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Antimicrobial Policy in Indonesia within the One Health Context: Literature Analysis and Implementation Challenges

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ABSTRACT

Background: Antimicrobials such as antibiotics, antivirals, antifungals, and antiparasitics are vital for treating infections in humans, animals, and plants. Antimicrobial Resistance (AMR) occurs when microorganisms become resistant to these drugs, posing a serious global threat. In Indonesia, high rates of infectious diseases increase the risks associated with AMR, highlighting the need for effective control measures. This study reviews research on efforts to control antimicrobial resistance in Indonesia within the One Health context, analyze related policies, and identifies key implementation challenges to provide recommendations for improvement.

Method: A literature review was conducted, identifying 1,029 articles from databases including EBSCOHost, ProQuest, PubMed, and Google Scholar. After screening and applying inclusion criteria, 14 relevant articles were selected for analysis to evaluate policies related to AMR in Indonesia and their alignment with the One Health approach.

Result: The findings showed that the increase in antimicrobial resistance (AMR) in Indonesia is mainly due to the misuse of antimicrobial drugs in different areas. While there are policies in place, putting them into practice has proven difficult, especially in the health sector, which faces more challenges than the livestock and environmental sectors. These results highlight the need for better coordination and alignment of policies across all sectors.

Conclusion: Although current AMR policies in Indonesia incorporate the One Health approach, significant challenges remain, including limited resources, insufficient guidelines, and weak coordination among sectors. Strengthening collaboration between health, agriculture, and environmental sectors and improving monitoring systems is essential for effective AMR control in Indonesia.

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INTRODUCTION

Antimicrobials, which include antibiotics, antivirals, antifungals, and antiparasitic, are used to prevent and treat infections in humans, animals, and plants. Antimicrobial Resistance (AMR) occurs when microorganisms (bacteria, viruses, fungi, and parasites) become unresponsive to these drugs. This leads to reduced effectiveness, making infections harder or impossible to treat, and increasing the risk of disease spread, severe illnesses, disabilities, and deaths (1) Given the serious consequences of AMR, the global public health community has labeled it a "silent pandemic." Estimates show that AMR causes approximately 1.27 million deaths directly and contributes to 4.95 million deaths annually worldwide, surpassing the death tolls of HIV/AIDS (864,000 deaths) and malaria (643,000 deaths) (2). Without action, research suggests AMR could lead to 10 million deaths annually by 2050, with an

economic impact exceeding 100 trillion USD. Indonesia, with a high burden of infectious diseases such as malaria, HIV, and tuberculosis, is particularly vulnerable, potentially threatening both disease control efforts and national food security (3,4)

The objective of this study is to review existing research on the implementation of antimicrobial policies in Indonesia within the One Health context, analyze their alignment with this approach, identify challenges in policy enforcement, and offer recommendations for strengthening AMR control measures. Understanding these objectives provides a clearer direction for assessing how Indonesia's policies address the interconnected nature of human, animal, and environmental health, which is crucial for tackling AMR effectively (1).

AMR, while naturally occurring, is greatly accelerated by improper antimicrobial use across human, animal, and environmental sectors. The One Health approach, emphasizing cross-sector collaboration, has been recognized as an effective strategy to address AMR comprehensively. Southeast Asia (SEA) is regarded as the "global epicenter for AMR emergence" and has the highest risk of AMR development compared to other WHO regions in Asia (5).

In Indonesia, AMR has become an urgent concern. Data from the Global Antimicrobial Resistance and Use Surveillance System (GLASS) in 2019 revealed significant resistance rates from blood test results: S. pneumoniae (712 cases), S. aureus (630 cases), Salmonella spp. (504 cases), and E. coli (358 cases). Urine test data showed even higher resistance levels, with 962 cases of E. coli and 2,421 cases of K. pneumoniae (6). Further, the Institute for Health Metrics and Evaluation (IHME) reported that in the same year, the leading bacterial causes of death in Indonesia were E. coli (26,900 deaths), K. pneumoniae (19,600 deaths), Acinetobacter baumannii (18,600 deaths), S. aureus (13,800 deaths), and S. pneumoniae (12,200 deaths). These figures indicate that AMR is a significant contributor to mortality, ranking third among causes of death after cardiovascular diseases and neoplasms (IHME, 2019) (7).

During 2001-2012, imipenem resistance—associated with severe infections—was reported at 6%, making Indonesia the Asian country with the highest resistance rate.[8] The situation is further aggravated by data showing that approximately 10% of Indonesians store antibiotics at home, and 86.1% obtain these antibiotics without a doctor’s prescription.[9] These findings underscore the need for coordinated efforts and serious action from all relevant stakeholders to address the high levels of AMR in Indonesia.

METHOD

This literature review followed a structured approach comprising the following steps: first, identifying the research question; second, searching for relevant sources using specific databases; third, selecting, describing, summarizing, and reporting all findings. The main objective of this research is to identify policies related to antimicrobial resistance in Indonesia that align with the One Health approach for addressing antimicrobial resistance challenges.

Relevant literature was explored using databases such as EBSCOHost, ProQuest, PubMed, and Google Scholar, chosen for their comprehensive range of peer-reviewed journals, accessibility to public health and policy studies, and reputation for high-quality sources. The keywords employed in the search included “Antimicrobial Policy,” “Antimicrobial Resistance (AMR),” “One Health Approach,” “Implementation Challenges,” and “Indonesia.” The search covered original research articles and literature reviews to provide a broad perspective on the topic.

The literature screening process involved assessing the relevance of each piece to the study title and objectives. Inclusion criteria were as follows: literature in English or Indonesian, published within the last 10 years, appearing in accredited journals, and available in full text. The rationale for selecting these criteria was to ensure the findings were up-to-date, reliable, and contextually appropriate to Indonesia’s current policy landscape. Exclusion criteria ruled out literature in languages other than English or Indonesian, publications older than 10 years, non-accredited journal articles, literature lacking an author list, and sources not fully accessible.

A more detailed review process was employed for narrowing down to the final set of 14 studies. This selection was based on their direct relevance to the One Health approach and the depth of analysis regarding policy implementation challenges in Indonesia. Studies that provided comprehensive discussions on inter-sectoral coordination, policy effectiveness, or highlighted barriers to implementation were prioritized to enrich the analysis and meet the objectives of this review.

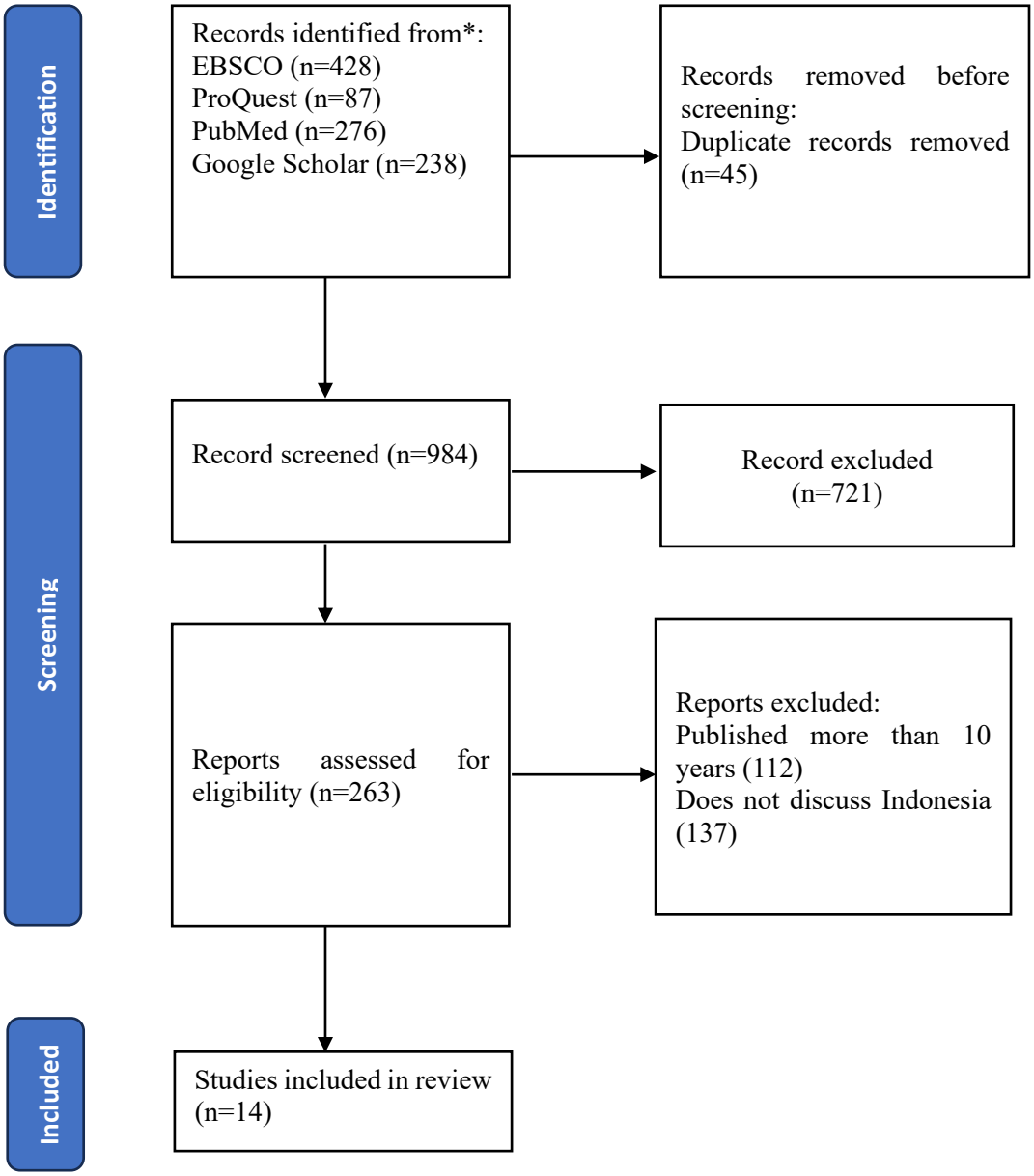

Figure 1. PRISMA flow diagram

RESULTS

A total of 1,029 articles were initially identified from database searches: EBSCOHost (428), ProQuest (87), PubMed (276), and Google Scholar (238). After removing 45 duplicate articles, 984 articles remained for screening. Following a review based on title, abstract, and accessibility, 721 articles were excluded due to irrelevance or lack of access. From the 263 articles assessed for eligibility, none were excluded for not being in English or Indonesian. However, 137 articles were excluded for not addressing Indonesia, and 112 were excluded for being published more than 10 years ago. This process led to the exclusion of 249 articles, resulting in 14 articles that met all the inclusion criteria (Table 1).

Table 1. Summary of Research Results

No.	Title study, year	Researcher	Results
1.	Antimicrobial Resistance Situation in Indonesia: A Challenge of Multisector and Global Coordination, 2022	Selma Siahaan; Max J. Herman; Nyoman Fitri.	The irrational use of antimicrobials is prevalent across all sectors. Weak coordination, poor regulatory oversight, and easy access to antibiotics exacerbate the AMR issue. Key challenges include suboptimal drug management in healthcare, inadequate monitoring in livestock, and disparities in export vs. domestic regulation in fisheries. The lack of skilled personnel and resources hampers effective policy implementation (10).
2.	The Effort to Rationalize Antibiotic Use in Indonesian Hospitals: Practice and Its Implication, 2023	Selma Siahaan; Rukmini Rukmini; Betty Roosihermiatie; Pramita Andarwati; Rini S. Handayani; Ingan U. Tarigan; Tita Rosita; Rustika Rustika; Yuslely Usman; Lusi Kristiana	The Antimicrobial Resistance Control Program (AMR-CP), mandated since 2017, shows varied implementation across hospitals. Challenges include insufficient funding, infrastructure, and a shortage of qualified human resources. Many healthcare workers are unaware of the program due to poor dissemination efforts (11).
3	Improving antibiotic use through behaviour change: a systematic review of interventions evaluated in low- and middle-income countries.2020	Carla Cueva; Neha Batura; Luh Putu Lila Wulandari; Mishal Khan; Virginia Wiseman	Education-based interventions positively influence antibiotic use but evidence is limited in low-income countries. Weak data collection impedes policy development. A comprehensive AMR surveillance system is needed for effective situation analysis and policy formulation, as recognized in the WHO Global Action Plan (12).
4	An analysis of national action plans on antimicrobial resistance in Southeast Asia using a governance framework approach,, 2020	Alvin Qijia Chua; Monica Verma; Li Yang Hsu; Helena Legido-Quigley	Many NAPs lack accountability, clear objectives, and sustainability. Coordination issues, conflicts of interest, and inadequate monitoring and evaluation (M&E) hinder the One Health approach's effectiveness. Addressing these challenges is essential for successful cross-sectoral strategies (13).
5	One Health approach and zoonotic diseases in Indonesia: Urgency of implementation and challenges, 2023	IMD Adnyana; Budi Utomo; Dwinka S. Eljatin; Ni LG Sudaryati	The One Health approach is critical for managing zoonotic outbreaks in Indonesia but faces obstacles such as weak intersectoral coordination, limited resources, and inadequate surveillance systems. Enhanced government-community collaboration and local capacity building are recommended (14).
6	Antimicrobial resistance in aquaculture: Occurrence and strategies in Southeast Asia, 2024	Suyamud Bongkotrat Chen; Yiwei Quyen; Do Thi Thuy Dong; Zhan Zhao; Chendong Hu; Jiangyong	AMR in Southeast Asia's aquaculture sector is under-researched, particularly in Indonesia, which is a major producer. Despite growth in the industry, challenges include climate crises and biodiversity

No.	Title study, year	Researcher	Results
			loss. The One Health approach has shown benefits in countries like Singapore, but systematic data on AMR in aquaculture is lacking (15).
7	Potential Sources of Antibiotic-Resistant Bacteria Based on Water Quality Conditions and Land Use in the Code River, Yogyakarta: A Methodological Review, 2018.	M. P. Hadi, L. ; N. Fadlillah ; M. Y. Widasmara ; W. I. Muziasari Subaryono	High antibiotic resistance is noted in agricultural regions due to pesticide and fertilizer runoff. Resistance spreads through livestock farming, domestic waste, and hospital discharge. Effective waste management and water monitoring policies are recommended to address contamination (16).
8	Antimicrobial resistance: One Health approach, 2022	Maria Elena Velazquez-Meza; Miguel Galarde-López; Berta Carrillo-Quiróz; and Celia Mercedes Alpuche-Aranda	Stakeholders in human, animal, and environmental health must align on AMR action priorities and policies. Differing interests and methods of monitoring AMR pose significant challenges for integrated approaches (17).
9	Evolution and implementation of One Health to control the dissemination of antibiotic-resistant bacteria and resistance genes: A review, 2022	Nayeem Ahmad, Ronni Mol Joji, and Mohammad Shahid	Majority (73%) of antibiotic use is in animal husbandry, contributing to human AMR through transfer via food and water. Successful implementations in Sweden and the Netherlands show reduced AMR prevalence, highlighting the importance of improved coordination, policy integration, and public awareness (18).
10	environmental antimicrobial resistance and its drivers: a potential threat to public health, 2021	Samreen, Iqbal Ahmad, Hesham A. Malak, Hussein H. Abulreesh	Key contributors to environmental AMR include hospital waste, pharmaceutical industry pollution, and agricultural practices. Antibiotics that do not degrade fully can spread resistance through soil and water. Enhanced regulations, better waste management, and environmental monitoring are crucial for mitigation (19).
11	Needs and capabilities for improving poultry production and health management in Indonesia (2024)	Chapot, Lorraine, Hibbard, Rebecca, Kurnia Bagus Ariyano, Kusnul Yuli Mulana, Havan Yusuf et. Al	The government struggles with incomplete and inaccurate data, leading to inadequate policies and responses, especially during disease outbreaks. Contributing factors include high poultry density, poor feed and water quality, and extreme weather. Small-scale farmers often lack the knowledge and resources for biosecurity, relying on experience rather than lab diagnoses, with medication use driven by commercial interests. The sector's rapid growth complicates the recruitment of skilled workers, impacting overall health

No.	Title study, year	Researcher	Results
			management and productivity (20).
12	Progress towards antimicrobial resistance containment and control in Indonesia, 2017 (28)	Parathon, Harry Kuntaman, Kuntaman; Widiastoety, Tri Hesty; Muliawan, Bayu T; Karuniawati, Anis	Similar to other low- and middle-income countries, Indonesia struggles with AMR due to antibiotic misuse in humans, livestock, and aquaculture. The expanding poultry industry and aquaculture exports contribute to increased antibiotic use, projected to surpass medical use. Challenges include unnecessary prescriptions, self-medication, and easy access to antibiotics. Weak policy enforcement, governance issues, inadequate education, and the affordability of antibiotics exacerbate the problem (21).
13	Antimicrobial Resistance and the Implementation of Control Policies in Hospitals in Indonesia, 2017	Handayani, Rini; Siahaan, S et al	AMR in Indonesia impacts treatment efficacy, increases infection spread, and raises healthcare costs. Despite existing regulations (e.g., Law No. 36/2009, Law No. 44/2009, and Ministerial Regulation No. 8/2015), hospitals face challenges with limited resources and infrastructure. Implementation hurdles include management commitment and adherence to guidelines (22).
14	An Analysis On The Policy Implementation Of Antibacterial Resistance Control at The Hospital, 2018	Indriana, Nani; Adisasmito, Wiku	Key challenges for ARCP in hospitals include poor communication, limited human resources, budget constraints, and lack of antibiotic guidelines. Insufficient coordination between government, hospitals, and stakeholders, along with low motivation, weak oversight, and inadequate policy dissemination, hinder effectiveness. Solutions involve improving communication, conducting workshops, offering incentives, integrating ARCP into hospital accreditation, and clearly demonstrating benefits to stakeholders (23).

DISCUSSION

Health Sector

Regulations concerning antimicrobial resistance (AMR) in Indonesia play a crucial role in supporting the One Health approach, which integrates human, animal, and environmental health to address AMR holistically. In the long term, these regulations will serve as the foundation for the success of Indonesia's National Action Plan (NAP) on AMR. Through stringent and coordinated regulations, the use of antimicrobials can be better controlled and monitored across various sectors, such as healthcare, animal husbandry, and agriculture, thereby preventing misuse and the transmission of antimicrobial resistance.

In the health sector, several key policies have been issued by the Ministry of Health, including: Minister of Health Decree No. 2406 of 2011 concerning "General Guidelines for Antibiotic Use", Minister of Health Regulation

No. 8 of 2015 on "Antimicrobial Resistance Control Program in Hospitals", Minister of Health Decree No. HK.01.07/MENKES/6460/2021 of 2021 regarding "Antimicrobial Resistance Control Committee". Although Minister of Health Regulation No. 8 of 2015 mandates that every hospital must have an antimicrobial control program as an accreditation requirement since 2017, only a few large hospitals have fully implemented this program. Challenges in its implementation include ineffective communication, limited human resources, budget constraints, lack of authority, and insufficient guidelines in some hospitals, as well as minimal coordination and supervision from relevant parties. Furthermore, obstacles have also arisen from hospital management, which has not yet demonstrated full commitment to implementing the existing guidelines. The implementation of this policy continues to face various impediments, particularly in hospital management and the lack of commitment from management to adhere to the established guidelines (22,23).

The current dissemination of AMR policies at the district level remains ineffective, as many health workers are unaware of these policies' existence. This issue stems from dissemination strategies that do not effectively engage the Health Office, despite their critical role as Regional Health Coordinators. Additionally, the low prioritization of the AMR-CP program results in inadequate budget allocations, further hindering progress (10, 11). Challenges also include a shortage of competent human resources and inadequate supporting facilities in hospitals. A notable example is the insufficient availability of reagents for sensitivity testing, leading to the use of high-tier antibiotics without proper testing, contradicting established regulations. The absence of clear technical guidelines for Provincial Health Offices to supervise hospitals exacerbates the issue, resulting in ineffective monitoring and evaluation of antimicrobial control programs (11).

The UK's proactive approach to AMR, particularly through public awareness campaigns and promoting rational antibiotic use, underscores the importance of targeted educational initiatives. Indonesia could benefit from adopting similar measures, which could include extensive educational campaigns directed at both healthcare professionals and the general public. Such initiatives would help address the misuse of antibiotics by fostering informed decision-making and responsible behavior. For example, the UK's “Keep Antibiotics Working” campaign significantly reduced unnecessary prescriptions by educating the public about the dangers of misuse and the risks of developing resistance (25). A similar initiative in Indonesia could enhance adherence to antibiotic guidelines and promote prudent usage, strengthening the national AMR strategy in alignment with global best practices.

An integrated surveillance process is crucial for effective AMR control, involving cross-sectoral collaboration. Without a comprehensive system for monitoring and evaluation, policy development is compromised due to a lack of accurate data and reporting on AMR. Therefore, establishing an integrated surveillance and evaluation framework is essential to collect and analyze relevant data, ensuring policy decisions are informed and effective (12, 13, 24).

Livestock Sector

In 2009, Indonesia established regulations prohibiting the use of Antibiotic Growth Promoters (AGPs) through Law No. 18 of 2009 in conjunction with Law No. 41 of 2014 on Animal Husbandry and Animal Health, aiming to protect consumers from exposure to antibiotics that do not meet quality, efficacy, and safety standards (15). Given Indonesia's status as a significant aquaculture producer, contributing 61.50% of Southeast Asia's aquaculture output, this issue is increasingly pertinent, particularly due to the potential for AMR spread through the fisheries and livestock sectors (2, 5). Majority (73%) of antibiotic use is in animal husbandry, contributing to human AMR through transfer via food and water.[18] A 2023 study on broiler chickens revealed that Salmonella sp. exhibited resistance to several antibiotics: tetracycline at 87.5%, chloramphenicol at 75%, amoxicillin at 62.5%, and streptomycin at 50%.

These findings highlight that antimicrobial distribution remains inadequately controlled despite the issuance of Ministerial Regulation No. 14/2017 and No. 22/2017, which reinforced the ban on AGPs in livestock. The proliferation of small-scale farms and the widespread, unregulated use of antimicrobials—driven by easy access—pose significant challenges to effective oversight (14). The prevalent practice of unnecessary antibiotic prescriptions, self-medication, and over-the-counter antibiotic purchases, compounded by weak policy enforcement, poor governance, insufficient education, and the availability of low-cost antibiotics, exacerbates the problem (21). Additionally, the lack of comprehensive and accurate data in the poultry sector hampers the government's ability to implement responsive policies, especially when addressing disease outbreaks. Small-scale farmers frequently lack the knowledge and resources needed to apply robust biosecurity measures and effective health management practices (20).

Denmark serves as a model with its stringent regulations on antibiotic use in livestock, which have led to a significant reduction in antibiotic consumption without compromising animal health or productivity. This approach includes mandatory reporting of antibiotic use and an emphasis on preventive measures such as improved farming practices (FAO,2024). Indonesia could consider adopting a similar regulatory framework that mandates livestock producers to report antibiotic usage and implement best practices in animal care to reduce antimicrobial dependency.

Additional challenges include disjointed communication among relevant sectors, policy decentralization, and limited human resources, particularly a shortage of government-employed veterinarians. The absence of policy harmonization, such as discrepancies between food safety and food security regulations that conflict with economic development goals, further complicates the issue. This focus, which often prioritizes meeting national meat demands over food safety, underscores the need for policy alignment, capacity building, and increased awareness. These factors contribute to why the One Health approach has not been fully effective in Indonesia (10, 14).

Environmental Sector

The environmental sector plays a crucial role as a reservoir for antibiotic-resistant bacteria and antimicrobial resistance (AMR) genes, contributing to the contamination of water, soil, and air, and thus facilitating the wider dissemination of resistance. This observation is supported by research from Samreen et al. (2021), which highlights that the environment can act as both a repository and a breeding ground for resistance evolution. Wildlife and livestock, through fecal contamination in water bodies, drainage systems, or organic fertilizers, are primary vectors for transmitting resistance. Additionally, animal-derived food products can serve as significant exposure points for resistant pathogens, further complicating public health efforts (14).

A persistent challenge in managing antibiotic resistance lies in the limited public awareness regarding proper medication use and waste management, as well as the environmental impacts of these practices. To address this, it is recommended that waste management policies be reinforced and water quality monitoring systems be strengthened, particularly in regions with high land use intensity. These improvements can play a pivotal role in mitigating environmental contributions to AMR (9).

The Indonesian government has made strides in tackling AMR through its National Action Plan, which incorporates strategies aimed at minimizing pollution from medical, livestock, and agricultural sources. However, a study by Alvin Q.C. et al. (2021) found that despite the inclusion of the One Health approach in these national plans, the environmental sector often receives less attention compared to human and animal health sectors. This regulatory gap contributes significantly to the persistence of AMR in the environment (4),(14)

Addressing AMR is complex, requiring an effective cross-sectoral approach like the One Health framework, which faces substantial challenges such as collaboration difficulties, conflicting interests, lack of coordination, and inadequate monitoring and evaluation systems. Research has shown that varying interests across economic sectors and organizations involved in human, animal, and environmental health further complicate cohesive action. Achieving consensus among stakeholders on priority actions, effective monitoring methods, and clear policies for antimicrobial use is essential for progress (13).

Notably, the Netherlands has demonstrated success by integrating environmental health into its AMR strategy, which includes systematic monitoring of antibiotic residues in water and the implementation of stringent waste management practices to prevent environmental contamination. Indonesia could benefit from adopting similar practices by establishing comprehensive environmental monitoring systems to track antibiotic levels in agricultural runoff and wastewater, effectively addressing critical AMR transmission pathways (27),(28).

Limitations and Cautions

This study reveals various factors that pose challenges in controlling the threat of antimicrobial resistance (AMR) in Indonesia, one of which is the ease of public access to antibiotics. The findings provide deeper insight into how uncontrolled access to antibiotics can contribute to misuse and resistance. Therefore, the results of this study have great potential to serve as a foundation for designing policies or interventions aimed at changing public behavior, as well as enhancing the role of pharmacists and healthcare facilities in ensuring rational and appropriate drug use. This research also serves as an important reference for policymakers in developing countries to create more effective policies and strategies to control access to medicines, particularly antibiotics, to avoid exacerbating the AMR burden.

The information obtained from this study provides strong evidence for health sector policymakers to consider new approaches in regulating the interactions between doctors, pharmacists, and the public. The researchers highlight the need to formulate a more holistic strategy or regulatory framework that involves all stakeholders in its development. With a more inclusive and integrated approach, it is expected that the resulting policies will be more effective in controlling AMR and minimizing its negative impact on public health.

Recommendations for Future Research

The Ministry of Health should enhance the competency of human resources through continuous training and provide clear technical guidelines for hospitals. They should also ensure the adequate availability of sensitivity test reagents, especially at the regional level. Additionally, they need to develop technical instructions for Provincial and District Health Offices to conduct supervision of hospitals to optimize the monitoring and evaluation of antimicrobial control programs.

The Ministry of Agriculture, particularly the Directorate General of Livestock and Animal Health, needs to develop a comprehensive, accurate, and traceable data system to monitor the use and distribution of antimicrobials in the livestock sector. This will enable policies to be tailored to field requirements. Consequently, an increase in the number of professionals, especially veterinarians in the government sector, is necessary. Furthermore, there is a need to develop comprehensive education and training programs for farmers, particularly small-scale farmers, regarding the implementation of biosecurity and good health management practices.

The Ministry of Environment should enhance the monitoring systems for water, soil, and air quality to detect the spread of resistant bacteria and antimicrobial resistance genes, especially in areas with high-intensity agricultural and livestock land use.

Cross-sectoral coordination needs to be improved to optimize the One Health approach already adopted in the National Action Plan on Antimicrobial Resistance (NAP AMR). The government should facilitate inter-ministerial and organizational forums to strengthen collaboration, establish action priorities, and align antimicrobial policies more comprehensively. Moreover, policies ensuring integrated monitoring and evaluation mechanisms for all AMR control programs are required to produce complete and accurate data. Monitoring should be conducted routinely and integrated across various sectors.

CONCLUSION

The current antimicrobial resistance (AMR) policy in Indonesia shows that, despite various regulations supporting the One Health approach, significant challenges in implementation remain across different sectors. In the health sector, obstacles include limited resources, the absence of comprehensive guidelines, weak supervision, shifting policy priorities, and inadequate coordination and oversight. The livestock sector faces similar challenges, with uncontrolled antimicrobial use by small-scale farmers and weak law enforcement exacerbated by incomplete and inaccurate data. The environmental sector, although recognized as an important reservoir for the spread of resistance, remains insufficiently integrated into One Health policies.

To overcome these challenges, practical steps must be taken to strengthen cross-sectoral collaboration, align policies, and implement comprehensive monitoring and evaluation frameworks across all relevant sectors. This approach would enable a more cohesive response to AMR and help identify gaps in policy enforcement. Additionally, future research should focus on assessing the long-term impact of AMR policies, especially the economic burden they may impose, as well as the effectiveness of these strategies in practice.

AUTHOR'S CONTRIBUTION STATEMENT

The author conducted the literature review, analyzed 14 selected articles, and evaluated antimicrobial resistance (AMR) policies in Indonesia within the One Health context, identifying key implementation challenges and providing recommendations for improvement.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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