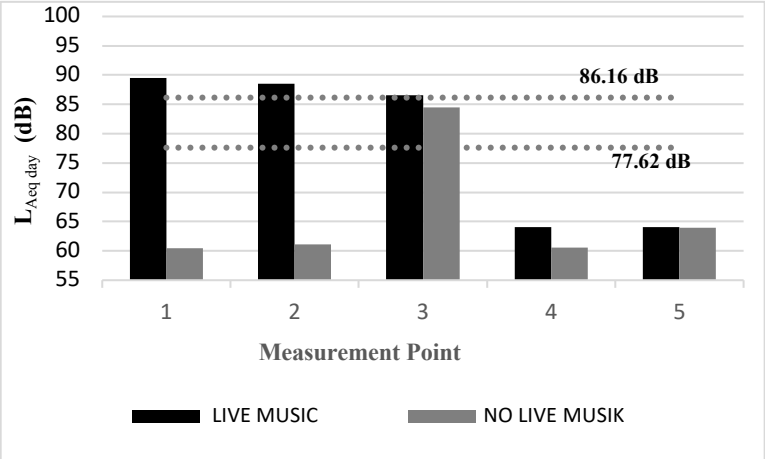


Figure 2. Noise level histogram.

The histogram above shows that the average noise level during music at all observation points is 86.16 dB; for LAeq value, the maximum day is at observation point 01 at 89.53 dB; this is because the point is in an area close to the source speaker music. LAeq, the minimum day is at observation point 4 of 64.01 dB, where point 4 is in residential areas. This is because the speakers from the music do not lead to a settlement, and there is a boundary wall between the area and settlement. While the average noise level no music took place, at all observation points at 77.62 dB, for LAeq day the maximum was at observation point 03 at 84.52 dB this is because the observation point was outside the area ie, the sidewalk was close to the highway, so the influence of the traffic volume generated from vehicle sound, exhaust and horn, and LAeq day minimum is at observation point 01 at 60.48 dB where the observation point is close to the source/stage so that when the music does not take place the noise generated is not great.

A statistical test was carried out in the form of a hypothesis test with the application of paired sample t-tests with significant values to find out the influence of live music shows on noise levels around the Aroepala Food City area, namely:

If the Significance value (Sig.) <0.05, the conclusion is that there is a significant difference, which means there is an influence. If the Significance value (Sig.)> 0.05, the conclusion is that there is no difference, which means there is no influence from the results of hypothesis testing (t-test) using the SPSS program, where the test results can be seen in Table 2.

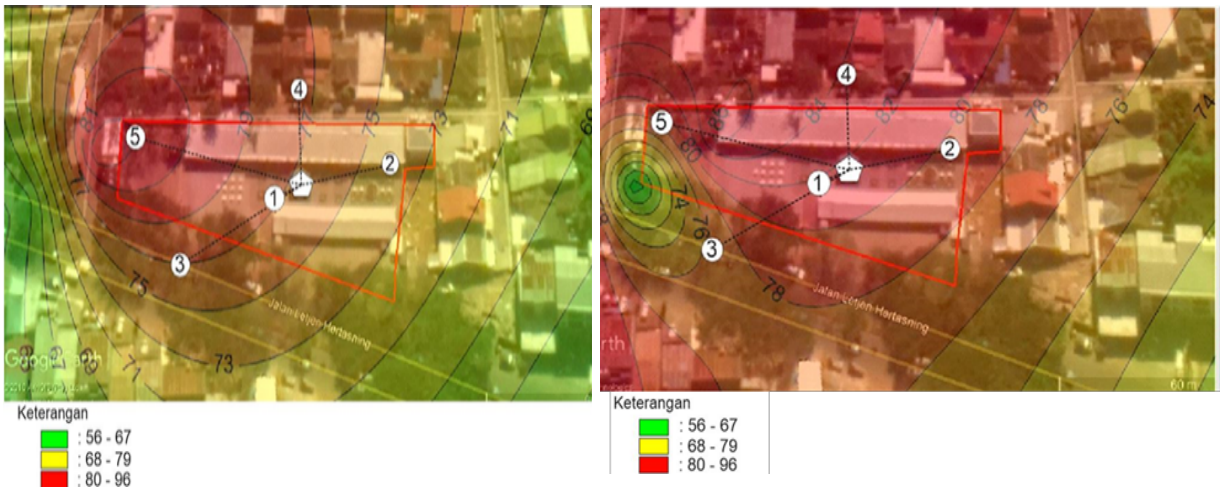
Table 2. Statistical test results.

Area	Sig(2-tailed)	Taraf Sig.	Information
Aroepala Food City	0.033	0.05	Weigh

From the table above, you can see the value of Sig. 0.001 <0.05, it can be concluded that the presence of live music gives an increase in the level of noise around the area where the live music takes place, seeing the average data obtained by increasing the noise level when the music goes on, and no music has a difference of 8.54 dB.

When compared with the Noise Quality Standard Standards according to KepMen-LH No. 48 of 1996 and Ministry of Public Works Guidance no. 13 of 2003) at points 1 and 2 are devoted to trading by 70 dB seen from the results when the music goes on then exceeds the standard, points 4 and 5 are devoted to settlements by 55 dB when viewed from the results obtained when there is music and no music exceeds the standard, and point 3 for commercial roads is 76 dB seen from the results obtained which are> 80 dB then declared not according to standard.

Within certain technical accuracy limits, the denser noise levels indicate the higher noise level differences in certain areas. Conversely, the less noise level shows there is no high difference in noise [6]. Contour manufacturing is very useful in visualizing noise over a fairly wide area. The depiction of the pattern of distribution of the area of the food court area of the noise level by using the contour is visualized with three levels of colors, namely green, yellow, and red, and distinguished when the music goes on, and there is no music. For more details, see Figure 3.



(a) **(b)**

Figure 3. Contour noise level distribution no music and live music in aroepala food city.

Based on Figure 25. the image contour is known a (no music) the whole area is yellowish-green so that the entire measurement point is in the region with noise values ranging from 66-74 dB while for image b the color of the area changes to orange-red with noisy values ranging from 72-88 dBa this is due to the presence of music taking place so that it affects the spread of noise levels it can be concluded, the influence of dominant music concerts at all measurement points in the Aroepala Food City Area.

4.2. Perception of data analysis results in a noise interference level.

After calculating the score using a Likert scale, the instrument has passed the instrument testing in the form of a validity test for each question item, and the reliability test uses the SPSS program and has fulfilled the classic assumption test in the form of a normality test, linearity test, and heteroscedasticity test, which also uses the SPSS program. The simple linear regression test results can be seen in Figure 4 as follows.

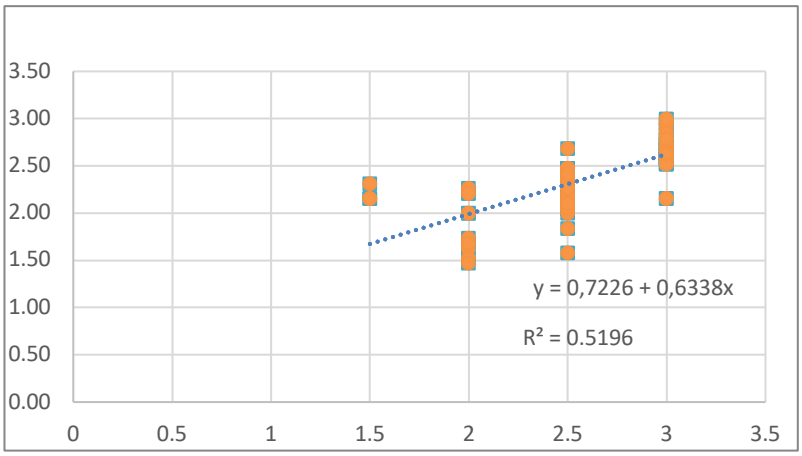


Figure 4. Equation of the regression model equation.

From Figure 4, we are explaining the magnitude of the effect of the noise level on noise disturbance that is equal to 51.96%. And the noise disturbance value is 0.6338, with a regression coefficient of 0.7226. Because the regression coefficient value is (+), then it can be said that the noise level (X) has a positive effect on noise disturbance (Y). So the regression model equation is Y = 0.7226 + 0.6338x.

5. Conclusion

The following conclusions:

1. The existence of live music in Aroepala Food City has a significant influence on noise levels in the region. There was an increase in noise levels during the music concert program, where the average yield had a difference of 8.54 dB.
2. There is a relationship between the perception of noise level with the perception of the level of disturbance that is felt by the audience and surrounding residents, from the simple linear regression model equation it is found that there is a positive influence of the noise level on the noise disturbance caused, with an effect of 51.96% (*Adjusted R Square, 0.5196).*

Suggestions

Based on the results of the research that has been carried out then as a material consideration, proposed a number of suggestions as follows:

Future studies are suggested to increase the number of observation points with variations in distance and data collection in the region and can measure with special tools for noise exposure. Researchers can then focus more on looking at the relationship between age, sex, and duration of exposure to noise with perceived levels of disturbance.

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