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Research article

The Relationship Between Distribution of Pharmacy Locations and The Availability of Pharmaceutical Services In Kediri City

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ABSTRACT

Background: Pharmaceutical services are a vital component of the healthcare system, with pharmacies serving not only as sources of medication but also as centers for drug-related consultation. Kediri City, one of the major cities in East Java, has a population of approximately 295,230 people and an area of 63.4 km², with 156 pharmacies distributed across its regions. However, the uneven distribution of pharmacies may affect public access to pharmaceutical services. This study aimed to analyze the impact of pharmacy distribution on community access to pharmaceutical services in Kediri City.
Methods: A quantitative approach was employed using data from the local Health Office, field observations, and a survey of 102 respondents across three districts.
Result: The results reveal that areas with a higher number of strategically located pharmacies enjoy better access to pharmaceutical services, whereas regions with fewer pharmacies experience access barriers, such as longer travel time, limited service availability, and lower patient satisfaction.
Conclusion: These findings highlight the importance of regulation and oversight in pharmacy distribution to ensure equitable access to services across all areas. Limitations of the study include a limited number of respondents, simple random sampling without stratification, and constrained observational scope. The study recommends policy development for pharmacy distribution based on regional needs to improve access and quality of pharmaceutical services in Kediri City.

I. Introduction

Healthcare facilities play a pivotal role in the advancement of Indonesia's health sector, as they are essential in delivering adequate, equitable, and high-quality services to the population. In the context of Kediri City, which boasts a population of 287,962 and spans an area of 63.4 km², the presence of 156 pharmacies highlights the importance of these establishments in providing essential healthcare services. Pharmacies not only serve as dispensaries for medications but also function as vital drug consultation centres, offering advice and support to patients regarding their pharmaceutical needs. The increase in the number of pharmacies in East Java by 19% approximately 5,443 pharmacies for a population of 40,530,954, as reported by the Health Office in 2023—underscores the growing recognition of the role that pharmacies play in the healthcare landscape.

Pharmaceutical services are directly linked to the enhancement of patients' quality of life, serving as a bridge between healthcare providers and the community. The Minister of Health Regulation No. 73 of 2016 sets forth standards for pharmaceutical services in pharmacies, aiming to safeguard public health and uphold the integrity of the profession. However, the real-world implementation of these regulations raises concerns; for instance, a study conducted in Lombok revealed that a mere 2.33% of pharmacies were rated as providing good service. This alarming statistic highlights a significant gap in service quality, where patient dissatisfaction often stems from inadequate service, poor communication, and

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insufficient facilities. For example, a patient seeking advice on a complex medication regimen may leave a pharmacy feeling confused and unsupported if the pharmacist is unable to provide clear guidance or if the pharmacy lacks adequate resources for such consultations.

Accessibility to pharmaceutical services is another critical aspect that warrants attention. Long travel distances to pharmacies can significantly delay or even prevent patients from obtaining necessary medications, thereby adversely affecting adherence to prescribed treatment regimens. This issue is particularly pronounced in rural areas, where transportation options may be limited, further complicating access to essential healthcare services. Research by Raditiya Firda Maulany et al. (2021) illustrates how geographical barriers can hinder public health outcomes. The strategic location of pharmacies is therefore crucial; local governments have a role to play in regulating the distribution of pharmacies to enhance public access to these vital services. Despite this, the Minister of Health Regulation No. 26 of 2018, which addresses location permits, falls short by not stipulating the required distance between pharmacies. This oversight can result in an uneven distribution of pharmacies, fostering unhealthy competition and potentially compromising the quality of services available to the community.

Access to affordable and accessible healthcare facilities is not merely a convenience but a fundamental public necessity. Pharmacies, in this regard, stand out as more accessible healthcare providers compared to hospitals and clinics, particularly in urban settings. The morbidity rate data from East Java Province and Kediri City reflect fluctuations that underscore the critical role of pharmacies in supporting public health initiatives and treatment efforts. However, the distribution of pharmacies in Kediri City is uneven, which raises concerns about equitable access to pharmaceutical services. According to data from the Health Office and the Food and Drug Monitoring Agency (BPOM), around 50% of the 156 pharmacies in Kediri City did not meet the applicable regulatory requirements in 2022. This situation reveals a pressing need for improvement in regulatory compliance and a more equitable distribution of pharmacies throughout the city.

The urgency of conducting research to analyse the distribution of pharmacies and their impact on access to pharmaceutical services in Kediri City cannot be overstated. Such research would provide valuable insights into the existing gaps in service provision and highlight areas for improvement. By understanding the dynamics of pharmacy distribution and its implications for public health, stakeholders can develop targeted strategies to enhance service delivery and ensure that all segments of the population have access to the pharmaceutical care they require.

Role of healthcare facilities, particularly pharmacies, in Indonesia's health sector cannot be overstated. In Kediri City, the current landscape of pharmaceutical services presents both opportunities and challenges. While the increase in the number of pharmacies signifies progress, the uneven distribution and varying quality of services highlight the need for more robust regulatory frameworks and implementation strategies. By prioritising accessibility and adherence to service standards, we can significantly improve public health outcomes and ensure that every individual receives the pharmaceutical care they need. The ongoing research into pharmacy distribution is not only relevant but essential for shaping a more equitable and effective healthcare system in Kediri City and beyond.

II. METHODS

This study employed a quantitative design with a survey approach, supported by data from the Health Office and field observations. The study population was the Kediri City community, with a sample of 102 respondents spread across three sub-districts (Kediri, Mojoroto, and Pesantren), divided proportionally (approximately 34 respondents per sub-district). Respondents were divided into pharmacy service users and pharmacy staff (owners or staff).

The research variables included pharmacy distribution, access to pharmaceutical services, population density, morbidity patterns, and service quality. The data collection instrument was a closed-ended questionnaire for quantitative data on distance, travel time, and service quality. Qualitative data were obtained through in-depth interviews with pharmacists and direct observation at pharmacies, as well as literature review and secondary documentation (data on the number of pharmacies and population demographics).

The research is planned for March 2025 in Kediri City, East Java. The collected data will be analyzed descriptively using frequency distribution tabulation. The Chi-Square (χ^2) statistical test will be used to examine the relationship between the distribution of pharmacies and public access to pharmaceutical

services. Univariate analysis will be conducted to examine the frequency distribution and percentage of each variable, while bivariate analysis will examine the relationship between variables. The validity and reliability of the questionnaire were tested, indicating that all items were valid and the instrument was consistent. The Shapiro-Wilk test showed that the variables total_access and total_services are not normally distributed ($p < 0.05$).

III. RESULT

Respondent Characteristics

The general description of respondents in this study covers five main demographic aspects: gender, age, highest level of education, employment status, and district of residence. The total number of respondents was 102, consisting of 51 members of the general public and 51 pharmacy visitors in Kediri City.

Table 1. Respondent Characteristics

Characteristics	Category	General public	Pharmacy	Total	Percentage (%)
Gender	Man	23	21	44	43.1
	Woman	28	30	58	56.9
Age	18–30 years	23	25	48	47.1
	31–40 years	8	6	14	13.7
	41–50 years	13	11	24	23.5
	>50 years	6	9	15	14.7
Last education	Elementary School/Equivalent	2	1	3	2.9
	Junior High School/Equivalent	11	9	20	19.6
	High School/Equivalent	19	17	36	35.3
	D3/S1	19	24	43	42.2
Employment Status	Work	26	28	5s4	52.9
	Doesn't work	25	23	48	47.1
Subdistrict	Kediri	17	17	34	33.3
	Mojoroto	17	17	34	33.3
	Islamic boarding school	17	17	34	33.3

Perceptions of Pharmacy Access

Table 2. Distribution of Respondents' Perceptions regarding the Distribution of Pharmacies and Access to Pharmaceutical Services

The research variables examined in this study include the distribution of pharmacies and access to pharmaceutical services. Each variable is divided into several indicators measured through a questionnaire using a Likert scale. Respondents were asked to assess physical access, distance, travel time, and service quality of the pharmacies available in their area.

Indicator	Score 1	Score 2	Score 3	Score 4	Total Respondents	Dominant Score	Category
Access 1 – Ease of finding a pharmacy	0	0	17	34	51	4	Strongly agree
Access 2 – Distance of pharmacy from residence	7	17	20	7	51	3	Agree
Access 3 – Travel time to the pharmacy	0	0	39	12	51	3	Agree
Access 4 – Accessibility to transport	0	0	26	25	51	3	Agree

Total Access (10–16 Likert scale)	7	17	102	78	51	12–13	Tall
P1 – Ease of obtaining medication	0	0	35	16	51	3	Agree
P2 – Satisfaction with drug information	0	0	51	0	51	3	Agree
P3 – Clarity of instructions for use of medication	0	0	40	11	51	3	Agree
P4 – Pharmacist consultation services	9	8	20	14	51	3	Agree
Total Service (10–15 Likert scale)	9	8	146	41	51	12–13	Tall

Respondents' perceptions of pharmacy access were positive. The indicator "ease of finding a pharmacy" received the highest score (34 respondents strongly agreed), indicating that pharmacies have reached key areas. However, the indicator "distance of the pharmacy from one's residence" was "agree" (score 3) for the majority of respondents, indicating that pharmacy distribution is good according to the public's perception. The indicator "satisfaction with drug information" showed that all respondents "agreed" (score 3), but none "strongly agreed," indicating potential for improvement in education and communication. The majority of respondents tended to agree or strongly agree with statements indicating a preference for self-medication, but this could also be interpreted as indicating that people tend to seek help from health professionals or pharmacy services to address their health problems, rather than relying solely on self-medication.

Qualitative Results and Analysis (Pharmacist Interview)

Semi-structured interviews with pharmacists in Mojoroto, Kediri City, and Islamic Boarding Schools strengthened the quantitative data.

Table 3. Distribution of Pharmacies and Level of Competition :

Access Variables	Score	Frequency	Percentage (%)	Assessment Categories
Access 1	3	17	33.3	Agree
	4	34	66.7	Strongly agree
Access 2	1	7	13.7	Strongly Disagree
	2	17	33.3	Don't agree
	3	20	39.2	Agree
	4	7	13.7	Strongly agree
Access 3	3	39	76.5	Agree
	4	12	23.5	Strongly agree
Access 4	3	26	51.0	Agree
	4	25	49.0	Strongly agree

Total Access	10–16	51	100.0	High – Very High

Pharmacists stated that the distribution of pharmacies in Kediri City is uneven. Mojoroto District and Kediri City have high density, leading to intense competition. In Islamic boarding schools (pesantren), there are fewer pharmacies, forcing residents in the outskirts to travel longer distances.

Community Outreach Strategies : Pharmacists have developed strategies such as medication delivery services, online consultations via WhatsApp, and discounts for repeat customers, which are effective in reaching people with mobility difficulties.

Service Inhibiting Factors : Obstacles include limited availability of generic drugs, price fluctuations, and a shortage of trained pharmaceutical technicians, which affect service quality and customer satisfaction.

Perception of the Role of Pharmacies : Pharmacists are not only providers of medication but also educators. However, many people simply name a medication without consulting a pharmacist, indicating a low awareness of the importance of a pharmacy consultation.

These interviews confirmed that the distribution, accessibility, and quality of pharmacy services vary widely and are influenced by local factors and adaptation strategies.

Distribution of Pharmacies and Ease of Obtaining Medicines

A chi-square test showed a significant relationship between the distribution of pharmacies and the ease of access to medicines ($p = 0.045$). A nearby pharmacy facilitates quick access, minimizes service inequalities, and supports primary healthcare. Qualitative interviews support this, showing that the high density of pharmacies in Mojoroto and Kediri City makes it easier for residents to find medicines. This is consistent with other studies that suggest an even distribution of pharmacies improves service efficiency and reduces the burden on patient mobility. The WHO recommends a ratio of one pharmacy per 2,000 residents. Although the number of pharmacies in Kediri City is high, in areas such as Islamic boarding schools, travel time can be more than 15 minutes, indicating uneven distribution. Mapping of pharmacy locations using GIS (Geographic Information System) is essential for equitable distribution. These results confirm that physical accessibility is a key factor in ensuring the availability of equitable and effective pharmaceutical services.

IV. DISCUSSION

The distribution of pharmacies and the ease of obtaining medicines is a critical aspect of public health that significantly influences the well-being of communities. Recent statistical analyses, particularly a chi-square test, have revealed a noteworthy correlation between the geographical distribution of pharmacies and the accessibility of medicines, with a p-value of 0.045 indicating statistical significance. This relationship underscores the importance of having pharmacies located within close proximity to residents, which not only facilitates swift access to necessary medications but also plays a crucial role in minimising service inequalities and bolstering primary healthcare initiatives. In urban areas such as Mojoroto and Kediri City, qualitative interviews with residents have highlighted the benefits of a high density of pharmacies. For instance, many respondents noted that the ease of locating a pharmacy has significantly reduced the time and effort required to procure medicines. This finding aligns with existing literature that posits that a more even distribution of pharmacies can enhance service efficiency and alleviate the mobility burdens often faced by patients. The World Health Organization (WHO) recommends a ratio of one pharmacy for every 2,000 residents to ensure optimal access to pharmaceutical services. Although Kediri City boasts a relatively high number of pharmacies, certain areas, particularly those surrounding Islamic boarding schools, present challenges; residents in these locales may experience travel times exceeding 15 minutes, indicative of an uneven distribution of pharmacy services.

To address these disparities, the application of Geographic Information Systems (GIS) for mapping pharmacy locations is essential. This technology can provide valuable insights into the spatial distribution of pharmacies, allowing for a more equitable allocation of resources. By visualising

pharmacy locations in relation to population density, stakeholders can identify underserved areas and implement strategies to enhance access. The evidence gathered thus far reinforces the notion that physical accessibility is a fundamental component in ensuring the availability of equitable and effective pharmaceutical services.

Respondents' perceptions of pharmacy access have been largely positive. The survey indicated that the indicator "ease of finding a pharmacy" received the highest score, with 34 respondents expressing strong agreement. This suggests that pharmacies have successfully established themselves in key areas, making them readily accessible to the public. However, the indicator concerning the "distance of the pharmacy from one's residence" received a score of 3, indicating a general agreement among respondents that while pharmacy distribution is satisfactory, there remains room for improvement. Additionally, the indicator measuring "satisfaction with drug information" revealed that while all respondents agreed with the statement, none strongly agreed, highlighting a potential gap in educational outreach and communication efforts.

Interestingly, the majority of respondents expressed a tendency towards self-medication, which could be interpreted in multiple ways. On one hand, it suggests a level of confidence among individuals to manage minor health issues independently; on the other hand, it may indicate a reluctance to seek professional advice from healthcare providers or pharmacists. This duality points to the necessity of fostering a greater understanding of the role of pharmacies in patient care, as well as the importance of professional consultations when addressing health concerns.

Pharmacists themselves have acknowledged the uneven distribution of pharmacies within Kediri City. The Mojoroto District and central areas of Kediri City experience a high density of pharmacies, resulting in intense competition among providers. Conversely, residents in the outskirts, particularly around Islamic boarding schools, face significant challenges due to the scarcity of pharmacies, compelling them to travel longer distances to access medications. This disparity not only affects the convenience of obtaining medicines but also has broader implications for public health, particularly for vulnerable populations who may have mobility issues or lack transportation.

To mitigate these challenges, pharmacists have implemented various community outreach strategies aimed at improving access to pharmaceutical services. Initiatives such as medication delivery services, online consultations via platforms like WhatsApp, and discounts for repeat customers have proven effective in reaching individuals with mobility difficulties. These strategies not only enhance accessibility but also foster a sense of community engagement, reinforcing the role of pharmacies as integral components of the healthcare system.

Despite these efforts, several inhibiting factors persist that affect the quality of pharmacy services and, consequently, customer satisfaction. Limited availability of generic drugs, fluctuations in pricing, and a shortage of trained pharmaceutical technicians are significant barriers. These obstacles can lead to delays in service delivery and may deter individuals from seeking necessary medications, ultimately impacting their health outcomes. Addressing these issues requires a multifaceted approach that encompasses training for pharmacy staff, ensuring a steady supply of essential medications, and implementing pricing strategies that make medicines more affordable.

The perception of the role of pharmacies within the community has evolved. Pharmacists are increasingly viewed not just as dispensers of medication but also as educators who can provide valuable health information. However, many individuals still approach pharmacies with a limited understanding of the importance of consulting with pharmacists before making medication choices. This lack of awareness underscores the need for enhanced educational initiatives that promote the benefits of pharmacy consultations and empower individuals to make informed health decisions.

Distribution of pharmacies and the ease of obtaining medicines are critical determinants of public health. The evidence suggests that while there are positive perceptions regarding access to pharmacies, significant gaps remain, particularly in underserved areas. The application of GIS technology, coupled with innovative outreach strategies and a focus on education, can help bridge these gaps and ensure equitable access to pharmaceutical services for all community members. As we move forward, it is imperative to recognise the dynamic role of pharmacies in healthcare and to continue fostering an environment that supports both accessibility and quality of care. By addressing the challenges identified and leveraging the strengths of pharmacy services, we can enhance the overall health and well-being of

communities, ensuring that everyone has the opportunity to receive the medications they need in a timely and efficient manner.

V. CONCLUSION

The distribution of pharmacies influences the level of public access to pharmaceutical services in Kediri City. Areas with more pharmacies in strategic locations have easier, faster, and more adequate access to services. Conversely, areas with fewer pharmacies or those in difficult-to-reach locations experience access barriers, such as long travel times and limited services. This demonstrates the importance of equitable pharmacy distribution for optimal and equitable pharmaceutical services.

VI. CONFLICT OF INTEREST

The authors declare no conflict of interest regarding the publication of this article. No financial, personal, or institutional relationships existed that may have influenced the research process, data interpretation, or preparation of the manuscript

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