ISSN. 2338-7475
E-ISSN. 2620-7869
Hearty
Jurnal Kesehatan Masyarakat
Berinan, Tulus, Sepenuh Hati,Berbesar Hati, Jujur, Sehat dan Kuat
Vol. 13 No. 5, Oktober 2025, Hal. 1283-1289

PUBLIC PARTICIPATION, WASTE MANAGEMENT, AND FLY CONTROL: IMPACT ON FLIES IN PANCUR BATU MARKET, DELI SERDANG

Dewi Rinanda Tanjung, Meutia Nanda *, Faiqah Adnin Purba, Maznil Suhaima, Rosida Sapriani Harahap
Fakultas Kesehatan Masyarakat, Universitas Islam Negeri Sumatera Utara
Jl. Lap. Golf No. 120, Kab. Deli Serdang, 20353, Medan, Sumatera Utara, Indonesia
Email: meutianandaumi@gmail.com

Abstract

Markets are vulnerable places for fly breeding, especially when waste management and fly control are not properly implemented. Therefore, active community participation is crucial in maintaining market cleanliness through proper waste management and effective fly control. This study aims to examine the influence of community participation in waste management and fly control on the presence of flies at Pancur Batu Market, Deli Serdang Regency, North Sumatra. The research used a quantitative method with a cross-sectional approach. The sample size in this study was 54 respondents, and the data were analyzed using univariate and bivariate analysis with the chi-square test. Based on the analysis results, there was a significant relationship between waste management and fly control with the level of fly presence at Pancur Batu Market ($p < 0.05$). Respondents with poor waste management and inadequate fly control had a higher risk of experiencing high fly presence. Poor waste management increased the risk by 2.246 times, while poor fly control increased the risk by 2.010 times compared to those with good management and control. These findings highlight the importance of community participation in optimizing waste management and fly control efforts to reduce fly populations in market environments.

Keywords: Flies, Market, Waste Management, Fly Control

Introduction

Traditional markets are one of the public facilities that are the center of economic and social activities of the community. In Deli Serdang Regency, especially in the Pancur Batu area, Pancur Batu Market is one of the markets that is quite active and crowded with visitors every day. Buying and selling activities involving various commodities such as vegetables, fruits, fish, meat, and other food ingredients produce large volumes of waste, especially organic waste that rots easily. This condition makes the market one of the most potential places for the development of disease vectors, one of which is flies. (1)

House flies (Musca domestica) are one of the important vectors in the transmission of various environmental-based diseases such as diarrhea, cholera, dysentery, and typhus. Flies breed rapidly in dirty, humid environments that are rich in organic materials, such as piles of market waste. The presence of flies in large numbers not only reduces the comfort of visitors and traders, but can also have a negative impact on the quality of food and the health of the surrounding community. Therefore, good management of the market environment is an important effort in controlling the fly population (2).

Submitted: June-2025 Received: August-2025 Available Online: October-2025

Traditional markets are often breeding grounds for flies because the environmental conditions support the fly life cycle, especially the presence of organic waste such as food scraps, vegetables, fruits, fish, and meat that rot easily. Warm temperatures, high humidity, and piles of garbage that are not immediately cleaned create an ideal habitat for flies to lay eggs and breed. In addition, the lack of sanitation facilities, low awareness of cleanliness, and minimal vector control efforts also exacerbate the high population of flies in the market area (3). One effective approach to creating a healthy market environment is through organized and participatory waste management. Good waste management does not only depend on the provision of facilities and infrastructure from the government or market managers, but also requires active participation from the community, especially traders and market visitors. Community participation can be realized in various forms, such as disposing of waste in its place, sorting waste, maintaining the cleanliness of trading stalls, and participating in mutual cooperation activities and socialization of market cleanliness. The high level of participation indicates a collective awareness in maintaining market cleanliness, which ultimately has an impact on reducing the potential for fly breeding grounds (4).

In addition to waste management, direct fly control efforts, such as spraying insecticides, installing fly traps, and using natural fly repellents also need to be carried out routinely and in a coordinated manner. However, these control efforts will not be effective if they are not accompanied by clean environmental management and active community involvement (5)

Pancur Batu Market is a traditional market located in Pancur Batu District, Deli Serdang Regency, North Sumatra. This market is the center of local community trading activities, especially for basic necessities such as vegetables, fruits, fish, meat, and other daily necessities. With a high level of visits every day, Pancur Batu Market has dense activities and produces a fairly large volume of waste, so it requires good environmental management to maintain the cleanliness and health of the market.

Based on the initial survey conducted, waste management at Pancur Batu Market is still less than optimal. This can be seen from the large number of waste disposals that are not in their place (scattered waste) and piles of waste that are left to pile up without quick handling. These conditions create a dirty and humid environment, which is the main factor for the breeding of flies. The presence of high flies not only disrupts the comfort of buying and selling activities, but also has the potential to transmit various diseases. Therefore, in addition to improving the waste management system, the active role of the community in maintaining cleanliness and controlling flies independently is also needed to create a healthy market environment that is free from disease vectors. Based on this background, the purpose of this study is to see the relationship between community participation with waste management and fly control on the presence of flies in Pancur Batu Market, Deli Serdang Regency, North Sumatra.

Method

This study uses a quantitative method with a cross-sectional approach that aims to see the influence of community participation in waste management and fly control on the presence of flies in Pancur Batu Market, Deli Serdang Regency, North Sumatra. The population in the study amounted to 427 traders who were the inclusion criteria in this study. Sampling using the lameshow formula, the population is known so that the sample in this study amounted to 54 respondents. The sampling technique used simple random sampling where all traders have the same opportunity to be sampled in this study. The type of data in this study uses primary data with sampling through interviews and observations. This research instrument uses a questionnaire. Data analysis uses univariate analysis to see the frequency of each variable and bivariate analysis to see the relationship between independent variables (waste management and fly control) and dependent variables (the presence of flies).

Results

Table 1. Respondent Characteristics

Kerakteristik	Frekuensi (f)	Persentase (%)
Jenis Kelamin		
Laki-laki	11	20,4
Perempuan	43	79,6
Usia		
< 30 Tahun	13	24,1
≥ 30 Tahun	41	75,9
Pendidikan		
Rendah	19	35,2
Tinggi	35	64,8
Total	54	100,0

Based on the characteristics of the respondents, the gender is male 11 respondents (20.4%) and female 43 (79.6%). Respondents with age < 30 years were 13 respondents (24.1%) and age ≥ years were 41 respondents (75.9%). Respondents with low education were 19 respondents (35.2%) and high education were 35 respondents (75.9%).

Table 2. Frequency Distribution of Waste Management and Fly Control among Traders at Pancur Batu Market

Variabel	**Frekuensi (f)**	**Persentase (%)**
Pengelolaan Sampah		
Baik	23	42,6
Buruk	31	57,5
Pengendalian Lalat		
Baik	16	29,6
Buruk	38	70,4
Total	54	100,0

Based on table 2 shows respondents with good waste management 23 respondents (42.6%) and respondents with poor waste management 31 respondents (57.4%). In the control of respondents with good fly control as many as 16 respondents (29.6%) and respondents with poor fly control as many as 38 respondents (70.4%). This indicates that most respondents have poor waste management and fly control.

Table 3. Frequency Distribution of Flies in Pancur Batu Village

Keberadaan Lalat	**Frekuensi (f)**	**Persentase (%)**
Rendah	16	29,6
Tinggi	38	70,4

Based on table 3, the presence of low flies was 16 respondents (29.6%) and the presence of high flies was 38 respondents (70.4%). This indicates that the presence of flies in Pancur Batu Market is quite high.

Tabel 4. The Relationship Between Waste Management and the Presence of Flies in Pancur Batu Village

Variable	Wasting Incident				Total		*P-Value*	PR (95%CI)
	Low		Tall					
	n	%	n	%	N	%		
Waste management								
Good	15	65.2	8	34,8	23	100,0	0,018	2,246 (1,201 – 4,201)
Bad	9	29,0	22	71,0	31	100,0		
Fly Control								
Good	11	68,8	5	31,5	16	100,0	0,042	2,010 (1,158 – 3,468)
Bad	13	34,2	25	65,8	38	100,0		

Based on table 4.5, it shows that in waste management, respondents with good waste management experienced 15 respondents (65.2%) experiencing low fly presence and 8 respondents experienced high fly presence. In poor waste management, 9 respondents (29.0%) experienced low fly presence and 22 respondents (71.0%) experienced high fly presence. The results of the chi-square test showed a P-Value of 0.018 <0.05, indicating a relationship between waste management and the presence of flies and a PR value (95%CI) = 2.246 (1.201 - 4.201) indicating that poor waste management is 2.246 more at risk of experiencing high fly presence than good waste management. In fly control, respondents with good fly control experienced 11 respondents (68.8%) experiencing low fly presence and 5 respondents (31.5%) experiencing high fly presence. In poor fly control, 13 respondents (34.2%) experienced low fly presence and 25 respondents (65.8%) experienced high fly presence. The results of the chi-square test showed a P-Value of 0.042 <0.05 which indicated a relationship between fly control and fly presence and PR (95% CI) = 2.010 (1.158 - 3.468) which indicated poor fly control was 2.010 times more at risk of experiencing high fly presence than poor fly control.

Discussion

The Relationship between Waste Management and the Presence of Flies in Pancur Batu Market

The results of the study showed that there was a significant relationship between waste management and the presence of flies in Pancur Batu Market. Respondents who managed their waste well tended to experience the presence of flies in the low category, which was 15 respondents (65.2%), while only 8 respondents (34.8%) still experienced high fly presence. Conversely, in respondents who managed their waste poorly, only 9 respondents (29.0%) experienced low fly presence, while 22 respondents (71.0%) experienced high fly presence.

The results of the chi-square statistical test showed a P-Value of 0.018, which is smaller than the significance value of 0.05. This indicates that there is a statistically significant relationship between waste management and the level of fly presence. This means that the worse the waste management carried out by the respondents, the higher the possibility of an increase in the fly population in the market environment.

In addition, the Prevalence Ratio (PR) value of 2.246 with a 95% Confidence Interval (1.201 - 4.201) shows that respondents with poor waste management have a 2.2 times higher risk of experiencing high fly presence compared to respondents who manage their waste well. Because the CI value does not exceed 1, statistically this result is also considered significant.

Scientifically, this can be explained because good waste management such as sorting organic and inorganic waste, disposing of waste in its place, and routine waste transportation - can break the life cycle of flies and prevent the formation of an ideal habitat for their breeding. On the other hand, piles of waste that are not managed properly provide a food source and breeding ground for house flies (Musca domestica), which ultimately causes the fly population to increase sharply in the (6).

A study at the Wonogiri Regency TPS showed that waste sorting, collection, and monitoring significantly affected fly density ($p < 0.05$), while transportation did not (7). Research conducted by Ivan Fadilah Alfikqi in 2023 at the Pontianak Traditional Market showed that waste management in the market was still relatively poor, marked by the large amount of waste scattered in the market area. This condition contributed to the high density of flies, with measurement results showing more than 11 flies per trap (grill) in 24 hours (8).

These findings indicate that the market environment is an ideal place for flies to breed due to piles of garbage and inadequate sanitation. Based on these results, researchers recommend the need for comprehensive improvements to the market sanitation system, including improving waste management facilities and improving drainage channels, in order to reduce the fly population and create a healthier market environment (9).

Relationship between Fly Control and the Presence of Flies in Pancur Batu Market

The results of the study showed that there was a significant relationship between fly control efforts and the level of fly presence in the Pancur Batu Market environment. Respondents who carried out good fly control mostly experienced the presence of flies in the low category, namely 11 respondents (68.8%), while only 5 respondents (31.5%) still experienced high fly presence. Conversely, in respondents with poor fly control, only 13 respondents (34.2%) experienced low fly presence, while the majority, namely 25 respondents (65.8%), experienced high fly presence.

Statistical analysis using the chi-square test showed that the P-Value was 0.042, which was smaller than the significance limit of 0.05. These results indicate that there is a statistically significant relationship between fly control and the presence of flies. In other words, the worse the fly control measures taken, the greater the possibility of an increase in the fly population in the market area.

Furthermore, the Prevalence Ratio (PR) value of 2.010 with a 95% Confidence Interval (CI): 1.158 – 3.468 indicates that respondents who carry out poor fly control have a 2 times greater risk of experiencing high fly presence compared to respondents who carry out good fly control. Because the CI range does not exceed 1, this result is statistically significant and can be used as a basis for decision making. Theoretically, flies breed rapidly in dirty, humid environments full of organic matter. Therefore, effective fly control, such as regular spraying of insecticides, setting fly traps, using natural repellents, and maintaining the environment around the stalls are important to reduce the fly population. Poor control, either due to irregular frequency, ineffective methods, or the lack of involvement of traders and market managers, will make the fly population difficult to suppress, and even tend to increase (10). In line with research conducted by Utami et al. (2024) at the Subagan Traditional Market, Karangasem, studying the effectiveness of various types of bait on fly traps. In this study, the One-Way ANOVA statistical analysis method was used to determine the difference in effectiveness between types of bait (11). The results of the analysis showed a significant difference ($p = 0.002$), indicating that the type of bait affects the number of flies caught. Among the various types of bait tested, shrimp head-based bait proved to be the most effective, with an average of catching around 112 flies or around 41.7% of the total catch within 24 hours.

Research conducted by Putra (2023) at Srikerti Market, Padangsambian Kelod, used the Pre-Test Post-Test Control method to test the effectiveness of adding fish waste attractants to fly traps. The results showed that the use of fish waste attractants significantly reduced fly density, with a t

value = 3.586 and p = 0.006. These results indicate that the treatment made a significant difference in the number of flies caught before and after the intervention. This study confirms that the use of local bait, such as fish waste, can be an effective, economical, and easy-to-implement fly control strategy in traditional market environments that have similar problems (12).

Conclusion

Based on the results of the analysis, there is a significant relationship between waste management and fly control with the level of fly presence in Pancur Batu Market (p = <0.5). Respondents with poor waste management and fly control have a higher risk of experiencing high fly presence. Poor waste management increases the risk by 2.246 times, while poor fly control increases the risk by 2.010 times compared to good management and control. This finding emphasizes the importance of community participation in optimal waste management and fly control in reducing the fly population in the market environment.

To reduce the fly population in the market environment, it is necessary to increase education and socialization to traders and visitors regarding the importance of waste management and fly control. Education can be done through direct counseling or easy-to-understand information media. On the other hand, the availability of facilities and infrastructure such as closed trash bins, trash collectors, and effective fly traps need to be increased to support clean behavior. Active community participation is needed in maintaining the cleanliness of the market environment, both through mutual cooperation activities and independent initiatives. Strong collaboration between market managers, government agencies, and the community is also the key to the success of vector control efforts. In addition, regular monitoring is needed so that corrective actions can be taken immediately if there is an increase in the fly population in the market.

References

[1] Simon PS. Penataan Pasar Tradisional Sebagai Pusat Aktvitas Ekonomi Dan Relasi Sosial Di Kota Ambon. Widyakala J Pembang Jaya Univ. 2022;9(1):62.

[2] Noor YEI, Sihombing IUA, Oktafiani D, Veranita A, Andriani L, Qurniyawati E, et al. Pengendalian Vektor Penyakit. Sada Kurnia Pustaka; 2025. 196 p.

[3] Ersa Nainggolan. Analisis Sanitasi Pasar Dan Pengetahuan Pedagang Kaki Lima Serta Kepadatan Lalat Di Pasar Sei Sikambing Kota Medan Tahun 2022. 2022;1–89.

[4] Annisa R. Pengelolaan Sampah Di Lingkungan Pasar Modern. 2025;80–91.

[5] Mila S. Kesehatan Lingkungan Bencana. 2023;

[6] Indra U. Pengendalian Vektor Penyakit,. 2025;

[7] Aliefta . R. Prajaningtyastiti, Eram TP. Pengelolaan Sampah Dengan Tingkat Kepadatan Lalat Pada Tempat Penampungan Sementara (Tps). 2023;

[8] Alfikqi IF. Analisis Sanitasi Pasar Tradisional Dan Kepadatan Lalat Di Pasar Kota Pontianak. Univ Muhammadiyah Pontianak. 2023;

[9] Sitti IRA, Zaky MA, Christian TS. Model Pengelolaan Sampah Rumah Tangga Di Desa Pejaten Kecamatan Kramatwatu Household Waste Management Model In Pejaten Village Kramatwatu Subdistrict. 2025;11(1):113–22.

[10] Laily LMK, A. W, A. NR. Pengendalian Vektor Dan Binatang Pengganggu. 2021.

[11] Utami PAED. Efektivitas Umpan Lalat Berdasarkan Jenis Umpan Pada Fly Trap Di Pasar Rakyat Subagan Kabupaten Karangasem Tahun 2024. Poltekkes Kemenkes Denpasar Jur Kesehat Lingkung 2024. 2024;

[12] Putra IGArianata. Pengaruh Atraktan Limbah Ikan Pada Fly Trap Sebagai Penurunan Kepadatan Lalat Di Pasar Tradisional Srikerthi Desa Padangsambian Kelod Tahun 2023. Poltekkes Kemenkes Denpasar Jur Kesehat Lingkung 2023. 2023;