

OVERVIEW OF ENVIRONMENTAL SANITATION CONDITIONS AND RAT PRESENCE AT SIMPANG LIMUN MARKET, MEDAN CITY

**Meutia Nanda *, Widya Fadhillah, Qory Adinda Siregar, Ira Sulastri Pasaribu,
Muhammad Arif Ikhsan**

Public Health Science Study Program, Faculty of Public Health, Universitas Islam Negeri Sumatera Utara
Jl. Lapangan Golf, Kampung Tengah, Kecamatan Pancur Batu, Kabupaten Deli Serdang, Sumatera Utara 20353,
Indonesia

Email: muetianandaumi@gmail.com

Abstract

Traditional markets can become rat habitats due to poor environmental sanitation conditions. Simpang Limun Market in Medan City is a traditional market with high trading activity particularly involving fresh fish, vegetables, fruits, and other foodstuffs that generates daily organic waste. The market faces various sanitation issues, such as scattered refuse, accumulated fish and vegetable scraps, substandard waste receptacles, open and poorly maintained drainage channels, and muddy, damp flooring. These conditions provide food sources and breeding grounds for rats, thereby increasing the risk of disease transmission and disrupting trade activities. This study aimed to assess environmental sanitation conditions and the presence of rats at Simpang Limun Market, Medan City. A qualitative, descriptive research design was employed, utilizing field observations and in-depth interviews with eight vendors acting as informants. The results indicate that the market's environmental sanitation remains suboptimal, characterized by scattered waste, inadequate waste disposal facilities, and open, poorly maintained drainage systems. All informants reported frequent sightings of rats within the market premises, particularly near waste disposal sites, fish-selling areas, and locations where food scraps accumulate. The presence of rats is considered disruptive to trade activities, as they can damage merchandise and contaminate food products. It is concluded that the environmental sanitation at Simpang Limun Market does not meet environmental health standards, and signs of rat presence were observed in several areas of the market. Consequently, sustainable efforts to improve environmental sanitation and control the rat population are required.

Keywords: Environmental Sanitation, Traditional Markets, Rats

Introduction

Environmental sanitation is a crucial factor influencing public health status. Poorly maintained environments can become breeding grounds for various disease vectors, including rats. Rats are known carriers capable of transmitting various diseases to humans, such as leptospirosis, salmonellosis, plague, and hantavirus. Unsanitary and damp conditions, accumulated waste, and poor drainage systems are primary factors driving the increase in rat populations in an area (Arrazy, 2021).

Traditional markets are public spaces at high risk for the spread of environmentally linked diseases. Waste management has become an increasingly complex global challenge alongside population growth and economic activity. Global projections indicate that solid waste generation in developing countries is expected to triple by 2050, driven by rapid economic growth. In Indonesia, the waste management crisis is intensifying, with projected waste generation reaching 82 million tons annually by 2045 a significant portion of which risks being improperly managed. This situation underscores the global urgency for sustainable and integrated waste management systems (Ramadhani

et al., 2025). Daily trading activities generate various types of organic waste, including scraps from vegetables, fruits, fish, and meat. Data from Statistics Indonesia (2021) shows there are 14,182 traditional markets accounting for approximately 88.5% of all markets in the country yet many still face environmental sanitation issues, potentially serving as habitats for rats, which act as disease vectors (Ernawati & Priyanto, 2023).

Rats are rodents that serve as reservoirs for various zoonotic diseases. Research by Adnani et al. (2024) revealed that wild rats carry gastrointestinal parasites that pose potential zoonotic risks to the community. Research by Widiastuti et al. (2024) also found zoonotic helminth eggs in the feces of *Rattus tanezumi* collected from markets, indicating a potential health risk for both vendors and visitors.

Simpang Limun Market is a traditional market in Medan City characterized by high daily trading activity. Preliminary observations revealed several sanitation issues, such as piles of refuse, muddy market floors, poorly maintained drainage channels, and the presence of rats in certain areas. Some stalls still utilize damaged or perforated wooden structures, creating potential hiding spots for rats. Furthermore, a shortage of trash receptacles leads to accumulations of organic waste, which serve as a food source for rats. Open, dirty, and debris-filled drainage systems also facilitate the presence and movement of rats throughout the market. Scattered waste was observed at various points on the market floor, and the lack of individual trash bins at every stall contributes to the accumulation of organic waste (Hasibuan, 2021). These conditions heighten the risk of environmental pollution and the transmission of rodent-borne diseases to both vendors and visitors (Nanda et al., 2025).

Waste management at Simpang Limun Market requires further attention. While sanitation workers collect waste periodically, accumulations often occur prior to collection. Although the market has a designated temporary waste storage area, hygiene conditions in the vicinity need improvement to prevent foul odors and the proliferation of disease vectors. According to the Regulation of the Minister of Health of the Republic of Indonesia Number 17 of 2020 concerning Healthy Markets, waste management must be supported by the provision of segregated waste bins at every stall, trading bay, and aisle. These bins must be made of waterproof, durable, and corrosion-resistant material, be equipped with lids, and be easy to clean. Additionally, waste must be removed regularly to prevent accumulation. Waste management practices that fail to meet these standards can lead to environmental pollution and increase the risk of disease vectors such as rats, flies, and cockroaches breeding in the area. Research by Husni et al. (2023) indicates a significant correlation between substandard waste disposal facilities and drainage systems and the presence of rats in the environment. Furthermore, Damanik et al. (2022) also revealed that poor environmental sanitation conditions significantly influence the presence of rats.

Methods

This study employs a qualitative descriptive design and was conducted at Simpang Limun Market, Medan City, in January 2025. The location was selected due to suboptimal environmental sanitation conditions, evidenced by accumulated waste, muddy market floors, poorly maintained drainage channels, and indications of rat presence in several stall areas.

The study involved eight subjects specifically, active vendors at Simpang Limun Market who served as the primary informants. Informants were selected using purposive sampling based on the following criteria: (1) vendors operating stalls in critical areas, such as those selling fish, vegetables, fruits, and basic commodities; and (2) vendors who had been trading at the market for at least three years, thereby ensuring their ability to provide valid information regarding sanitation conditions and the presence of rats.

Data collection instruments included observation sheets, in-depth interview guidelines, writing materials, mobile phones or tape recorders for audio recording, and a digital camera. Data collection was carried out through three methods: (1) direct observation of the market's environmental sanitation

conditions; (2) in-depth interviews with all informants regarding sanitation conditions and the presence of rats; and (3) documentation in the form of photographs of field conditions. Data validity was ensured through source and method triangulation; the data were subsequently analyzed qualitatively and presented in a descriptive narrative format.

Results and Discussion

Overview of the Research Site

a. Geographical Setting

Simpang Limun Market is a traditional market located in the Medan Amplas District of Medan City, North Sumatra. It is situated in a strategic area with road access that is easily reachable for the local community. Trading activities take place daily from morning until late afternoon, making the market a key hub for meeting the daily needs of residents in Medan Amplas and the surrounding areas.

b. Demographic Conditions

The vendors at Simpang Limun Market come from diverse backgrounds and offer a wide range of goods, including fish, vegetables, fruits, and basic necessities. Many vendors have been operating there for a considerable time, giving them a strong understanding of the market environment. The high level of daily trading activity generates a large volume of waste, which is a significant factor influencing the sanitary conditions of the market environment.

Interview Results

In this study, the researcher conducted in-depth interviews with eight active traders who served as the study's key informants. All interviews were conducted voluntarily in a friendly atmosphere and without disrupting the informants' working hours. The in-depth interviews focused on the state of environmental sanitation in relation to the presence of rats at Simpang Limun Market in Medan City.

Table 1. Characteristics of Study Informants

No	Gender	Initials	Age	Types of Merchandise	Years in Business
1.	Female	SA	45 yo	Fish	5 year
2.	Male	RM	47 yo	Vegetable	7 year
3.	Female	RO	40 yo	Fish	4 year
4.	Male	FR	37 yo	Fish	5 year
5.	Female	AN	38 yo	Vegetable	3 year
6.	Male	DT	39 yo	Basic necessities	5 year
7.	Female	AS	40 yo	Fruits	3 year
8.	Female	YN	38 yo	Fish	5 year

Source: Interview results (2025)

Based on Table 1, the study involved eight informants, comprising five women and three men. The informants ranged in age from 37 to 47 years and had been trading for periods of three to seven years. Their merchandise included fish, vegetables, basic food staples, and fruits. Having traded at Simpang Limun Market for a considerable time, all informants were considered capable of providing comprehensive information regarding environmental sanitation conditions and the presence of rats in the market area.

Observation Results

Based on observations conducted using a research instrument specifically, an observation sheet the following results were obtained.

Table 2. Environmental Sanitation and Hygiene in Relation to the Presence of Rats at Simpang Limun Market, Medan City

No	Aspects of Observation	Yes	No
A	Waste management		
	There is a rubbish dump in the market area	√	
	The trash can has a lid.		√
	Waste is collected routinely every day.	√	
	There is no rubbish scattered in the market area		√
B	Drainage Conditions		
	The drainage channel is open.	√	
	The drainage channel has an unpleasant odor.	√	
	There is standing water in the market area	√	
	The drainage channels are not obstructed.		√
C	Presence of Rat Vectors		
	There are rat droppings in the market area	√	
	There are rat bite marks on the merchandise	√	
	There is a rat's nest in the market area		√
	There are traces of nocturnal rat activity.	√	

Source: Observation results (2025)

a. Waste Management

Research findings indicate that the condition of waste disposal facilities at Simpang Limun Market does not yet meet environmental health standards, as some bins lack lids and the number of receptacles is insufficient. These conditions potentially attract rats by providing sources of food and shelter.

Based on interview results, all informants stated that waste frequently accumulates before being collected by sanitation workers. Informant 7 (Mrs. AS) stated: "Waste is often seen in various corners of the market, especially after peak trading hours. Sometimes, waste piles up before removal, creating an unpleasant odor."

Improperly managed waste can generate foul odors, create damp conditions, and serve as a food source for rats. This aligns with the Regulation of the Minister of Health of the Republic of Indonesia Number 2 of 2023 concerning the Implementation of Government Regulation Number 66 of 2014 on Environmental Health, which stipulates that public health protection efforts aim to create a healthy environment free from health hazards caused by waste not managed according to standards. Furthermore, health requirements regarding vectors and disease-carrying animals mandate environmental conditions that prevent their proliferation. Therefore, proper waste management is a crucial measure in preventing the presence of rats within the market environment.

The results of this study align with the findings of Husni et al. (2023), which indicate a significant relationship between the condition of waste disposal sites and the presence of rats. Dirty and damp environments provide ideal conditions for rats to forage and seek shelter. Furthermore, research by Aprillia et al. (2021) identifies the availability of substandard waste disposal facilities as a risk factor for the presence of rats in the surrounding area. Based on the study's findings, it is evident that the waste disposal site at Simpang Limun Market lacks a cover, leading to unpleasant odors and attracting rats. This situation stems from a lack of awareness and knowledge among vendors regarding proper waste management; improper management can result in human disease and environmental pollution.

b. Drainage Conditions

Observations and in-depth interviews revealed that the drainage system at Simpang Limun Market remains substandard. Some drainage channels appear dirty, open, and foul-smelling, suffering from blockages caused by trash and leftover merchandise debris entering the waterways. These conditions impede water flow and cause pooling in several areas of the market, creating the damp environment that rats favor. Research findings indicate that open, dirty, and clogged drainage channels can create damp conditions and serve as pathways for rat movement within the market area.

All informants stated that the drainage system requires attention and regular maintenance. Informant 4 (Mr. FR) noted: "The drains sometimes get clogged because a lot of trash falls into them. When it rains heavily, water usually pools in parts of the market."

According to Yulianto and Chandra (2021), substandard wastewater drainage systems carry a 15-fold higher risk of rat infestation in homes compared to compliant systems (OR [95% CI] = 15.750 [3.090–80.276]). This highlights the significant impact that drainage conditions have on the presence of rats in an environment.

These findings are supported by research conducted by Damanik et al. (2022) at Belawan Port, which demonstrated that poor environmental sanitation such as the presence of trash and unmaintained drainage influences the presence of rats. Open and poorly maintained drainage channels can also serve as movement corridors for rats, thereby increasing the risk of rat infestation in the market environment.

Based on the researcher's assessment and the study's findings, the drainage system at Simpang Limun Market does not yet meet health standards. Open and clogged drainage channels can serve as entry points for rodent vectors and create sources of stagnant water that facilitate the breeding of various disease vectors.

c. Presence of Rat Vectors

Research at Simpang Limun Market reveals clear signs of rat vectors, such as droppings and gnaw marks found in several merchandise storage areas. All informants reported that rats are frequently encountered within the market environment, particularly near waste disposal sites, fish-selling areas, and locations with significant food waste. Rats are most often sighted from late afternoon through the night as market activity subsides. The presence of droppings, gnaw marks on merchandise, and informant reports confirms that the market environment remains conducive to the activity of rats as disease vectors.

Based on interview results, Informant 6 (Mr. DT) stated: "Rats are frequently seen, especially around trash bins and fish-selling areas, because abundant food scraps serve as their food source." Signs of rat vectors include feces or droppings, gnaw marks, tracks, and general rat activity near merchandise storage areas. Rats are rodents characterized by gnawing habits; they typically nest in locations that are hidden and damp but free from standing water. Poorly maintained markets often harbor rat nests in specific areas (Sahabati et al., 2025).

These findings align with research by Ernawati & Priyanto (2023), which indicates that markets serve as habitats supporting rat proliferation due to abundant food sources and environmental conditions

favorable to rat activity. That study identified *Rattus tanezumi* as the most common rat species in markets, predominantly found in stalls selling staple goods. Furthermore, research by Toha et al. (2025) at Oeba and Oesapa Markets in Kupang City demonstrated a high rat-trapping success rate, indicating a large rat population within the traditional market environment.

Research by Adnani et al. (2024) indicates that wild rats act as carriers of gastrointestinal parasites and pose a potential zoonotic risk. The presence of rats can disturb vendors, damage merchandise, contaminate food supplies, and potentially cause human illness. Maintaining a clean and healthy environment is the most effective natural method for rat control, as reducing food sources leads to a decline in the rat population (Nanda et al., 2025).

Based on the researchers' assessment of the study findings, the presence of rats at Simpang Limun Market is attributed to inadequate environmental sanitation practices, which allow the rats to easily adapt to the surroundings. The presence of rats not only causes discomfort to vendors but also poses a potential risk of disease transmission to both vendors and market visitors.

Conclusion

Based on the research findings, it can be concluded that the environmental sanitation conditions at Simpang Limun Market in Medan City do not yet meet environmental health standards. This is evidenced by suboptimal waste management, poorly maintained drainage systems, and signs of rat presence in several areas of the market. The presence of rats poses a potential risk of health issues and losses for both vendors and visitors. Therefore, improvements in waste management and drainage systems, along with periodic rat control measures, are necessary to create a market environment that is clean, healthy, and comfortable.

References

- [1] Adnani, A., Amelia, R., & Hutagalung, S. V. (2024). Peran tikus liar sebagai pembawa parasit saluran cerna dan potensi risiko zoonosis: Systematic literature review. *Syntax Literate: Jurnal Ilmiah Indonesia*, 9(1), 312–322.
- [2] Aprillia, N. M. N., Rusmiati, & Suprijandani. (2021). Analisis faktor-faktor sanitasi kapal terhadap tanda-tanda keberadaan tikus (Studi pada kapal penumpang yang bersandar di Pelabuhan Kalianget 2019). *Prosiding Seminar Nasional Kesehatan Poltekkes Kemenkes Surabaya*, 57.
- [3] Arrazy, S. (2021). Persepsi masyarakat tentang higiene sanitasi pasar tradisional Kota Medan. *Contagion: Scientific Periodical of Public Health and Coastal Health*, 2(1), 1–10.
- [4] Badan Pusat Statistik. (2019). *Statistik Indonesia 2019*. Badan Pusat Statistik Indonesia.
- [5] Damanik, R., Nababan, D., & Sitorus, M. E. J. (2022). Asesmen sanitasi lingkungan dan keberadaan tikus di Pelabuhan Laut Belawan Kantor Kesehatan Pelabuhan Kelas I Medan. *Higiene*, 8(3), 131–136.
- [6] Ernawati, D., & Priyanto, D. (2023). Pola sebaran spesies tikus habitat pasar berdasarkan jenis komoditas di Pasar Kota Banjarnegara. *Balaba*, 9(2), 58–62.
- [7] Hasibuan, M. R. (2020). Kontribusi wanita pedagang sayur terhadap pendapatan rumah tangga (Studi kasus: Pasar Tradisional Simpang Limun Kecamatan Medan Amplas) (Doctoral dissertation).
- [8] Hasibuan, R., Susilawati, & Nanda, M. (2021). Pemicuan sanitasi total berbasis masyarakat (STBM) pilar BABS di Kota Sibolga. *Shihatuna: Jurnal Pengabdian Kesehatan Masyarakat*, 1(1), 1–7.
- [9] Husni, S. H., Martini, M., Suhartono, S., Budiyo, B., & Raharjo, M. (2023). Faktor lingkungan yang berpengaruh terhadap keberadaan tikus serta identifikasi bakteri *Leptospira* sp. di pemukiman sekitar pasar Kota Semarang tahun 2022. *Jurnal Kesehatan Lingkungan Indonesia*, 22(2), 134–141.
- [10] Nanda, M., Matondang, T. S., Hidayat, A. S., Nasution, L. L., & Ginting, R. A. B. (2025). Tanggapan masyarakat mengenai risiko kesehatan yang ditimbulkan oleh tikus dan lalat di perumahan padat penduduk. *Health Care: Jurnal Kesehatan*, 14(1), 134–140.
- [11] Nanda, M., Syahri, A., Bancin, A., Pratiwi, G. I., Maulisa, S., Sakina, S., & Siirin, S. A. (2024). Efektivitas pelaksanaan fungsi pengawasan Dinas Lingkungan Hidup Provinsi Sumatera Utara dalam penanggulangan pencemaran lingkungan. *Cendekia Utama: Jurnal Keperawatan dan Kesehatan Masyarakat*, 13(2).
- [12] Nanda, M., Yustika, D., Lubis, A. H., Maipina, D. R., Pralistami, F., & Putri, K. A. (2024). Hubungan kondisi jamban dan perilaku sanitasi lingkungan terhadap kejadian diare di wilayah Belawan Sicanang. *El-Mujtama: Jurnal Pengabdian Masyarakat*, 4(1), 233–242.
- [13] Sahabati, G. V., Joseph, W. B. S., & Danes, V. R. (2025). Gambaran kepadatan tikus di Pelabuhan Laut Manado. *Prepotif: Jurnal Kesehatan Masyarakat*, 9(3), 10570.
- [14] Toha, L. R. W., Inna, A. M. T., & Laga, L. K. L. (2025). Studi tingkat keberhasilan penangkapan dan keragaman jenis tikus di Pasar Oeba dan Pasar Oesapa Kota Kupang. *Jurnal Veteriner Nusantara*, 8(2), 75–86.
- [15] Widiastuti, D., Pramestuti, N., & Astuti, N. T. (2024). Identifikasi telur cacing zoonotik pada feses *Rattus tanezumi* di Pasar Kota Banjarnegara. *Balaba*, 10(2), 53–58.
- [16] Kementerian Kesehatan Republik Indonesia. (2023). Peraturan Menteri Kesehatan Republik Indonesia Nomor 2 Tahun 2023 tentang Peraturan Pelaksanaan Peraturan Pemerintah Nomor 66 Tahun 2014 tentang Kesehatan Lingkungan. *Berita Negara Republik Indonesia Tahun 2023 Nomor 55*.

- [17] Yulianto, B., & Chandra, L. (2019). Kondisi fisik rumah dan sisa makanan terhadap keberadaan vektor tikus di Kelurahan Sukajadi Kecamatan Sukajadi Kota Pekanbaru. *Al-Tamimi Kesmas: Jurnal Ilmu Kesehatan Masyarakat*, 8(1), 41–47.
- [18] Zufri, A., Saputra, R. M., Susanto, A., Artiwi, T., & Nursafira, A. (2025). Status kepadatan tikus dan deteksi bakteri *Leptospira* di wilayah Pelabuhan Tanjung Balai Karimun tahun 2025. *Al-Tamimi Kesmas: Jurnal Ilmu Kesehatan Masyarakat*, 14(2), 147–155.
- [19] Ramadhani, P., Rifqi, M., Kartika, S., Panjaitan, E. A., Alif, Y. A., Manalu, G. S., ... & Febrizalni, A. (2025). Inovasi pembuatan tempat sampah dalam mendukung gerakan peduli lingkungan di Desa Sri Bintan. *Jurnal Pengabdian Masyarakat dan Riset Pendidikan*, 4(2), 7506-7513.
- [20] Kementerian Kesehatan Republik Indonesia. (2020). Peraturan Menteri Kesehatan Republik Indonesia Nomor 17 Tahun 2020 tentang Pasar Sehat. *Berita Negara Republik Indonesia Tahun 2020 Nomor 803*. Jakarta: Kementerian Kesehatan RI.