

Hygiene Challenges in Old Public Housing: A Case Study of Rifle Range Flat, Penang

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ABSTRACT

This exploratory study investigates hygiene conditions in the old public housing environment, with a focus on the Rifle Range Flats in Penang. The research aims to provide insights into the state of hygiene and the factors influencing it within this specific housing setting. Using a qualitative approach, including case study methodology and on-site observations, the study examines various aspects of hygiene, such as cleanliness, waste management, and resident perceptions. Initial findings highlight a complex interplay of factors affecting hygiene levels at the Rifle Range Flats. While residents express satisfaction with the routine rubbish collection conducted by management twice daily, concerns emerge regarding the organisation of stalls within the housing complex. Additional issues, such as pest control, ventilation, and water sanitation, are identified as critical areas for further investigation. This study's findings offer valuable implications for housing authorities and community stakeholders in developing targeted interventions to enhance hygiene standards and improve the overall well-being of residents in similar public housing settings.

INTRODUCTION

Since 1970, in two (2) states, Kuala Lumpur and Penang, the authority has been planning and designing the first public housing high-rise in Malaysia. This public housing will accommodate the migration of people from rural to urban areas. The public housing high-rise to support people's migration living with amenities and facilities has been provided with the basic needs of electricity and water supply because, at that time, the government wanted to make sure people had a good life with the basic needs of high-rise housing.

The Federal Government's Five-Year Malaysia Plan for Penang prioritises the enhancement of access to education, healthcare, safety, and housing for all sectors of society (Jabatan Perancang Bandar dan Desa Negeri Pulau Pinang, 2019). This includes addressing affordable housing issues and promoting diversity,

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improving public safety and cleanliness, enhancing welfare and caregiving systems, and diversifying recreational, sports, artistic, and cultural facilities. Through these initiatives, the government aims to create a more inclusive and thriving community in Penang, where residents from various backgrounds can access essential services and enjoy a high quality of life.

Hygiene in public housing is a critical issue, influencing not only the physical health of residents but also their mental well-being and quality of life. Public housing, often accommodating low-income households, can face unique challenges related to hygiene and cleanliness due to factors such as overcrowding, limited resources for maintenance, and ageing infrastructure. Disproportionately affecting vulnerable populations such as children and the elderly (World Health Organization, 2021).

Previous studies underscore the impact of environmental hygiene on resident satisfaction and well-being, revealing that cleanliness and maintenance are among the primary concerns of public housing residents (Joseph, N., Burn, A. M., & Anderson, J. 2023; Lopez & Hernandez, 2021). However, factors like limited budgets for housing authorities, residents' lack of awareness, and inadequate communal facilities often exacerbate hygiene issues in these settings (Green & Adams, 2017). Additionally, the condition of shared spaces, including corridors, stairwells, and outdoor areas, plays a significant role in residents' perceptions of hygiene and overall safety.

LITERATURE REVIEW

Public Housing in Penang

After the introduction of the New Economic Policy (NEP) in 1970, housing policies and strategies in this country have been more inclined towards achieving two (2) main objectives of the NEP, which are eradicating poverty by increasing the income of the people and enhancing employment opportunities regardless of race, as well as eliminating race-based economic functions (Jabatan Perumahan Negara KPKT, 2018). The government identifies that the provision of housing not only addresses the issue of housing shortages among the people but also serves as a measure to alleviate poverty and restructure the population in urban areas. Since the 1970s, the government has implemented various housing programs in its efforts to achieve the objectives of the New Economic Policy (NEP).

Public housing in Malaysia, particularly in urban areas like Penang, has played a crucial role in providing affordable accommodation for low- and middle-income households. Penang, as one of Malaysia's most densely populated and rapidly urbanising states, faces unique housing challenges due to its high demand for affordable housing and limited land resources (Lim & Ismail, 2019). Public housing initiatives in Penang are primarily aimed at alleviating urban poverty and ensuring that vulnerable groups have access to basic living conditions. However, issues related to housing quality, maintenance, and residents' satisfaction remain prevalent in many public housing schemes (Hashim & Rahim, 2018).

Public housing in Penang encompasses various initiatives administered by both the Penang City Council and the State Government. The City Council manages approximately 1,000 units, while the State Government oversees a larger portfolio of 5,784 units. These housing units are typically sold through hire-purchase agreements, with both authorities jointly responsible for collecting monthly instalments. The evolution of public housing in Penang has been influenced by the political dynamics of different governing bodies, including the City Council, State Government, and Federal Government, each controlled by different political parties over time. One of the most significant public housing projects in Penang, the Rifle Range Flats, was initiated between 1966 and 1970 following a request from the State Government to the

Federal Government in 1965 (Yeung & International Development Research Centre (Canada), 1983). Presently, the management of all public housing projects in Georgetown falls under the purview of the Penang State Government, with the Penang City Council (now known as MBPP) tasked with overseeing rental collection and service provision. According to Jabatan Perancang Bandar dan Desa Negeri Pulau Pinang (2019), Penang 2030 theme is to increase liveability to enhance the quality of life for people living in Penang.

Hygiene in Public Housing

Living in public housing as a low-income individual presents distinct challenges that can exacerbate hygiene-related concerns. Limited financial resources may restrict access to essential cleaning supplies and hygiene products, making it difficult for residents to maintain cleanliness in their living spaces. Additionally, overcrowded living conditions and inadequate maintenance of public housing facilities can contribute to the proliferation of germs and contaminants, further compromising hygiene standards.

For low-income individuals and families residing in public housing, maintaining a high standard of hygiene is not merely a matter of comfort but a fundamental necessity for their overall well-being. The living conditions in public housing complexes can significantly impact on the health and quality of life of residents, particularly concerning hygiene-related factors such as cleanliness, waste disposal, and surrounding environmental conditions. This introduction delves into the unique challenges faced by low-income individuals regarding hygiene in public housing and underscores the critical importance of addressing these issues to improve their quality of life. The households of lower-cost residential areas are satisfied with the physical design elements but express dissatisfaction with the physical environmental elements (Ismail et al., 2015). Accordingly, to Lestan et al., (2014) cleanliness, health, and safety are integrated to promote overall well-being.

Recognising the importance of hygiene in public housing, this study aims to explore hygiene conditions in old public housing, identify key issues and factors influencing cleanliness, and generate insights to inform policy and interventions aimed at improving living conditions for residents. The study specifically focuses on understanding the challenges faced by low-income individuals and families in maintaining cleanliness and hygiene standards in their living environments.

Maintenance in Public Housing

Maintenance is a fundamental aspect of ensuring the longevity, functionality, and quality of public housing, particularly in addressing the needs of low-income individuals and families. It encompasses several critical dimensions, including the significance of proactive maintenance strategies, the impact of maintenance on resident satisfaction and well-being, and the challenges and solutions specific to low-income housing contexts. Together, these factors underline the essential role maintenance plays in improving living conditions and fostering sustainable housing environments (A. Yusof & Abidin, 2013). Health issues are linked to environmental hygiene and indoor air quality, both of which are essential for achieving satisfactory living conditions in public housing (Tao, 2015; Zehadul Karim, 2013).

Proactive Maintenance Strategies

Proactive maintenance practices are vital for preserving the physical infrastructure of public housing complexes and preventing the gradual deterioration of housing conditions. Accordingly, the findings indicate the need for immediate internal proactive measures by government agencies and related parties involved in maintenance practices, as most identified elements are linked to organisational maturity and

capability (Abdullah S. et al, 2016). Such measures not only protect infrastructure but also enhance the safety and reliability of housing complexes, providing residents with a stable living environment. According to Ashiqin et al., (2023), Small but repetitive repairs and maintenance often result from poor maintenance planning by management, highlighting the importance of well-documented information, construction details, and product specifications in enabling strategic maintenance planning.

Additionally, Azmy et al., (2023) stated several aspects of the maintenance system in public housing in Malaysia, including cleaning services, the security system, and the timeliness of defect repairs, require significant improvement to enhance overall maintenance quality. Effective maintenance should prioritise essential infrastructure systems, such as electrical, sanitary, and plumbing services, as these are critical to ensuring safety, hygiene, and the well-being of residents. A more comprehensive understanding of safety features can be achieved by examining various contexts and exploring selected features in greater depth, ultimately leading to more accurate and insightful results (Khairul et al., 2024).

Impact on Resident Satisfaction and Well-Being

Maintenance activities directly influence resident satisfaction and overall well-being in public housing environments. Research highlights that residents' perceptions of cleanliness, safety, and functionality are closely tied to the maintenance efforts undertaken by housing authorities (Okoye, 2014; Yusof et al., 2012). Well-maintained housing complexes foster a sense of pride among residents, contributing to enhanced community cohesion and improved quality of life. Conversely, poorly maintained housing can lead to dissatisfaction, health risks, and a diminished sense of security.

According to Karim (2012), individuals living in unfortunate conditions who still express some levels of satisfaction have likely adapted to their environment, demonstrating that well-being is highly subjective, as even acceptable living conditions can leave some people feeling dissatisfied. By exploring the relationship between housing quality and children's well-being, the research seeks to identify key factors that contribute to achieving satisfactory living conditions for families (Zhou et al., 2021). Public housing in Malaysia often faces significant challenges, as it is commonly associated with insufficient maintenance, lower-quality living environments, and limited funding for operations and upkeep (She et al., 2022). A well-designed house can enhance the overall living environment and promote well-being by supporting multigenerational families in urban settings, offering adaptable spaces and fostering stronger family dynamics (Mohd Arshard et al., 2024).

These issues are compounded by high levels of vandalism and crime, dilapidated building conditions, ineffective allocation systems, and persistent tenant dissatisfaction driven by unmet expectations for basic living standards and inadequate responses to maintenance needs (Mohit et al., 2010; Salleh et al., 2011). Together, these factors highlight the critical need for targeted interventions to address the underlying challenges and improve the overall quality of life in Malaysia's public housing sectors.

Waste Disposal Maintenance

Effective maintenance services for waste disposal facilities are essential in ensuring public housing cleanliness and hygiene. These services include regular inspections, repairs of damaged bins, clearing of blocked drains, and ensuring the proper functioning of waste collection equipment. According to Okoye et al., (2022), efficient waste disposal systems are a core criterion for service efficiency in public housing management, highlighting the importance of addressing these needs comprehensively. Ensuring waste management systems operate effectively can significantly reduce environmental hazards and improve residents' living conditions.

The study of low-cost housing management in Kuala Lumpur provides valuable insights into the challenges and strategies for maintaining public housing. It identifies three (3) key aspects of management: maintenance, rental, and garbage disposal, with the latter being overseen by the City Hall of Kuala Lumpur (CHKL) through specialist contractors (Ismail et al., 2015). Garbage management, in particular, is critical in preventing health and environmental issues in densely populated housing areas.

METHODOLOGY

This study employs a qualitative approach, combining case study methodology with observational techniques and household interviews to explore hygiene conditions in old public housing. The case study method allows for an in-depth examination of a specific housing area, providing context and insights into the unique challenges and dynamics at play. Through direct observation, researchers can gather firsthand information about the physical environment, cleanliness practices, and maintenance standards within the housing complex. Additionally, household interviews offer valuable perspectives from residents, enabling a deeper understanding of their experiences, perceptions, and concerns regarding hygiene. By integrating these qualitative methods, this study investigates hygiene conditions in old public housing, identifies key issues and factors influencing cleanliness, and generates insights to inform policy and interventions aimed at improving living conditions for residents.

This study employs a qualitative approach, combining case study methodology with observational techniques to explore hygiene conditions in old public housing. The case study method allows for an in-depth examination of a specific housing area, providing context and insights into the unique challenges and dynamics at play. Observations, on the other hand, enable researchers to gather firsthand information about the physical environment, cleanliness practices, and maintenance standards within the housing complex. By integrating these methods, the data analysis focuses on systematically coding and interpreting information to uncover underlying themes and actionable insights.

Observational Data

Observational data were collected through detailed on-site documentation of hygiene-related conditions in communal spaces, including corridors, staircases, and disposal areas. Observations were coded to capture patterns such as the physical cleanliness of these areas, the frequency and quality of cleaning activities, and visible maintenance issues. For example, notes on rubbish accumulation, the condition of waste disposal facilities, and the presence of pests were systematically categorised under themes like "maintenance gaps" and "waste management practices." This coding process helped identify areas that consistently exhibited poor cleanliness or required urgent attention.

According to Moser and Korstjens (2018), observation was employed, where certain situations were observed for extended periods to identify recurring patterns and areas of concern, with some aspects of hygiene becoming more prominent over time. This approach allowed researchers to delve deeper into the dynamics of waste disposal practices, cleaning routines, and maintenance schedules within the housing complex, providing a richer understanding of the observed hygiene conditions.

Case Study Data

The case study of the Rifle Range Flat provided a deeper contextual understanding of hygiene conditions within an ageing public housing complex. Data such as the housing layout, waste disposal systems, and community dynamics were analysed to identify factors contributing to hygiene challenges.

Specific themes were derived, including the impact of infrastructure design on cleanliness, the role of management in maintaining hygiene standards, and the influence of resident behaviour on communal living conditions. Maps and photographs of the Rifle Range Flat were also examined to complement observational data and provide a holistic view of the environment. The case study method identifies the holistic and meaningful characteristics of real-life events, providing a comprehensive framework to understand the complexities of real-world situations. In this study, it captures the realities of people's lives within the public housing context, offering valuable insights into their hygiene practices, living conditions, and the challenges they face daily (Chowdhury & Shil, 2021).

The selected case study is based on information on public housing in Penang, Rifle Range Flat the first public housing in Penang still operation until now. Penang State, the most densely populated in Malaysia, holds Ayer Itam at a strategic crossroads between George Town's urban hub and the tourist attractions of Penang Hill and Kek Lok Si. Due to this advantageous positioning, Ayer Itam swiftly evolved into a favoured residential enclave during Penang's early development. However, the Rifle Range Residence, Penang's initial public low-cost housing endeavour in Ayer Itam, situated at the intersection of Jalan Padang Tembak and Jalan Sempadan, has fallen into disrepair. Adjacent to the Batu Gantong Chinese Cemetery with Penang Hill looming behind, neglect and insufficient maintenance have transformed this once-promising area into a perceived slum in the eyes of the public.



Fig. 1. Site Plan Case Study Rifle Range Flat

Source: Google (2024)

The site, with a rectangular shape measuring approximately 700 meters from east to west and 150 meters from north to south, accommodates nine (9) blocks of high-rise flats and seven (7) blocks of low-rise flats, totalling 3,699 units and hosting over 15,000 residents, each consisting of seventeen stories. These units include 3,081 two-room units and 588 one-room units, with the former comprising a hall, a bedroom, a kitchen, and a bathroom cum-toilet. Additionally, each block features sixty large shops and twelve small shops on the ground floor. The first blocks were occupied in early 1969, and the entire scheme was completed by the beginning of 1971. However, not all units are fully occupied; some remain empty. Additionally, amenities such as a primary school, hawker stalls, food bazaar, kindergarten, bus stop, car parks, police station, playground, and wet market are provided for the convenience of the residents. Living in this flat the elderly people are Chinese, and the young people are Malay, Chinese and Indian.

FINDINGS AND DISCUSSION

By triangulating findings from observations and the case study, the analysis highlights critical hygiene-related issues such as inadequate maintenance, overcrowded living conditions, and waste disposal inefficiencies. This integrated approach enables a comprehensive understanding of the interplay between environmental factors and resident behaviour in shaping hygiene conditions. Ultimately, the analysis generates actionable recommendations to improve cleanliness and living standards in old public housing complexes. The findings from the case study conducted in old public housing complexes reveal a range of hygiene-related challenges faced by residents. These challenges include inadequate waste disposal facilities, limited access to clean water sources, and insufficient maintenance of communal spaces. Additionally, overcrowding and poor ventilation contribute to the spread of germs and contaminants, exacerbating hygiene concerns within these living environments. The finding focuses on three (3) aspects:

Disposal Facilities Housing

Disposal facilities on this flat have two (2) refuse chambers near the end of the building staircase (refer to Figure 2). These disposal facilities have been provided by the authority in Penang (Majlis Bandaraya Pulau Pinang). The collection of rubbish occurs twice a day, in the morning (7.30 a.m. and 10 p.m.). The observation on site has been done from morning until afternoon.

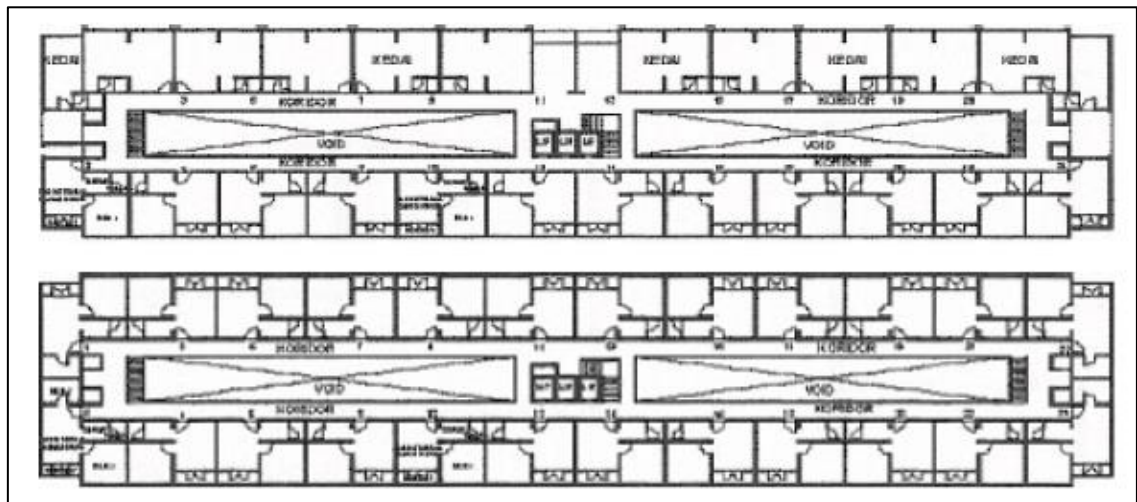


Fig. 2. Floor Plan of Rifle Range Flats, Penang

Source: Leong, K.C. (1979)

The exploration of hygiene and cleanliness in the public housing complex offers valuable insights into the living conditions and challenges faced by residents. Through observations and interviews, a comprehensive view of the cleanliness practices and maintenance efforts within the flats is obtained. The exploration highlights various factors influencing hygiene levels, including residents' behaviour, waste disposal facilities, and the effectiveness of cleaning services refer to Figure 3.

Observations reveal the impact of certain residents' actions, such as throwing rubbish from upper floors, on the overall cleanliness of the flats. This behaviour not only contributes to littering but also poses safety hazards and detracts from the residents' quality of life. Additionally, the observations shed light on the

efforts made by the cleaning staff to maintain cleanliness within the complex. From the condition of common areas to the presence of litter bins and waste disposal facilities, the exploration provides a detailed understanding of the hygiene standards the public housing.

Interviews with residents offer valuable perspectives on their satisfaction with cleanliness and maintenance efforts. Positive feedback indicates that residents appreciate the cleanliness of common areas and the efforts made by the cleaning staff. However, concerns may arise regarding specific areas that require attention, such as littering or inadequate waste management facilities.



Fig. 3. Disposal Chambers

Source: Authors (2025)

Maintenance Housing

The maintenance of old public housing reveals several key aspects of the garbage collection process and management office provision. Firstly, the authority provides a central collection point for garbage within the public housing. This centralised approach streamlines waste disposal efforts and ensures that residents have convenient access to disposal facilities. Additionally, the authority employs ten (10) staff members dedicated to garbage collection, with five (5) shifts allocated for morning and five (5) for night shifts. This staffing arrangement ensures continuous coverage throughout the day to address waste management needs effectively. The management provided a domestic tong roro bin to make it easy for the collector to collect the garbage from Rifle Range flats refer to Figure 4.



Fig. 4. Domestic Roro Bin

Source: Authors (2025)

Furthermore, it is noteworthy that the staff members responsible for garbage collection reside within the same housing complex. This arrangement not only enhances the efficiency of garbage collection but also fosters a sense of community involvement and accountability among the staff members. Their presence within the housing complex allows for prompt response to any waste management issues and facilitates communication with residents regarding garbage disposal guidelines and practices. Moreover, the management office, located under block H within the housing complex, serves as a central point of contact for residents. This office plays a crucial role in addressing residents' inquiries, complaints, and maintenance requests promptly. By providing a dedicated space for management activities, residents have a convenient avenue to voice their concerns and receive assistance related to housing maintenance and management matters.

Hygiene Surrounding Housing

The findings regarding hygiene in the public housing flats, based on observations refer to Figure 5. Overall, the hygiene level is assessed to be average to good within the complex. However, several factors contribute to challenges in maintaining optimal cleanliness standards.

One (1) notable observation is the crowdedness of the area due to the presence of hawkers or small stalls selling local food. While these vendors provide convenient access to food options for residents, the concentration of stalls may lead to overcrowding and potential hygiene issues, such as littering or food waste. Addressing these challenges requires a coordinated effort between housing authorities and local authorities to regulate the density of stalls, implement waste management measures, and enforce hygiene standards among vendors.



Fig. 5. (left) Ground Floor Corridor and Air Well Area Cleanliness; (right) Stall at Surrounding Flat.

Source: Authors (2025)

Additionally, the demographic composition of the residents, with the majority being elderly people, presents unique considerations for hygiene and cleanliness. Observations indicate that many elderly residents congregate in common areas, particularly in the mornings and evenings, often engaging in social activities such as drinking refer to Figure 6. While social interactions among residents are important for community cohesion, these gatherings may contribute to increased foot traffic and potential hygiene challenges in shared spaces. The social activities of elderly residents, particularly gatherings involving drinking, may impact hygiene standards within shared spaces. While social interactions among residents are essential for community well-being, these gatherings can contribute to increased foot traffic and potential hygiene challenges in common areas.



Fig. 6. Engaging Elderly People

Source: Authors (2025)

Overall, while the hygiene level within the public housing complex is generally rated as average to good, the presence of crowded hawker stalls and the social activities of elderly residents pose challenges that need to be addressed to maintain optimal cleanliness standards. Effective management strategies, such

as regulating stall density, implementing waste management measures, and promoting responsible social behaviour, may help mitigate these challenges and ensure a cleaner and healthier living environment for all residents.

CONCLUSION

In conclusion, this research has shed light on the hygiene conditions and associated factors within old public housing environments, with a focus on exploring the challenges faced by low-income individuals and families in maintaining cleanliness and hygiene standards. Through observations and interviews, several key findings have emerged. Overall, the hygiene conditions within old public housing complexes vary, with some areas exhibiting average to good hygiene levels, while others face challenges such as overcrowding, littering, and inadequate waste management. Factors contributing to these challenges include the presence of crowded hawker stalls, social activities of elderly residents, and limited access to resources for proper waste disposal. The recommendation this study proposed to improve hygiene conditions and promote a healthier living environment in old public housing includes implementing regulatory measures to manage the density of hawker stalls and small food stalls, encouraging community engagement through clean-up initiatives and hygiene awareness campaigns, improving waste management facilities and services, and providing education and training on proper waste disposal practices and personal hygiene to residents.

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CONFLICT OF INTEREST STATEMENT

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with the funders.

AUTHORS' CONTRIBUTIONS

Wan Nur Rukiah Mohd Arshard carried out the research and wrote and revised the article. Puteri Yuliana Samsudin and Wenny Armada anchored the review and wrote on the discussion. Nurul Ulyani revised and approved the article submission.

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