



Social, economic, and access to services factors influencing non-prescription antibiotic use in island communities: A qualitative study

Anna Maria Daud^{1,*}, Adi Hermawan², Muh. Rusdi¹

¹ Department of Hospital Administration, Institut Teknologi dan Kesehatan Tri Tunas Nasional, Makassar, South Sulawesi 90121, Indonesia;

² Department of Nursing, Sekolah Tinggi Ilmu Kesehatan Amanah Makassar, Makassar, South Sulawesi 90121, Indonesia.

*Correspondence: anha0844@gmail.com

Received Date: May 13, 2026

Revised Date: July 30, 2026

Accepted Date: August 29, 2026

ABSTRACT

Background: The use of antibiotics without a prescription remains a public health problem because it can increase inappropriate drug use and accelerate antimicrobial resistance. In island communities, this behavior is not only influenced by knowledge, but also by treatment experience, family norms, economic capacity, distance between islands, sea transportation, weather, and service availability. This study aims to explore social, economic, and service access factors that underlie the use of antibiotics without a prescription in the community.

Methods: The study used an exploratory qualitative case study design with a constructivist-interpretive paradigm. Informants were selected purposively with maximum variation, consisting of 20 community members who had obtained or used antibiotics without a prescription and seven key informants. Data were collected through in-depth interviews, non-participant observation, and document review. The analysis was conducted through data condensation, inductive-deductive coding, matrix presentation, thematic analysis, source triangulation, and conclusion verification. **Findings:** Five main themes were identified, antibiotics are perceived as a powerful medicine based on recovery experiences; family and social networks shape usage decisions; direct and indirect costs influence treatment choices; geographic and operational barriers limit access to community health centers; and the use of antibiotics without a prescription becomes a pragmatic strategy when services are difficult to access. These findings indicate that positive attitudes toward previous experiences, social norms, and perceived ease of access to antibiotics reinforce the use of antibiotics without a prescription. The integration of the theory of planned behavior and the service access framework explains the relationship between individual decisions and structural barriers in local island communities. **Conclusions:** The use of antibiotics without a prescription in island communities is shaped by the interaction of individual experiences, social norms, economic burdens, and limited access. **Novelty/Originality of this article:** The study provides a community-based framework for addressing non-prescription antibiotic use by integrating educational interventions, mobile services, pharmaceutical service strengthening, and strategies to reduce transportation barriers and indirect costs.

KEYWORDS: access to health services; economic factors; island communities; non-prescription antibiotics; social factors.

1. Introduction

Antibiotics are essential drugs that play a crucial role in the treatment of bacterial infections (Kolář, 2022; Naveed et al., 2020). The availability of antibiotics has reduced

Cite This Article:

Daud, A. M., Hermawan, A., & Rusdi, M. (2026). Social, economic, and access to services factors influencing non-prescription antibiotic use in island communities: A qualitative study. *Arung: Community Health Insight*, 2(2), 85-104. <https://journal-iasssf.com/index.php/ARCHI/article/view/4087>

Copyright: © 2026 by the authors. This article is distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).



morbidity and mortality from various infectious diseases. However, these benefits face serious threats from inappropriate antibiotic use. Unintentional use, inappropriate antibiotic selection, inappropriate dosage and duration, premature discontinuation of treatment, and use of antibiotics without medical examination and prescription can accelerate the emergence of antimicrobial resistance. Antimicrobial resistance (AMR) occurs when microorganisms undergo changes that make antimicrobial drugs no longer effective in treating infections (Belay et al., 2024; Sharma et al., 2024). The World Health Organization (WHO) confirms that the excessive and inappropriate use of antimicrobials in humans, animals, and plants is a major driver of the development of resistant microorganisms (World Health Organization, 2023). The use of antibiotics without a prescription is a form of irrational antibiotic use and is still common in low- and middle-income countries. People can obtain antibiotics from pharmacies, drug stores, small shops, leftover medication, family members, and other informal sources. This practice is often seen as a quick, easy, and affordable way to treat symptoms without requiring a medical consultation. However, the use of antibiotics without a proper diagnosis can lead to incorrect drug selection, inappropriate dosages, inadequate treatment duration, side effects, delays in receiving appropriate treatment, and an increased risk of antimicrobial resistance. A synthesis of qualitative evidence from 78 studies in low- and middle-income countries indicates that people's decisions to use antibiotics without a prescription are not solely driven by a lack of knowledge. These decisions are shaped by previous treatment experiences, assessments of disease severity, social norms, antibiotic availability, treatment costs, time required to obtain care, and difficulty reaching health facilities (Cabral et al., 2024).

In Indonesia, antibiotics are considered prescription drugs, and their use should be based on clinical indications and under the supervision of healthcare professionals. The Guidelines for Antibiotic Use, stipulated in Regulation of the Minister of Health of the Republic of Indonesia Number 28 of 2021, emphasize that antibiotic use must consider the appropriate diagnosis, indication, type of drug, dosage, administration interval, route, and duration of therapy. However, various studies indicate that people can still obtain antibiotics without a prescription through pharmacies, drug stores, and informal sources. A systematic review of antibiotic use in Indonesia shows that suboptimal use occurs at various levels, from community behavior and drug dispensing practices to prescribing and implementing antimicrobial control programs. The available evidence is also concentrated in specific regions and is dominated by survey studies on knowledge, attitudes, and practices regarding antibiotic use (Limato et al., 2022). Qualitative research in Yogyakarta City indicates that people perceive using antibiotics without a prescription as saving time and money and reducing the number of medications required. Easy availability of antibiotics, previous experiences of successful use, and approval from family or friends contribute to this behavior. Conversely, potential side effects, treatment failure, and antibiotic resistance are perceived as disadvantages. These findings suggest that the decision to use antibiotics without a prescription is a result of the interaction between individual beliefs, experience, the influence of those closest to them, and the perceived ease of use (Widayati et al., 2015).

From the perspective of drug providers, qualitative research in Bekasi and Tabalong found that antibiotics were often prescribed after customers directly requested the medication by stating the generic name, brand name, or showing the packaging of previously used drugs. This practice is driven by limited knowledge about antibiotics and antimicrobial resistance, economic incentives to maintain sales, business competition, customer demand, and weak regulatory enforcement. For the public, purchasing drugs directly is also seen as a cheaper and more practical option than accessing health facilities, which require travel costs, waiting times, and lost work time. Thus, the use of antibiotics without a prescription is not only a matter of individual behavior, but is related to socioeconomic dynamics, the drug supply system, and the community's experience in accessing health services (Ferdiana et al., 2021). Recent evidence from ethnographic research in Central Java shows that access to antibiotics without a prescription remains

relatively easy, especially through pharmacies and small shops. Public knowledge of antibiotics and understanding drug labels tends to be limited, while antibiotic use is driven by convenience, ease of access, lower prices, and experiences of recovery after previous use. The study also found practices such as premature antibiotic discontinuation, antibiotic use for purposes other than the original indication, storage of leftover medication, and sharing antibiotics with family members. These findings reinforce the view that antibiotic use at the community level is shaped by the interplay of knowledge, personal experience, social relationships, economic conditions, and access to drug sources (Naing et al., 2026).

This issue has the potential to be more complex in archipelagic communities. Indonesia's geographic characteristics mean that residents in some regions must use a combination of land and sea transportation to reach health care facilities. Research on access to health care in the Maluku island community indicates disparities in distance, travel time, facility availability, and distribution of health workers across the archipelago. Travel by sea, limited transportation facilities, and population distribution across distant islands can reduce people's willingness and ability to seek care when experiencing health problems. These barriers can lead to delays in care, underutilization of health facilities, or the choice of closer and more accessible treatment sources (Leosari et al., 2023). Liukang Tupabbiring District is one of the island regions in Pangkajene and Kepulauan Regency, South Sulawesi. The population is spread across several islands, so mobility to healthcare facilities depends on geographic conditions and sea transportation. The Liukang Tupabbiring Community Health Center/*Unit Pelayanan Terpadu Pusat Kesehatan Masyarakat* (UPT Puskesmas) is listed as an inpatient health center in a very remote working area. These characteristics indicate that community access to healthcare can be affected by distance between islands, ship schedules and availability, weather and wave conditions, travel time, transportation costs, and the community's ability to leave work to seek treatment (Central Statistics Agency of Pangkajene and Kepulauan Regency, 2025).

Economic barriers in island communities extend beyond the cost of examinations or medication. They may also incur indirect costs such as sea travel, food during the trip, the need for companions, loss of daily income, and the uncertainty of returning the same day. For fishermen, small traders, laborers, or informal workers, leaving work to visit a health facility can have significant economic consequences. In such situations, purchasing antibiotics directly from the nearest source, using leftover medication, or following family recommendations may be perceived as more realistic options. Therefore, the behavior of using antibiotics without a prescription needs to be understood as a community strategy in response to structural limitations, not solely a result of low health literacy (Cabral et al., 2024; Ferdiana et al., 2021; Naing et al., 2026). This study uses the Theory of Planned Behavior as a foundation for understanding the formation of nonprescription antibiotic use. According to this theory, behavior is preceded by intentions shaped by attitudes toward the behavior, subjective norms, and perceived behavioral control. Attitudes reflect people's assessments of the benefits and disadvantages of using nonprescription antibiotics. Subjective norms relate to the approval, habits, and influence of family, friends, neighbors, or other important figures. Perceived behavioral control explains the extent to which a person feels it is easy or difficult to obtain and use antibiotics without a prescription. Drug availability, previous experience with use, ability to recognize packaging, financial resources, and barriers to visiting a community health center can reinforce the perception that using antibiotics without a prescription is easy (Ajzen, 1991; Widayati et al., 2015).

In addition to behavioral factors, this study refers to the patient-centered healthcare access framework developed by Levesque et al. (2013). This framework views access as the result of the interaction between the characteristics of the service system and the community's ability to recognize health needs, seek services, reach facilities, pay fees, and engage in the care process. From a facility perspective, access relates to ease of recognizing services, social and cultural acceptance, service availability, affordability, and the suitability of services to community needs. In an island context, the ability to reach services is crucial because it is influenced by island location, sea transportation, weather, service schedules, and household economic resources. This framework allows research to view non-

prescription antibiotic use as a consequence of the relationship between individual choices and the conditions of available health services (Levesque et al., 2013). Previous research has examined public beliefs regarding over-the-counter antibiotic use in urban Yogyakarta, consumer interactions with drug providers in urban and semi-rural areas of Bekasi and Tabalong, and antibiotic use practices among rural communities in Central Java. Research on island communities has also demonstrated spatial disparities in access to healthcare facilities and personnel. However, these areas have generally been examined separately. Studies on antibiotic use have focused more on knowledge, attitudes, practices, purchasing behavior, and sales practices, while island studies have focused more on distance, facility distribution, and availability of healthcare personnel (Widayati et al., 2015; Ferdiana et al., 2021; Limato et al., 2022; Leosari et al., 2023; Naing et al., 2026).

To date, no studies have been found that specifically explore the relationship between social, economic, and service access factors and over-the-counter antibiotic use in the Liukang Tupabbiring Community Health Center work area. There are also few qualitative studies in Indonesia that consider ship schedules, sea weather, inter-island travel costs, lost income, social networks in island communities, and drug acquisition strategies as a single factor in explaining non-prescription antibiotic use. This gap is crucial because educational interventions focused solely on increasing knowledge may be inadequate if communities still face geographic and economic barriers to accessing formal healthcare. The novelty of this research lies in the integration of three key dimensions. First, the study explores social factors such as knowledge, experience with use, family norms, recommendations from loved ones, trust in providers, and the habit of sharing medication. Second, the study examines economic factors more broadly, including direct costs, sea travel costs, lost work time, affordability of medications, and utilization of the National Health Insurance/*Jaminan Kesehatan Nasional* (JKN). Third, the study places access to services within the geographical context of the archipelago, taking into account distances between islands, transportation schedules, weather, travel time, availability of healthcare workers, service hours, and the presence of informal sources of medication. The integration of the Theory of Planned Behavior and the patient-centered care access framework also provides a perspective that links individual decisions to the social and structural conditions of island communities.

Based on this foundation, a tentative, one-way assumption is that the stronger the social norms justifying the self-use of antibiotics, the greater the economic burden of accessing health facilities, and the greater the geographic and operational barriers to services, the stronger the tendency of island communities to obtain and use antibiotics without a prescription. In qualitative research, this assumption is not intended as a statistical hypothesis, but rather as an initial concept to be further explored, interpretedly tested, and developed based on the experiences of informants (Malterud et al., 2016; O'Brien et al., 2014; Tong et al., 2007). This study aims to explore the social, economic, and access-to-service factors underlying the use of antibiotics without a prescription among island communities in the Liukang Tupabbiring Community Health Center work area in Pangkajene and Kepulauan Regency. Specifically, the research aims to understand the community's knowledge and understanding of antibiotics, experiences with obtaining and using antibiotics, the role of family and social networks, direct and indirect cost considerations, barriers to inter-island travel, experiences with utilizing community health center services, and community strategies for obtaining treatment when health services are difficult to access. The research results are expected to be the basis for developing contextual antibiotic use education, strengthening pharmaceutical and community health center services, increasing access to island health services, and developing antimicrobial resistance control interventions that not only emphasize changes in knowledge but also consider the social, economic, and geographical conditions of the community.

2. Methods

This research uses an exploratory qualitative case study design to understand the social, economic, and access-to-service factors that shape the practice of nonprescription

antibiotic use in an island community. The case study was limited by region, community group, and study period, namely the community living in the working area of the Liukang Tupabbiring Community Health Center technical implementation unit/*unit pelayanan terpadu* (UPT), Pangkajene and Kepulauan Regency, during May-June 2026. The research is positioned within a constructivist-interpretive paradigm with a relativist ontology. Ontologically, nonprescription antibiotic use is viewed as a social reality with diverse meanings, depending on the community's experience of illness, social relationships, economic capacity, geographic location, and experiences interacting with health services. Epistemologically, knowledge about this practice is constructed through interactions between researchers and informants and interpreted within the context of the island community's lives.

Therefore, this study is not aimed at measuring the magnitude of influence or statistically proving causal relationships, but rather at understanding how informants explain the factors that encourage, enable, or limit nonprescription antibiotic use. This design was chosen because antibiotic use behavior is influenced not only by individual knowledge, but also by social norms, treatment experience, ability to pay, drug availability, distance, sea transportation, and experience accessing health facilities. The Theory of Planned Behavior is used as a sensitization concept to understand attitudes, subjective norms, and perceived behavioral control in society (Ajzen, 1991). Meanwhile, a patient-centered service access framework is used to understand the community's ability to recognize needs, seek services, reach facilities, pay for services, and engage in the health care process (Levesque et al., 2013). Levesque's framework views access as the result of the interaction between community capabilities and the characteristics of the health care system.

2.1 Research location and timeline

The research was conducted in the working area of the Liukang Tupabbiring Community Health Center (UPT Puskesmas) in Pangkajene and Kepulauan Regency, South Sulawesi. The location was selected purposively due to its archipelagic geographic characteristics and its registration as a remote inpatient community health center. Pangkajene and Kepulauan Regency health planning documents also indicate that access to health services in the archipelagic region depends on weather conditions and the availability of sea transportation, while some island community health centers still face limitations in facilities, infrastructure, and referral transportation. These characteristics align with the research objectives because they allow for exploration of the relationship between inter-island distance, travel time, transportation costs, lost work time, service schedules, and the community's decision to obtain antibiotics without a prescription. The location selection was not intended to represent the entire Indonesian archipelago, but rather to gain a deeper contextual understanding of the phenomena within a geographically limited health service system. Data collection was planned for three months, from May to July 2026.

This three-month period was chosen to allow for visits to several islands, rescheduling due to changes in sea transportation or weather, follow-up interviews, and initial checks on the adequacy and consistency of the data. All field trips were conducted only when transportation was available and sailing conditions were deemed safe, based on information from the local government, community health center staff, and local transportation providers. The data collection area was determined through initial mapping based on travel time to the community health center. Inhabited islands were grouped into three relative travel time categories: short, medium, and long travel time. The boundaries of each category were determined based on the distribution of travel times obtained in the preliminary mapping. The selection of islands within each category was intended to capture a variety of experiences in accessing services.

2.2 Research population and informants

The conceptual population of the study was all adults living in the Liukang Tupabbiring Community Health Center (UPT) working area and having experience obtaining or using antibiotics without a doctor's prescription. In qualitative research, informants are not selected to generate population estimates, but rather to obtain in-depth and varied information about the phenomenon under study. The initial number of informants is estimated at 25–30. The final number is not determined solely based on a numerical target, but is evaluated gradually using the principle of information power. The more specific the informant's characteristics, the more focused the research objectives, the better the quality of the interviews, and the stronger each informant's contribution to the research questions, the fewer informants are needed. Conversely, recruitment continues when significant variations are still found, themes are not sufficiently developed, or there are groups of experiences that are not yet identified.

Table 1. Informants are divided into primary informants and key informants

Informant groups	Estimated initial number	Information gathered
People who have used or obtained antibiotics without a prescription	18–22 people	Illness experiences, reasons for use, drug sources, costs, social influences, barriers to access, and service experiences
Health center, community health center, or health service post staff	3–4 people	Patterns of antibiotic use in the community, drug services, education, referrals, and service barriers
Pharmacists or drug administrators	1–2 people	Antibiotic availability, drug information provision, community demand, and antibiotic use management
Health workers, village government officials, or community leaders	2–3 people	Community norms, treatment-seeking patterns, socioeconomic conditions, and geographic barriers
Drug sellers or staff at accessible pharmaceutical facilities	1–2 people	Antibiotic demand, service considerations, drug sources, and understanding of regulations

2.3 Informant criteria

Key informants from community groups must meet the following inclusion criteria: at least 18 years old; have resided in the Liukang Tupabbiring Community Health Center (UPT Puskesmas) work area for at least one year; have purchased, obtained, or used antibiotics without a doctor's prescription in the past 12 months; are able to describe their experiences using or obtaining antibiotics; are willing to participate in the interview and provide informed consent after receiving an explanation of the research. Antibiotic use experience was confirmed by mentioning the drug name, the retained packaging, a photograph of the drug, purchase records, or an antibiotic image card verified by a pharmacist. The image card was used solely as a memory aid and not as the basis for a diagnosis or clinical examination.

Informants were excluded if they were experiencing a serious health condition that would have prevented the interview, had communication difficulties that prevented them from giving informed consent, or were unable to provide sufficient information to confirm that the drug used was an antibiotic. Key informants were selected based on their involvement in and knowledge of health services, medication management, community health-seeking patterns, transportation conditions, or the social life of island communities.

2.4 Informant selection technique

Informants were selected using purposive sampling with a maximum variation strategy. Variability among community informants was considered based on: island of residence and travel time to the community health center; gender and age group; education level; occupation and source of income; ownership and use of National Health Insurance (JKN); experience using antibiotics; source of antibiotic acquisition; frequency of use of community health center services. Initial informants can be identified through health cadres, village government officials, health workers, or community networks. Furthermore, recommendations from other informants can be used on a limited basis to reach individuals with relevant experience. Officers who assisted in introducing potential informants were not involved in the consent and interview process to ensure that participation remains voluntary.

2.5 Research focus

This qualitative research does not use independent and dependent variables in the statistical sense. The focus of the study consisted of: Social factors, including knowledge and understanding of antibiotics, previous experience with use, family norms, recommendations from friends or neighbors, drug sharing habits, trust in healthcare workers and drug sellers, and perceptions of antimicrobial resistance. Economic factors, including drug prices, consultation fees, sea travel costs, companion fees, lost work time, ability to pay, JKN membership, and household economic considerations. Access to services, including distance, travel time, transportation schedules, weather conditions, service hours, availability of healthcare workers, drug availability, referral processes, waiting times, and experiences with healthcare facilities.

Non-prescription antibiotic use practices, including types of complaints, drug sources, antibiotic selection, dosage, duration, discontinuation, storage of leftover medication, reuse, and drug sharing. Community strategies, including decisions to seek or delay care, use of informal drug sources, utilization of social networks, and treatment options when healthcare facilities are difficult to access. Components of the Theory of Planned Behavior and Levesque's access framework were used as initial concepts, but the researcher remained open to the possibility of new categories and themes emerging from informants' experiences.

2.6 Materials, instruments, and data sources

This study did not use biological materials or collect specimens. The research materials and instruments included: a semi-structured interview guide; an informant characteristics form; a consent form after explanation; a voice recorder; a field notebook; an access and service observation sheet; a document review form; a picture card or photograph of antibiotic packaging verified by a pharmacist; a computer and qualitative data management software; encrypted digital data storage. The interview guide was developed based on the research objectives, the Theory of Planned Behavior, Levesque's access to service framework, and previous research findings on non-prescription antibiotic use in Indonesia and low-middle-income countries. The literature used as a basis includes Widayati et al. (2015), Ferdiana et al. (2021) and Materud et al. (2016).

The interview guide was piloted with two individuals with similar characteristics but living outside the primary research location. The pilot was conducted to assess language clarity, question sequence, question sensitivity, interview duration, and the ability of the questions to generate in-depth narratives. Pilot data was not included in the main analysis. Primary data sources consisted of in-depth interviews and field observations. Secondary data sources included community health center profiles, service and transportation schedules, accessible drug use or management reports, antibiotic education program documents, service data, and relevant regional policy documents.

2.7 Data collection procedure

Data collection was carried out in several stages. Preparation Stage: The researcher first obtained ethical approval, permission from the Pangkajene and Kepulauan Regency Health Office, permission from the Liukang Tupabbiring Community Health Center Technical Implementation Unit (UPT), and approval from the local village or sub-district government. The researcher then conducted an initial mapping of the area, identified data collection locations, prepared instruments, trained research assistants, and piloted the interview guide. The researcher also created reflexive notes that included the researcher's background, position, initial assumptions, relationship to the research location, and possible influence on data collection and interpretation.

In-depth interviews: Interviews were conducted face-to-face in a safe, quiet, and agreed-upon location. To reduce the tendency to provide answers deemed favorable to health workers, community interviews were not conducted in the presence of community health center staff, unnecessary family members, drug sellers, or local officials. Interviews lasted approximately 45–75 minutes and were conducted in Indonesian or the language most comfortable for the informant. If a local interpreter was required, the interpreter received prior training on confidentiality, neutral translation, and the prohibition on adding or subtracting from answers. Community interview topics included: introduction to and understanding of antibiotics; history of obtaining and using antibiotics without a prescription; complaints that prompted antibiotic use; sources of drug acquisition; previous experiences of success or failure; influence of family, friends, neighbors, or drug sellers; drug prices and the cost of accessing health services; experience using the National Health Insurance (JKN); distance, ship schedules, weather conditions, and travel time; experiences seeking treatment at community health centers or other facilities; reasons for choosing, delaying, or not using formal services; views on the risks of antibiotic use; forms of education and services deemed acceptable to the community. Key informant interviews were tailored to their respective roles. Health workers were asked about complaint patterns, antibiotic requests, drug services, education, personnel availability, referrals, and operational barriers. Community leaders and cadres were asked about social norms, treatment-seeking patterns, economic conditions, transportation, and community strategies when services are difficult to access. With the informants' consent, interviews were recorded using a voice recorder. If the informant declined to be recorded, the researcher took detailed notes during and immediately after the interview. At the conclusion of the interview, the researcher provided a summary of the initial understanding and asked the informant to correct any inaccurate information. Follow-up interviews were conducted if any areas needed clarification.

Non-participant observation was conducted to understand the context of healthcare access and service delivery, including the location and condition of health facilities, travel routes, transportation availability, actual travel time, service schedule information, queuing and medication services, availability of antibiotic education materials and accessible drug sources, and environmental conditions related to access. The observations did not involve covert purchasing or patient-based methods, as these activities require separate protocols and ethical approval, while observation notes were systematically separated into factual descriptions and researcher reflections or interpretations. In addition, a document review was conducted using community health center work area profiles, service schedules, program reports, drug education materials, aggregated visit data, transportation or referral documents, and antibiotic use policies. Individual patient data were not accessed without appropriate ethical approval and specific permission, and information from the reviewed documents was extracted using a structured form that recorded the document name, year, publisher, relevant content, and its relationship to the interview findings.

The data management and analysis procedures were conducted systematically throughout the research process. Each informant was assigned an anonymous code, with community informants identified as M01, M02, and so forth, and key informants identified as K01, K02, and so forth. Names, detailed addresses, telephone numbers, and other

identifying information were kept separate from the research transcripts, while interview recordings were transcribed verbatim within 48–72 hours after each interview and cross-checked against the recordings to ensure completeness. Portions of the interviews conducted in the local language were translated into Indonesian while retaining the original text, and local terms with specific meanings were preserved with contextual explanations. Recordings, transcripts, field notes, and digital documents were stored on encrypted media, with the informant identity and coding list maintained separately from the research data and access restricted to the research team. Data were retained for five years after publication or in accordance with institutional guidelines before being securely destroyed. Data analysis was conducted concurrently with data collection, allowing emerging findings to inform the refinement of interview questions, exploration of variations in participant experiences, and determination of the need for additional informants. The analysis followed the interactive model proposed by Miles et al. (2020), which involves data condensation, data presentation, and drawing and verifying conclusions, with the methodological framework of Miles, Huberman, and Saldaña providing a systematic basis for the analytical process.

Data condensation began with repeated reading of the interview transcripts and field notes, followed by the preparation of initial analytical memos documenting emerging ideas, patterns, discrepancies, and analytical questions. Units of meaning were then coded using a combination of deductive and inductive approaches, with initial deductive codes derived from attitudes toward non-prescription antibiotic use, subjective norms, perceived behavioral control, the ability to recognize service needs, seek services, reach health facilities, pay for services, and engage in services, as well as the recognition, acceptability, availability, affordability, and appropriateness of services. Inductive codes were subsequently added to capture experiences, practices, local terms, and explanations that were not represented in the initial framework, such as “buying medication faster,” “fear of missing workdays,” “no boat available,” “following family advice,” “using leftover medication,” “medication deemed appropriate,” and “no health worker available.” Conceptually related codes were grouped into categories and broader themes, following the stages of thematic analysis proposed by Braun & Clarke (2006), including data familiarization, code formation, initial theme development, theme review, theme definition and naming, and report preparation. Two researchers independently coded at least 25% of the initial transcripts, after which the coding results were compared through discussion to clarify code definitions, category boundaries, and differences in interpretation. This process was intended not to calculate statistical inter-coder agreement but to broaden analytical reflection, identify researcher assumptions, and improve consistency in the application of the codebook. The codebook was progressively refined and included code names, definitions, inclusion and exclusion criteria, and representative quotations.

Data were presented in several systematic formats to facilitate the examination of relationships among the findings, including matrices of informants and socio-demographic characteristics, social, economic, and service access factors, comparisons based on inter-island travel time categories, comparisons between communities and key informants, antibiotic sources and reasons for their selection, and triangulation of interview, observation, and document findings. Additional analytical outputs included a map illustrating the relationships among conditions, actors, decisions, practices, and consequences, as well as analytical memos developed for each theme. Direct quotations were selected to illustrate variations, similarities, contradictions, and cases that differed from the dominant patterns, while quotations were translated without altering their meaning and coded according to informant characteristics to prevent individual identification. Conclusions were developed progressively by examining patterns, relationships between categories, alternative explanations, negative cases, and differences in perspectives across informant groups, with emerging conclusions continuously compared against transcripts, field notes, observations, and relevant documents. The final interpretation focused on how social factors influence the acceptance of non-prescription antibiotic use, how economic burdens affect treatment choices, how island conditions

constrain or modify access to health services, how these dimensions interact, the strategies adopted by communities when formal services are difficult to access, and the implications of these findings for community health center services and antimicrobial resistance control. Qualitative data management software, including NVivo, ATLAS.ti, or MAXQDA, was used to organize transcripts, codes, analytical memos, and matrices, while all interpretative decisions remained the responsibility of the researchers.

The validity of the study was assessed based on the criteria of credibility, transferability, dependability, and confirmability proposed by Lincoln & Guba (1985). Credibility was strengthened through source and method triangulation, prolonged field involvement, cross-checking of interview summaries, researcher discussions, and the identification of negative cases. Source triangulation involved comparisons across communities, health workers, pharmacists, cadres, community leaders, and drug providers, while method triangulation involved comparisons of findings from interviews, observations, and document reviews. Transferability was supported through detailed descriptions of the geographic, social, economic, transportation, and service contexts, as well as informant characteristics and the circumstances in which antibiotics were obtained, enabling readers to assess the applicability of the findings to other archipelagic settings. Dependability was maintained through an audit trail documenting versions of the interview guide, sampling decisions, codebooks, category revisions, analytical memos, team discussions, and the rationale for theme development. Confirmability was enhanced through reflexive records, documentation of supporting evidence for each theme, discussion of alternative interpretations, and systematic examination of the relationship between the conclusions and the original data. The reporting process followed the Consolidated Criteria for Reporting Qualitative Research (COREQ) and the Standards for Reporting Qualitative Research (SRQR). The findings were presented narratively according to themes and subthemes, with each theme supported by analytical explanations, links to the research questions, variations in experiences, relevant direct quotations, and conceptual matrices or models where appropriate. Informant characteristics were presented in aggregate to protect participants' identities, and the number of quotations was not used as an indicator of theme dominance. Terms such as "most" and "some informants" were used cautiously because the study did not aim to generate prevalence estimates, with interpretation instead emphasizing the depth, variation, context, and relationships among the identified categories.

3. Results and Discussion

3.1 Informant characteristics

This study involved 27 informants, consisting of 20 primary informants from community groups and seven key informants. The primary informants were residents aged 18 years or older who lived in the Liukang Tupabbiring Community Health Center (UPT) working area and had experience obtaining or using antibiotics without a doctor's prescription in the past 12 months. The key informants included a community health center doctor, a nurse, a drug administrator or pharmacist, two health cadres, a village government official, and a drug seller who regularly served island communities. The informants came from three inhabited islands, each with varying distances and travel times to the community health center.

Eleven community informants were female and nine were male. The informants' ages ranged from 21 to 67. Most worked in the informal sector, primarily as fishermen, housewives, small traders, and daily laborers. Sixteen informants had active National Health Insurance (JKN) membership, while four reported that their membership was inactive or could not yet be used. Travel time to the community health center ranged from 20 minutes to over two hours. Travel time varies depending on the island's location, the type of boat used, weather conditions, transportation availability, and departure time.

Table 2. Characteristics of research informants

Characteristics	Community informants	Key informant
Number of informants	20	7
Male	9	4
Female	11	3
Age 18–35 years	6	1
Age 36–55 years	10	5
Age > 55 years	4	1
Fisherman	6	–
Housewife	7	–
Small trader	4	–
Daily laborer	2	–
Other occupation	1	7
Has active National Health Insurance	16	–
Travel time to community health center < 30 minutes	5	–
Travel time 30–60 minutes	9	–
Travel time > 60 minutes	6	–

The antibiotic most frequently mentioned by informants was amoxicillin. Some informants also recognized tetracycline, ampicillin, and cefadroxil, although not all informants could distinguish antibiotics from pain relievers, fever medications, or cough medicines. The main sources of antibiotic acquisition included mainland pharmacies or drug stores, small shops selling limited quantities of medication, leftovers from previous medications, and gifts from family members. The analysis yielded five main themes: antibiotics are interpreted as potent drugs based on experiences of recovery; family and social networks shape use decisions; direct and indirect costs influence treatment choices; geographic conditions and service delivery limit access to community health centers; using antibiotics without a prescription is a pragmatic strategy to address limitations.

Table 3. Themes and subthemes of research results

Main themes	Subthemes
Antibiotics as a powerful medicine	Healing experience; recognition by name, color, or packaging; antibiotics for various complaints
The influence of family and social networks	Family recommendations; sharing medications; use of leftover antibiotics; trust in drug sellers
Economic considerations	Drug prices; transportation costs; loss of income; companion costs; limitations of JKN benefits
Barriers to accessing services	Distance between islands; boat schedules; weather; waiting time; availability of personnel and medications
Pragmatic community strategies	Buying medications directly; using old stock; postponing visits; choosing the nearest medication source

3.1.1 Antibiotics are understood as potent drugs based on experiences of recovery

Most informants recognized antibiotics by their name, tablet form, capsule color, or the packaging they had previously used. Knowledge of antibiotic function was generally not based on information from healthcare professionals, but on previous experiences when symptoms subsided after taking the medication. Amoxicillin is often referred to as a medication used for fever, cough, sore throat, toothache, wounds, and skin disorders. Some informants referred to antibiotics as "strong drugs" or "powerful drugs" believed to speed recovery.

"If I've had a fever for two days, I usually look for amoxicillin. I've taken it before and the fever went down quickly, so when I have a similar illness, I look for the same medication."
(M03, female, 42 years old)

Experiences of recovery reinforced the belief that the same antibiotic can be used again when similar symptoms arise. Informants did not always consider the possibility that the same symptoms could be caused by a different illness.

"I don't know if it's bacterial or not. All I know is that if I have a sore throat and take the capsule, it usually feels better after two or three days." (M11, male, 38 years old)

Thirteen of the 20 community informants admitted to having stopped antibiotics when they felt better. They saved the remaining medication to reuse or give to other family members.

"When I'm no longer sick, I stop. I save the rest. Later, if my child or husband gets sick and has the same symptoms, I sometimes use it again." (M08, female, 47 years old)

Only a small number of informants understood that antibiotics are not used for all types of infections. The term antimicrobial resistance was also not fully understood. Some informants defined resistance as a condition where "the body is immune" or "the drug no longer works," rather than as a change in the microorganism that causes the antibiotic to lose its effectiveness.

3.1.2 Family and social networks shape antibiotic use decisions

Decisions about obtaining and using antibiotics are often made after discussions with partners, parents, siblings, neighbors, or drug sellers. Advice from people who have used the same medication is considered more trustworthy than general information that is not directly related to the community's experience. Twelve informants stated that they had used antibiotics based on recommendations from family or neighbors. These recommendations are usually given after the informant describes their symptoms or demonstrates their physical condition.

"I usually ask my older sister because she often buys medicine. She said she takes this medicine when she has a toothache. Since she's had it before, I just go along with it." (M05, female, 29 years old)

The practice of sharing medicine is found in some families. Leftover antibiotics are stored with other household medicines. These medications are reused without medical attention when family members experience symptoms perceived to be similar.

"There are always some leftover medicines at home. If someone is sick and the medicine is still good, we use it first. If it doesn't improve, then we go to the doctor." (M14, male, 51 years old)

Drug vendors also serve as sources of recommendations. People often come in with complaints or ask for medicines they've used before. In some situations, vendors prescribe antibiotics based on their experience treating similar complaints.

"People usually come in with fever, cough, or toothache. Some even immediately mention amoxicillin. If they're used to using it, it's hard to refuse because they'll look elsewhere." (K07, drug seller)

Health workers reported that people are more likely to ask family or drug sellers because these sources are closer and easier to find. Health workers are generally only contacted when symptoms persist or the patient's condition worsens.

3.1.3 Direct and indirect costs influence treatment choices

Economic considerations are not limited to the price of medication or examination fees. Informants also considered the cost of sea transportation, meals during the trip, the cost of companions, and lost income due to being out of work. For fishermen and daily laborers, a day's journey to a health facility can mean a lost opportunity to earn income. Unstable incomes tend to lead people to choose treatment that is perceived as the quickest and cheapest.

"If I go to the community health center, I have to wait for a boat. Sometimes I come home late in the afternoon. That day I can't go to sea. If I buy medicine directly, it costs me twenty or thirty thousand rupiah, and I can still work." (M02, male, 45 years old)

Although 16 informants have active National Health Insurance (JKN), 10 of them have still purchased antibiotics without a prescription. JKN membership is considered to help reduce service costs, but it doesn't eliminate travel costs and lost income.

"I have a BPJS card, but I still have to pay for the boat fare myself. If I need to be accompanied, two people pay. So if the illness is still mild, we buy medicine first." (M02, male, 45 years old, fisherman) (M16, female, 39 years old)

Informants who live farther from the community health center incur higher transportation costs. In bad weather or with a small number of passengers, travel costs can increase because people have to rent a special boat. Community health center staff confirmed that indirect costs are often a reason people delay check-ups.

"Services at the community health center can be covered by the National Health Insurance (JKN), but people still calculate the cost of getting here. For those who live on more distant islands, transportation costs are sometimes greater than the cost of the medicines they buy themselves." (K01, community health center doctor)

3.1.4 Geographical conditions and services limit access to the community health center

Access to health services is affected by distance, boat schedules, weather conditions, waves, and fuel availability. During the windy season or high waves, trips to the community health center may be postponed due to perceived unsafe conditions. Six informants live in areas with a travel time of more than an hour. They often postpone visits or seek medicine from closer sources.

"If the wind is strong, we don't dare cross. Even if the child has a fever, we usually give them whatever medicine they have available while waiting for better weather." (M19, female, 34 years old)

Transportation schedules also don't always align with community health center service hours. Some informants have to leave early and wait for a boat to return. This uncertainty makes visits to the community health center perceived as taking a long time. In addition to geographical barriers, informants cited waiting times, limited staff, and uncertainty about medication availability as considerations. Although not experienced on every visit, previous experiences also influence people's decisions to return.

"Sometimes we arrive, but the designated officer is on another island. People think it's better to buy medication directly." (K04, health cadre)

A community health center officer explained that mobile services are provided, but the schedule is affected by the availability of staff, transportation, budget, and weather.

"We try to reach all the islands, but we can't visit all of them at the same time. Weather and transportation are crucial. If there are activities on several islands simultaneously, staff are also limited." (K02, nurse)

Simulation observations indicate that information regarding service schedules is readily available at primary facilities, but is not always equally accessible to communities on more remote islands. Educational media regarding antibiotics is also limited and primarily contains general messages about drug use.

3.1.5 *Non-prescription antibiotic use as a pragmatic strategy*

For informants, non-prescription antibiotic use is often seen as a practical response to limitations. Purchasing medication directly is seen as reducing waiting times, travel costs, and uncertainty about care. Strategies employed include purchasing antibiotics from pharmacies or drug stores, using leftovers, asking family members for medication, bringing old packaging when purchasing medication, and delaying visits until symptoms worsen.

"If we can tolerate it, we buy the medication first. If it doesn't improve or gets worse after three days, then we go to the community health center." (M10, male, 56 years old)

People do not always realize that this strategy has the potential to lead to incorrect medication selection, inappropriate dosages, or delayed diagnosis. From the informants' perspective, antibiotic use is a reasonable choice because formal care is not always easily accessible. These findings demonstrate a relationship between social, economic, and access factors. Experience builds trust, family provides recommendations, economic constraints encourage cheaper options, and geographic conditions make informal sources of medicine more attractive.

3.2 *Discussion*

3.2.1 *Antibiotic use is shaped by experience, not just formal knowledge*

The results show that people interpret antibiotics based on their experiences of recovery and the physical characteristics of the drug. Antibiotics are not always understood through clinical indications, but rather through the brand name, color, shape, and packaging previously used (Mackey et al., 2022; Monnier et al., 2023). These findings align with research by Widayati et al. (2015), which showed that previous successful experiences shape positive attitudes toward using antibiotics without a prescription. Naing et al. (2026) also found that Indonesians recognize antibiotics based on everyday experiences, the drug's form, price, and perceived benefits. In the Theory of Planned Behavior, experiences of recovery shape attitudes that support behavior. The benefits of antibiotics are perceived directly through symptom relief, while the risk of antimicrobial resistance is intangible and only emerges over the long term (Boiko et al., 2020; Cai et al., 2022; Ledingham et al., 2019).

The imbalance between perceived benefits and abstract risks can strengthen the intention to reuse antibiotics without a prescription. Discontinuing antibiotics when symptoms improve also demonstrates that people judge the success of treatment based on their own experiences. This understanding differs from the principles of rational antibiotic use, which emphasize appropriate indications, type, dosage, and duration of therapy. Educational interventions should go beyond simply conveying that antibiotics must be prescribed. They should also explain why similar symptoms don't necessarily have the same cause, how to distinguish antibiotics from symptomatic medications, and why using leftover medication can be harmful to patients.

3.2.2 Social, economic, and geographic contexts shaping antibiotic use and treatment decisions

Family and neighbors serve as sources of information, providers of medication, and legitimizers of antibiotic use. Once this behavior becomes a household habit, over-the-counter use is no longer perceived as risky. These results align with those of Cabral et al. (2024), who found that social norms, family experience, and recommendations from close friends are important drivers of over-the-counter antibiotic use in low- and middle-income countries. Widayati et al. (2015) also demonstrated that the approval of family and friends forms subjective norms that support this behavior. The practice of sharing medications demonstrates that antibiotics are treated as a household resource. In an island context, storing medications can be understood as a form of preparation for uncertain access. However, this practice can lead to use for different patients, different illnesses, and inappropriate dosages. Therefore, educational programs need to be directed at families and communities, not just individuals. Health workers, community leaders, fishermen's groups, and women's groups can be involved as trusted communication channels.

This simulation study shows that the main economic barriers are not only consultation fees and drug prices, but also sea travel costs, lost income, food costs, and the need for companions. These findings indicate that JKN membership does not guarantee full access to services. This is consistent with Cabral et al. (2024), who identified travel costs, lost work time, and waiting times as factors in the use of antibiotics without a prescription. Ferdiana et al. (2021) also found that Indonesians consider purchasing antibiotics directly to be more time- and cost-effective than accessing formal services. Within the framework of access to services by Levesque et al. (2013), this situation is related to ability to pay. Ability to pay encompasses all costs incurred to obtain services, not just the official rate. These findings suggest that increasing JKN coverage needs to be supported by policies that reduce indirect costs. Mobile services, strengthening community health centers (Pustu), regular visit schedules, and remote consultations can reduce the need for people to travel long distances.

Distance between islands, weather conditions, and transportation limitations are factors that differentiate island communities from urban ones. When travel is not possible, communities utilize resources available in their immediate environment. These results support research by Leosari et al. (2023), which showed that access to services in archipelagic areas cannot be measured solely by straight-line distance. Access is also determined by sea travel, transportation availability, facility distribution, and travel time. Within the framework of Levesque et al. (2013), these barriers relate to the ability to reach, as well as availability and accommodation. Communities may recognize a need for services and desire to seek help, but are unable to reach facilities due to lack of transportation or unfavorable sea conditions (Tumwine et al., 2019; Weiss et al., 2020). Geographical conditions also influence perceived behavioral control. Purchasing antibiotics or using leftover medication is within the community's direct control, while visiting a community health center depends on the ship, weather, cost, and service schedule. Thus, access to over-the-counter medications may be perceived as more certain than access to formal services.

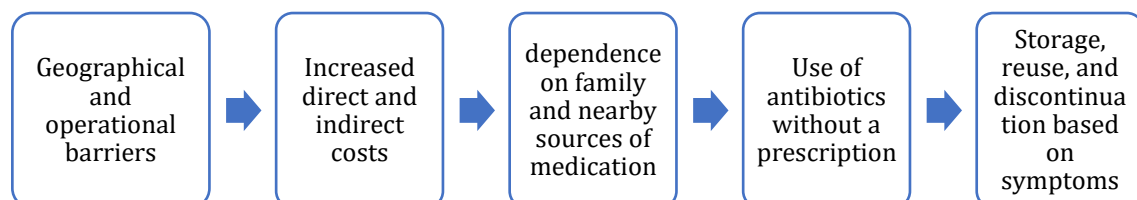


Fig. 1. Schematic of factors shaping non-prescription antibiotic use in island communities

The results of this study indicate that over-the-counter antibiotic use is not simply a behavior driven by ignorance. This behavior is also a community adaptation strategy when faced with limited services. People weigh the benefits and drawbacks of each option. Visiting a community health center offers a health professional examination, but it requires cost,

time, and travel time. Buying medication without a prescription is considered quicker and easier, but carries the risk of medication errors. The relationship between factors can be described follows in Figure 1. This diagram demonstrates that social, economic, and access factors are not mutually exclusive. They reinforce each other, creating conditions that make over-the-counter antibiotic use a rational choice from a societal perspective.

The novelty of this research lies in the integration of behavioral factors and service access within the context of an island community. The research by Widayati et al. (2015) focused on the beliefs of urban communities, while Ferdiana et al. (2021) emphasized the relationship between consumers and drug providers. Leosari et al. (2023) discussed access to island services but did not specifically link it to over-the-counter antibiotic use. This study integrates treatment experiences, family norms, indirect costs, sea travel, weather uncertainty, labor availability, and informal drug sources into a single analytical framework. These findings have the potential to broaden understanding that antimicrobial resistance control programs in island regions cannot be achieved solely through education. Behavioral change needs to be supported by improved service access. Communities will find it difficult to abandon over-the-counter antibiotic use if formal health services remain more expensive, slower, and less predictable.

3.2.3 Implications of the research findings

The research results offer several implications for the Liukang Tupabbiring Community Health Center (*Puskesmas*) and the local government. First, antibiotic education needs to be structured using easily understood terminology and examples of drugs familiar to the community. Education should explain the differences between antibiotics and symptomatic drugs, the dangers of using leftover medication, and the importance of pre-use checks (Mallah et al., 2022; Rocha et al., 2022). Second, interventions need to involve families, health workers, community leaders, drug sellers, and pharmacy facility managers. A community approach is important because treatment decisions are shaped by social networks.

Third, the community health center needs to strengthen communication regarding service schedules, island visits, staff availability, and consultation mechanisms. Information can be disseminated through cadres, village communication groups, dock information boards, or other media used by the community (Lempert et al., 2023; Msughter & Idris, 2023). Fourth, mobile services and strengthening of community health centers/*Puskesmas Pembantu* (Pustu) need to be directed to islands with the longest travel time. Scheduled services can increase community certainty in obtaining examinations. Fifth, remote consultations can be developed for initial assessment, education, and determining referral needs. However, these consultations must be carried out in accordance with the authority of health workers, data protection, and the availability of communication networks.

3.2.4 Research limitations

This study has several limitations. Experience with antibiotic use relies on informants' memories, which can lead to errors in identifying drug names, dosages, and timing of use. The practice of obtaining antibiotics without a prescription is a sensitive topic. Informants may provide answers deemed more socially acceptable. Private interviews and guarantees of confidentiality are necessary to mitigate this risk. Research conducted in a single community health center (*Puskesmas*) cannot be statistically generalized to the entire Indonesian archipelago. However, an in-depth description of the context can be used to assess the applicability of the findings to areas with similar characteristics. Weather and sea transportation can also limit visits to certain islands. The use of a variety of informants, follow-up interviews, and source triangulation are necessary to mitigate these limitations.

4. Conclusions

The use of over-the-counter antibiotics among island communities in the Liukang Tupabbiring Community Health Center (UPT Puskesmas) area is shaped by the interaction of social and economic factors, and access to healthcare services. Experiences of recovery after using antibiotics, family and environmental influences, the habit of storing or sharing medications, and trust in nearby sources of medication strengthen community acceptance of independent antibiotic use. At the same time, the cost of sea transportation, lost work time, distance between islands, weather conditions, limited ship schedules, and uncertainty about services make purchasing over-the-counter antibiotics a faster, cheaper, and more accessible option.

These findings indicate that over-the-counter antibiotic use is not only related to low knowledge but also represents a form of community adaptation to the limitations of island healthcare services. Therefore, efforts to control antibiotic use and antimicrobial resistance need to be implemented through an integrated approach that includes family- and community-based education, strengthening the role of cadres and pharmacists, increasing certainty of service schedules, expanding mobile services, and reducing geographic and economic barriers. Interventions that solely emphasize prohibiting over-the-counter antibiotic use are potentially ineffective if not accompanied by improvements in access to healthcare services tailored to the characteristics of island communities.

Acknowledgement

The authors would like to thank all parties who contributed to the completion of this research, particularly those who provided valuable support, feedback, and assistance during the research and manuscript preparation process.

Author Contribution

A.M.D., conceptualization, methodology, investigation, data curation, formal analysis, visualization, writing – original draft preparation, writing – review & editing. A.H., methodology, investigation, validation, data curation, formal analysis, writing – review & editing. M.R., conceptualization, validation, supervision, project administration, writing – review & editing.

Funding

This research received no external funding.

Ethical Review Board Statement

Not available.

Informed Consent Statement

Not available.

Data Availability Statement

Not available.

Conflicts of Interest

The authors declare no conflict of interest.

Declaration of Generative AI Use

During the preparation of this work, the authors used Grammarly to assist in improving grammar, clarity, and academic tone of the manuscript. After using this tool, the authors reviewed and edited the content as needed and took full responsibility for the content of the publication.

Open Access

©2026. The authors. This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original authors and the source, provide a link to the Creative Commons license, and indicate if changes were made. The images or other third-party material in this article are included in the article's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this license, visit: <http://creativecommons.org/licenses/by/4.0/>

References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T).
- Belay, W. Y., Getachew, M., Tegegne, B. A., Teffera, Z. H., Dagne, A., Zeleke, T. K., ... & Aschale, Y. (2024). Mechanism of antibacterial resistance, strategies and next-generation antimicrobials to contain antimicrobial resistance: a review. *Frontiers in pharmacology*, 15, 1444781. <https://doi.org/10.3389/fphar.2024.1444781>
- Boiko, O., Gulliford, M. C., & Burgess, C. (2020). Revisiting patient expectations and experiences of antibiotics in an era of antimicrobial resistance: Qualitative study. *Health Expectations*, 23(5), 1250-1258. <https://doi.org/10.1111/hex.13102>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Cabral, C., Zhang, T., Oliver, I., Little, P., Yardley, L., & Lambert, H. (2024). Influences on use of antibiotics without prescription by the public in low- and middle-income countries: A systematic review and synthesis of qualitative evidence. *JAC-Antimicrobial Resistance*, 6(5), dlac165. <https://doi.org/10.1093/jacamr/dlae165>
- Cai, H. T. N., Tran, H. T., Nguyen, Y. H. T., Vu, G. Q. T., Tran, T. P., Bui, P. B., ... & Lewycka, S. (2022). Challenges and lessons learned in the development of a participatory learning and action intervention to tackle antibiotic resistance: Experiences from northern Vietnam. *Frontiers in Public Health*, 10, 822873. <https://doi.org/10.3389/fpubh.2022.822873>
- Central Statistics Agency of Pangkajene and Kepulauan Regency. (2025). *Kecamatan Liukang Tupabbiring dalam angka 2025*. Badan Pusat Statistik Kabupaten Pangkajene dan Kepulauan. <https://pangkepkab.bps.go.id/id/publication/2025/09/26/0d9f3c9ab97068d4d87a1d66/kecamatan-liukang-tupabbiring-dalam-angka-2025.html>
- Ferdiana, A., Liverani, M., Khan, M., Wulandari, L. P. L., Mashuri, Y. A., Batura, N., Wibawa, T., Yeung, S., Day, R., Jan, S., Wiseman, V., & Probandari, A. (2021). Community pharmacies, drug stores, and antibiotic dispensing in Indonesia: A qualitative study. *BMC Public Health*, 21, 1800. <https://doi.org/10.1186/s12889-021-11885-4>
- Kolář, M. (2022). Bacterial infections, antimicrobial resistance and antibiotic therapy. *Life*, 12(4), 468. <https://doi.org/10.3390/life12040468>
- Ledingham, K., Hinchliffe, S., Jackson, M., Thomas, F., & Tomson, G. (2019). *Antibiotic resistance: using a cultural contexts of health approach to address a global health challenge*. World Health Organization. Regional Office for Europe.
- Lempert, R. J., Busch, L., Brown, R., Patton, A., Turner, S., Schmidt, J., & Young, T. (2023). Community-level, participatory co-design for landslide warning with implications for climate services. *Sustainability*, 15(5), 4294. <https://doi.org/10.3390/su15054294>
- Leosari, Y., Uelmen, J. A., & Carney, R. M. (2023). Spatial evaluation of healthcare accessibility across archipelagic communities of Maluku Province, Indonesia. *PLOS Global Public Health*, 3(3), e0001600. <https://doi.org/10.1371/journal.pgph.0001600>

- Levesque, J. F., Harris, M. F., & Russell, G. M. (2013). Patient-centred access to health care: Conceptualising access at the interface of health systems and populations. *International Journal for Equity in Health*, 12, 18. <https://doi.org/10.1186/1475-9276-12-18>
- Limato, R., Lazarus, G., Dernison, P., Mudia, M., Alamanda, M., Nelwan, E. J., Sinto, R., Karuniawati, A., van Doorn, H. R., & Hamers, R. L. (2022). Optimizing antibiotic use in Indonesia: A systematic review and evidence synthesis to inform opportunities for intervention. *The Lancet Regional Health–Southeast Asia*, 2, 100013. <https://doi.org/10.1016/j.lansea.2022.05.002>.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. SAGE Publications.
- Mackey, T. K., Jarmusch, A. K., Xu, Q., Sun, K., Lu, A., Aguirre, S., ... & Dorrestein, P. C. (2022). Multifactor quality and safety analysis of antimicrobial drugs sold by online pharmacies that do not require a prescription: Multiphase observational, content analysis, and product evaluation study. *JMIR Public health and surveillance*, 8(12), e41834. <https://doi.org/10.2196/41834>
- Mallah, N., Orsini, N., Figueiras, A., & Takkouche, B. (2022). Education level and misuse of antibiotics in the general population: A systematic review and dose–response meta-analysis. *Antimicrobial Resistance & Infection Control*, 11(1), 24. <https://doi.org/10.1186/s13756-022-01063-5>
- Malterud, K., Siersma, V. D., & Guassora, A. D. (2016). Sample size in qualitative interview studies: Guided by information power. *Qualitative Health Research*, 26(13), 1753–1760. <https://doi.org/10.1177/1049732315617444>
- Miles, M. B., Huberman, A. M., & Saldaña, J. (2020). *Qualitative data analysis: A methods sourcebook* (4th ed.). SAGE Publications.
- Monnier, A. A., Do, N. T., Asante, K. P., Afari-Asiedu, S., Khan, W. A., Munguambe, K., ... & Wafawanaka, F. (2023). Is this pill an antibiotic or a painkiller? Improving the identification of oral antibiotics for better use. *The Lancet Global Health*, 11(8), e1308–e1313. [https://doi.org/10.1016/S2214-109X\(23\)00258-9](https://doi.org/10.1016/S2214-109X(23)00258-9)
- Msughter, A. E., & Idris, M. K. (2023). Focus group discussions with rural women in yobe state on information services for community engagement on development issues in Nigeria. *Journal of African Conflicts and Peace Studies*, 5(2), 9. <https://digitalcommons.usf.edu/jacaps/vol5/iss2/9/>
- Naing, S. Y., Schneiders, M. L., Ningrum, D., Nurdianti, T., Severin, J., Peeters Grietens, K., Wagenaar, J. A., & Karuniawati, A. (2026). “Miss, I want itchy medicine”: Understanding what, why, and how antibiotics are used in Central Java Province, Indonesia through the drug bag method. *PLOS Global Public Health*, 6(3), e0005933. <https://doi.org/10.1371/journal.pgph.0005933>.
- Naveed, M., Chaudhry, Z., Bukhari, S. A., Meer, B., & Ashraf, H. (2020). Antibiotics resistance mechanism. In *Antibiotics and Antimicrobial Resistance Genes in the Environment* (pp. 292–312). Elsevier. <https://doi.org/10.1016/B978-0-12-818882-8.00019-X>
- O’Brien, B. C., Harris, I. B., Beckman, T. J., Reed, D. A., & Cook, D. A. (2014). Standards for reporting qualitative research: A synthesis of recommendations. *Academic Medicine*, 89(9), 1245–1251. <https://doi.org/10.1097/ACM.0000000000000388>
- Rocha, V., Estrela, M., Neto, V., Roque, F., Figueiras, A., & Herdeiro, M. T. (2022). Educational interventions to reduce prescription and dispensing of antibiotics in primary care: a systematic review of economic impact. *Antibiotics*, 11(9), 1186. <https://doi.org/10.3390/antibiotics11091186>
- Sharma, S., Chauhan, A., Ranjan, A., Mathkor, D. M., Haque, S., Ramniwas, S., ... & Yadav, V. (2024). Emerging challenges in antimicrobial resistance: Implications for pathogenic microorganisms, novel antibiotics, and their impact on sustainability. *Frontiers in microbiology*, 15, 1403168. <https://doi.org/10.3389/fmicb.2024.1403168>
- Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research: A 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*, 19(6), 349–357. <https://doi.org/10.1093/intqhc/mzm042>

- Tumwine, C., Aggleton, P., & Bell, S. (2019). Accessing HIV treatment and care services in fishing communities around Lake Victoria in Uganda: Mobility and transport challenges. *African Journal of AIDS Research*, 18(3), 205-214. <https://doi.org/10.2989/16085906.2019.1648306>
- Weiss, D. J., Nelson, A., Vargas-Ruiz, C. A., Gligorić, K., Bavadekar, S., Gabrilovich, E., ... & Gething, P. W. (2020). Global maps of travel time to healthcare facilities. *Nature medicine*, 26(12), 1835-1838. <https://doi.org/10.1038/s41591-020-1059-1>
- Widayati, A., Suryawati, S., de Crespigny, C., & Hiller, J. E. (2015). Beliefs about the use of nonprescribed antibiotics among people in Yogyakarta City, Indonesia: A qualitative study based on the theory of planned behavior. *Asia-Pacific Journal of Public Health*, 27(2), NP402–NP413. <https://doi.org/10.1177/1010539512445052>
- World Health Organization. (2023). *Antimicrobial resistance*. World Health Organization. <https://www.who.int/news-room/fact-sheets/detail/antimicrobial-resistance>

Biographies of Authors

Anna Maria Daud, Department of Hospital Administration, Institut Teknologi dan Kesehatan Tri Tunas Nasional, Makassar, South Sulawesi 90121, Indonesia

- Email: anha0844@gmail.com
- ORCID: N/A
- Web of Science ResearcherID: N/A
- Scopus Author ID: N/A
- Homepage: <https://scholar.google.com/citations?user=g1jtwDkAAAAJ&hl=id>

Adi Hermawan, Department of Nursing, Sekolah Tinggi Ilmu Kesehatan Amanah Makassar, Makassar, South Sulawesi 90121, Indonesia.

- Email: adyhermawan27@gmail.com
- ORCID: 0009-0009-8968-4536
- Web of Science ResearcherID: N/A
- Scopus Author ID: 59417403200
- Homepage: <https://scholar.google.com/citations?user=bhjj72EAAAAJ&hl=id>

Muh. Rusdi, Department of Hospital Administration, Institut Teknologi dan Kesehatan Tri Tunas Nasional, Makassar, South Sulawesi 90121, Indonesia.

- Email: abrahmahogany233@gmail.com
- ORCID: N/A
- Web of Science ResearcherID: N/A
- Scopus Author ID: N/A
- Homepage: <https://sinta.kemdiktisaintek.go.id/authors/profile/6724007>