EPIDEMIOLOGICAL JOURNAL OF INDONESIA
Volume 4, Number 1, May 2024, pp. 3~75
Online ISSN: 2964 - 9471
Website: https://journal.paei.or.id
DOI: https://doi.org/10.70326/epidjrid.v4i1

WASTE HANDLING AND FLY DENSITY LEVELS IN THE TRADITIONAL MARKET OF PALEMBANG, SOUTH SUMATERA

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ARTICLE INFO

Article History:
Received: 30 April 2025
Revised form: 30 May 2025
Accepted: 31 May 2025
Published online: 31 May 2025

Keywords:
Tradiotional Markets;
Waste Management;
Flies Population

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ABSTRACT

Background: The market is one of the public places with many visitors and the activities of traders and sellers in the market, which indirectly cause waste in the market every day. Most markets produce market waste consisting of wet and dry waste so that during collection, the piles of waste become nests for flies, rats, and insects and become a source of soil, water, and air contamination, and from an aesthetic point of view, they will cause odors and bad views; therefore, it is necessary to manage market waste properly. Purpose: Knowing the handling of waste and the level of fly density in the traditional market of Palembang City in 2023. **Methods:** This research is descriptive, by means of survey or observation regarding waste handling. The measurement point of fly density was done diagonally with 5 points/market. The total number of points for the four markets is 20 measurement points. **Results:** The results showed that the sorting of market waste did not meet the requirements, the majority of waste collection did not meet the requirements, waste collection met the requirements, and waste processing did not meet the requirements. The highest average fly density in Pasar Kuto was at point 5 (back left) with an average fly density of 8.2 flies/grill block. **Conclusion:** Waste handling in 4 Palembang City Traditional Markets is not fully qualified, and the density of flies exceeds the vector quality standard.

INTRODUCTION

The market is one of the public places with many visitors, and the activities of traders or sellers in the market indirectly produce waste that enters the market every day. Most markets produce market waste consisting of wet waste and dry waste so that during collection, the piles of waste become nests for flies, rats, and insects and become a source of soil, water, and air pollution, and in terms of aesthetics. They will cause odors and views that are not good; therefore, it is necessary to manage market waste properly. Traditional markets in Indonesia are often uncomfortable to visit because they are identical to dirty, smelly, muddy, stuffy places. In addition, they are also breeding grounds for disease-transmitting animals, such as cockroaches, flies, and rats (Yunus, 2020).

Flies are one of the vectors that really like places that smell bad, including markets. In Pematang Siantar City Market, fly density is influenced by the waste management system and the sanitation conditions of the market environment (Manurung, 2018), Market sanitation conditions are closely related to fly density (Nanda et al., 2024). In addition, fly density was also found in the Kuningan market, West Java (Rahim et al., 2020). One of the causes of high fly density is the large amount of waste generated in non-residential areas, especially in markets. Based on data from the Ministry of Environment and Forestry, the amount of national waste generated is 175,000 tons/day, or equivalent to 64 million tons/year if using the assumption that each person produces 0.7 kg of waste per day.

The volume of waste from the population of Palembang City in 2021. Based on data from the National Waste Management Information System (SIPSN) of 430,791.65 tons/year, or an average daily amount of 1,180.25 tons/day. One of the Final Disposal Sites (TPA) in South Sumatra Province is the Sukawinatan Final Disposal Site. Based on data from the Sukawinatan Palembang Technical Implementation Unit Office. Sukawinatan Final Waste Disposal Site is located in Palembang City, precisely in Sukajaya Village, Sukarami District, Palembang City, with an area of approximately ± 25 hectares, and has been operating since 1994. Sukawinatan is used for waste disposal from industrial activities, markets, and household activities; the amount of waste collected is approximately 600 tons/day.

Market sanitation conditions that do not meet health requirements can cause health problems and pollute the environment. As for vector-based diseases and other ailments caused by waste management and poor environmental sanitation conditions, namely dengue fever and diarrhea (Maksuk & Mardianti, 2023; Nurbaiti et al., 2021; Yulidar et al., 2021). Apart from that, the density of flies can also cause typhoid fever (Lestari, 2017). Therefore, managing waste systems and maintaining sanitation conditions in both residential areas and public places is very important.

Waste management with fly density levels from previous research shows that of the five traditional markets in Makassar City, three markets do not meet the requirements, waste management is still ineffective, and waste bin and TPS facilities do not meet the requirements. With an average of the highest fly density in the Pabaeng Baeng market, an average of 14 flies/block grill (Yunus, 2020). Based on the description above, the majority still do not meet the requirements related to waste management and high fly density figures. Waste that is not handled properly often causes environmental and public health problems, including aesthetic problems, environmental pollution, and increased vector-borne diseases. Therefore, this study aims to analyze how waste management and fly density levels are in traditional markets in Palembang City.

METHODS

This study is descriptive observational with a cross-sectional design. This study was conducted in May 2023 at 4 traditional markets in Palembang City. The number of samples in this study were traditional markets with the same characteristics. Furthermore, fly density measurements were carried out diagonally with 5 points/market using a fly grill block. The total number of points in each of the four markets was 5 measurement points. Data were analyzed univariately and presented using a table. The tools used in checking fly density in the market are fly grills, while thermometers and lux meters are used to measure temperature and lighting.

RESULTS

Waste Management in Traditional Markets

This research was conducted with a checklist and observation on waste management. The results of the study can be seen in table 1 below:

Table 1
Waste Management in Traditional Markets in Palembang City

Waste Management	Assessment							
	KM		SU		LM		KT	
	E	NE	E	NE	E	NE	E	NE
Sorting		✓		✓		✓		✓
Collecting	✓		✓		✓		✓	
Transportation		✓		✓	✓			✓
Processing		✓		✓		✓		✓

E: Eligible, NE: Not Eligible

Based on Table 1, it can be seen that on average waste management does not meet the requirements, and waste collection that meets the requirements comes from 4 traditional markets.

Density Level of Flies in Traditional Markets

The calculation of fly density with fly grills was carried out in several places in the traditional market, namely T1 in the middle, T2 in the front right, T3 in the front left, T4 in the back right, and T5 in the back left. The calculation of fly density can be seen in the following table:

Table 2
Results of Fly Density Measurements at KM Market

Measurement Point	Measurement Results to										Average fly density
	1	2	3	4	5	6	7	8	9	10	
Middle	3	5	4	3	7	6	6	7	3	2	5
Depan Kanan	2	4	5	4	1	3	7	5	4	4	5
Depan Kiri	1	1	0	2	3	0	1	1	2	1	1,8
Belakang Kanan	2	3	3	2	2	4	2	2	1	2	2,8
Belakang Kiri	0	0	1	2	1	0	1	1	2	1	1,4

The density level of flies at KM 5 Market showed the highest results at the middle point with an average of 5 flies/grill block, and the lowest fly density was at the rear left point of the market with an average of 1.4 flies/grill block.

Table 2
Results of Fly Density Measurements at SU Market

Measurement Point	Measurement Results to										Average fly density
	1	2	3	4	5	6	7	8	9	10	
Tengah	3	1	2	2	1	1	2	2	0	1	2,2
Depan Kanan	0	2	1	1	0	1	0	0	2	2	1,2
Depan Kiri	6	7	6	7	1	6	1	3	2	3	6,4
Belakang Kanan	3	2	4	2	4	2	3	1	4	2	3,6
Belakang Kiri	5	7	5	2	4	3	7	4	6	5	6

The density of flies at SU Market was highest at the front left of the market, with an average of 6.4 flies/grill block, and lowest at the front right, with an average of 1.2 flies/grill block.

Table 4
Results of Fly Density Measurements at LM Market

Measurement Point	Measurement Results to										Average fly density
	1	2	3	4	5	6	7	8	9	10	
Middle	0	2	1	1	0	2	1	1	1	0	1,6
Depan Kanan	0	0	0	1	1	0	2	0	0	0	0,8
Depan Kiri	1	0	0	1	1	0	0	2	0	1	1,2
Belakang Kanan	2	1	1	0	0	0	1	1	1	2	1,4
Belakang Kiri	0	2	2	2	1	1	0	1	2	1	1,8

The highest fly density level in the LM Market is found at the left rear point of the market with an average of 1.8 flies/grill block, and the lowest fly density is found at the right front point of the market with an average of 0.8 flies/grill block.

Table 5
Results of Fly Density Measurements at KT Market

Measurement Point	Measurement Results to										Average fly density
	1	2	3	4	5	6	7	8	9	10	
Middle	5	6	8	4	5	7	5	5	3	2	6,6
Depan Kanan	4	2	3	2	2	2	3	1	1	2	2,8
Depan Kiri	2	2	4	2	3	3	2	3	5	2	3,2
Belakang Kanan	7	7	3	6	8	8	5	4	5	3	7,2
Belakang Kiri	7	8	7	7	9	7	5	9	8	6	8,2

In Table 5, the highest fly density level at the KT Market was found at the back left point of the market with an average of 8.2 flies/grill block, and the lowest fly density was found at the front right point of the market with an average of 2.8 flies/grill block.

DISCUSSION

Waste Management in Traditional Markets

The results of the study conducted at KM 5, Sekip Ujung, Kuto, and Lemabang markets from observations in waste sorting from all markets did not meet the requirements by not sorting waste properly; there was no separation of organic and inorganic waste. It was also seen that there was still a lot of waste piling up in some markets and a lot of waste scattered in front of the sales area. There were also no special officers from the market to sort waste according to its type. Law of the Republic of Indonesia No. 18 of 2008 concerning waste management states that one of the waste handling methods is sorting, sorting in the form of grouping and separating waste according to the type, quantity, and/or nature of the waste. This study is in line with Arief's (2018) study on the relationship between waste management and fly density levels in temporary shelters in Madiun City. It was found that TPS carried out waste sorting because there were no special officers assigned as waste sorting officers at TPS.

The results of the study conducted at KM 5, Sekip Ujung, Kuto, and Lemabang markets from observations on average, traders collect their waste in front of their stalls/kiosks using sacks, plastic bags, and containers, and then when the buying and selling activities are finished, the officers then take over collecting the traders' waste to the TPS. Law of the Republic of Indonesia No. 18 of 2008 concerning waste management, one of which is collection, collection in the form of taking and moving waste from the source of waste to a temporary shelter or integrated waste processing site. Each market provides tools used to collect waste from each trader and then take it to the TPS, namely, on average, using a basket that is lifted by hand.

This study is in line with Daeli's (2017) research on the waste collection pattern applied at Nou Market, Gunung Sitoli City, which is an indirect individual pattern that is an activity of collecting waste from each waste source taken to the transfer location (TPS) to then be transported to the final disposal site. The five markets also

carry out the same system by collecting waste from each source, then collecting it at the TPS, and then transporting it by a waste collection fleet to the TPA.

The results of the study conducted at the KM 5, Sekip Ujung, Kuto, and Lemabang markets from observations in waste transportation: from all markets studied, waste transportation was carried out after the buying and selling activities were completed, and for the Lemabang market, 47 waste transportation activities were carried out when the buying and selling activities were completed. This was done so that waste would not pile up in each stall/kiosk. Law of the Republic of Indonesia No. 18 of 2008 concerning waste management, one of the waste handling methods is transportation. Transportation in the form of carrying waste from the source and/or from the integrated temporary waste storage site to the final processing site. Waste from each of the four markets is transported on average 24 hours, and for the four markets, it is also transported in the morning.

In this case, waste transportation should also be carried out when the buying and selling activities are finished, namely at night, so that it does not interfere with buying and selling activities, and it would be better if the waste was transported to the TPA. The results of the study conducted at the KM 5, Sekip Ujung, Kuto, and Lemabang markets from observations in waste transportation from all observed markets did not meet the requirements. Law of the Republic of Indonesia No. 18 of 2008 concerning waste management, one of the waste management methods is processing, processing in the form of changing the characteristics, components, and amount of waste.

All markets do not carry out market processing; this is because there is no participation from traders to carry out waste processing by reducing, reusing, and recycling. Where waste processing can be carried out, it can increase the economic value of the market itself; for example, organic waste from leftover vegetables and fruits can be used as organic fertilizer, and waste produced from plastic bottles can be made into crafts so that it can increase income. Based on Permenkes No. 17 of 2020 concerning healthy markets, namely trash bins made of waterproof materials, not easily rusty, strong, closed, and easy to clean.

Density Level of Flies in Traditional Markets

From the measurement results at KM 5 Market, Sekip Ujung, Kuto, and Lemabang Palembang City with 5 measurement points in each market, the highest results were obtained at point 5 (back left) with an average value of 8.2 tails/grill block in the high category at Kuto Market. While the lowest value was at point 2 (front right) with an average value of 0.8 tails/grill block in the low category at Lemabang Market. The highest fly density was at Kuto Market, with an average of 8.2 tails/grill block in the high category. This was because the location of the measurement point was at the fish and meat stalls with dirty and muddy conditions from the remains of blood waste or fish waste that was still attached to the location.

It was also seen that there was garbage piled up around the measurement point so that it could cause the breeding of fly vectors. While the low fly density level was in the Lemabang market with an average of 0.8 tails/low category grill block, this was because at the measurement point location in the morning approaching noon, there was the existence of a fairly good and clean environment with no garbage that was 50 tails/grill block piled up or scattered around the stalls/kiosks and also the alley. At the time of measurement, the market conditions were not crowded with visitors. So that with these conditions it does not cause the development of fly vectors in the market.

Density of flies was found in the Pancur Batu traditional market (Nanda et al., 2024) and in several traditional markets in Pematangsiantar City (Manurung, 2018). According to the results of previous studies, it was shown that the density of flies was high, and there was a relationship between waste sorting facilities, temporary waste storage, and the level of fly density at the Makassar City Trade Center (Yunus, 2020). The density of flies found in traditional markets in Denpasar City (Dwi Meidyana Putri, 2019).

In the first and second measurements during the day with a fly population index of 36.9 tails/grill block in 10 fly density measurement points with an average temperature of 35.5°C and humidity of 46%, the measurement results at this time increased the level of fly density due to environmental aspects during the measurement, namely, during the day the air temperature increased and humidity decreased. This can happen because one of the characteristics of flies is being a phototropic insect, namely liking light or light. Waste collection that does not meet the requirements is 3 (33.3%) measurement points with a low fly population index, and in waste collection facilities that do not meet the requirements, there are 6 (66.6%) measurement points

with a high level of fly density. Measurement of temporary waste storage facilities that do not meet the requirements is 3 (100%) measurement points with a high level of fly density category (Juherah et al., 2023).

Research Limitations

The limitations of this study are the location of samples and variables that are lacking, so it is necessary to add a large number of samples and variables to strengthen the results of the study. This study is still limited to three traditional market

CONCLUSION

Waste management in traditional markets in Palembang City has not met the requirements, and the fly density level exceeds the vector standard value. or scientific findings obtained. From four traditional markets in Palembang City, the results of sorting and transportation of market waste did not meet the requirements. The highest fly density was found in one of the markets with a measurement point behind the left of the market with the highest fly density of 8.2 flies/grill block and an average for all measurement locations of 5.6 flies/grill block with a high fly density category.

Therefore, it is necessary to carry out a routine fly density and market condition monitoring program by the relevant agencies and education for traders in traditional markets.

AUTHOR CONTRIBUTIONS

The roles of all authors should be listed:AA: Conceptualization, Methodology, Software, MS.: Data curation, Writing- Original draft preparation. SS: Writing- Reviewing and Editing

ACKNOWLEDGMENTS

The author would like to thank the head of the PD Pasar Kota Palembang Market and also the management of the traditional markets in Palembang City, who have given permission to conduct research at the local location.

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