

Hospital Pharmacists' Knowledge and Perceptions of Antibiotic Use and Resistance in Indonesia

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ABSTRAK

Latar Belakang: Penggunaan antibiotik yang tidak tepat di Indonesia berkontribusi signifikan terhadap meningkatnya resistensi antibiotik, yang menjadi ancaman serius bagi kesehatan masyarakat. Apoteker rumah sakit memiliki peran penting dalam pengelolaan antibiotik, sehingga pengetahuan Apoteker terhadap penggunaan serta resistensi antibiotik sangat krusial untuk mendukung upaya pengendalian infeksi dan penggunaan antibiotik yang rasional. **Tujuan:** Untuk menilai pengetahuan dan persepsi apoteker rumah sakit terhadap penggunaan dan resistensi antibiotik. **Bahan dan Metode:** Desain penelitian menggunakan pendekatan *cross-sectional* dan pengumpulan data dilakukan melalui kuesioner. Data kemudian dianalisis menggunakan uji Chi-square pada program SPSS. **Hasil:** Sebanyak 103 tanggapan diterima, 93 (90,3%) responden memiliki pengetahuan yang baik, dan 83 (80,5%) memiliki persepsi positif terhadap penggunaan dan resistensi antibiotik. **Kesimpulan:** Hasil penelitian menunjukkan bahwa pengetahuan apoteker tentang resistensi antibiotik tidak berkorelasi dengan persepsi mereka terhadap isu ini ($p=0,416$).

Key word:

Antibiotic resistance;
Pharmacist;
Perception;
Knowledge

ABSTRACT

Background: Inappropriate antibiotic use in Indonesia contributes significantly to increasing antibiotic resistance, which poses a serious threat to public health. Hospital pharmacists play a crucial role in antibiotic management, so their knowledge of antibiotic use and resistance is crucial to supporting infection control efforts and the rational use of antibiotics. **Objectives:** To assess the knowledge and perception of hospital pharmacists on antibiotic use and resistance. **Material and Methods:** The research design is cross-sectional and involves collecting data through a questionnaire. Data was then analyzed using the SPSS program's Chi-square test. **Results:** A total of 103 responses were received, 93 (90.3%) respondents had good knowledge and 83 (80.5%) had positive perceptions of antibiotic use and resistance. **Conclusions:** The study's results indicate that pharmacists' knowledge of antibiotic resistance does not correlate with their perception of this issue ($p=0.416$).

Introduction

Due to the increasing number of infections caused by bacteria that are resistant to antibiotics, healthcare professionals are starting to take notice of the issue. This can lead to longer hospital stays and higher health costs (Wardhani, Wibowo, & Setiawan, 2020). Based on a report from the World Health Organization (WHO) in Antimicrobial Resistance: Global According to a report released by the Surveillance organization, Southeast Asia has the most cases of antibiotic resistance globally. This region's infections are caused by *Staphylococcus aureus*, which can resist Methicillin. Each year, around 440,000 cases of multi-drug-resistant tuberculosis (MDR-TB) are reported globally, and 150,000 people die. In Europe, 25,000 people die due to multi-drug-resistant bacteria. On the other hand, around 23,000 individuals die annually due to bacteria that are impervious to antibiotics (Desrini S, 2015). Due to the increasing prevalence of antibiotic resistance is considered a global health issue threatening human health (Meriyani, Sanjaya, Sutariani, Juanita, & Siada, 2021).

In Indonesia, excessive use of antibiotics has been known to increase the spread of bacterial resistance. According to a committee that monitors the issue, the bacterial resistance level in the country has risen from 40% in 2013 to 60.4% in 2019 (Kementrian Kesehatan, 2015). Pharmacists are responsible for delivering pharmaceutical services to hospitals. They perform various tasks such as clinical pharmacy and management of pharmaceutical preparations. As health workers, they play a vital role in preventing the spread of antibiotic resistance by carrying out effective antibiotic management. Although studies on the perceptions and knowledge of pharmacists about the use of antibiotics in hospitals are still in their early stages, they can provide valuable insight into the various aspects of antibiotic resistance. Therefore, this study aimed to assess the knowledge and perception of hospital pharmacists on antibiotic use and resistance.

Methods

A non-experimental cross-sectional design was used to measure knowledge and perception of antibiotic use and resistance among hospital pharmacists. Respondents were recruited from. The objective of this study was to collect data about pharmacists' perceptions about the usage of antibiotics in hospitals. Data was gathered through a questionnaire and analyzed using a Google form and Zoom meeting media. The research was approved by the ethics committee of Universitas Islam Indonesia (Number: 4/ Ka.Kom .Et/70 / KE/ 2021).

The study's target population is an affordable population composed of pharmacists working in hospitals in Indonesia, who participated in the research through Zoom meeting media. Data was collected using an accidental sampling method. The study's inclusion criteria were based on the presence of a pharmacist working in a hospital and a willingness to participate. Exclusion criteria were triggered if the pharmacist did not complete the questionnaire or did not have an active Pharmacist's Practice License (SIPA) and Pharmacist Registration Certificate (STRA).

The questionnaire was developed by the researchers after they had analyzed the literature and carried out their independent development. It consists of three components: perception, knowledge, and sociodemographic factors. It was evaluated using a reliability and validity test on 30 subjects. Validity tests (0.68) were carried out on the repaired items. The results of these tests revealed that all of them are reliable (0.70), which means they can be utilized as research tools. Data analysis was performed on the subjects' sociodemographics. The information collected from these subjects was then analyzed quantitatively. The perception and knowledge levels of the subjects were then determined by the various scoring factors.

Results and Discussion

The results of the survey revealed that a total of 103 individuals are pharmacists. Many of them are female (89.3%), and they have a pharmacist degree (88.3%). The others have worked for more than five years (46.6%). Table 1 provides the respondents' sociodemographic profiles.

Tabel 1. Characteristic of pharmacist (n=103)

Characteristic	Categories	Frequencies	%
Gender	Female	92	89.3
	Male	11	10.7
Aged	20-29 years	39	37.9
	30-39 years	46	44.7
	40-49 years	15	14.6
	≥50 years	3	2.9
Education	Pharmacist degree	91	88.3
	Master degree	12	11.7
Works experience	<1 years	12	11.7
	1-3 years	26	25.2

Tabel 2. Respondents' antibiotic resistance knowledge (n=103)

No.	Question item	Correct answer (%)
1.	The threat of antibiotic resistance is a serious issue that requires urgent action to address. Various sectors must work together to prevent its spread.	102 (99,0)
2.	Prolonged hospital stays and deaths caused by antibiotic resistance are costly for the healthcare system.	97 (94,2)
3.	Modern medicine's success in treating infections caused by cancer and chemotherapy could be jeopardized by the lack of effective antibiotics.	95 (92,2)
4.	Health workers are only responsible for preventing the spread of antibiotic resistance.	78 (75,7)
5.	The agricultural, livestock, and animal health sectors are not at fault when it comes to the development and maintenance of antibiotic resistance.	81 (78,6)

Although most of the respondents correctly answered the first question about antibiotic resistance, around 1 percent of them still gave the incorrect answer in the second question. The WHO has stated that antibiotic resistance is a threat to global development and the economy. It is one of the top ten issues that threaten public health globally (World Health Organization, 2021).

According to the second statement, most of the respondents were correct in answering the first question, while around 5.8% gave the incorrect answer. It has been known that improper use of antibiotics during pregnancy can lead to defects in the developing fetus. The improper use of antibiotics during the first trimester of pregnancy can also lead to various defects in the developing fetus. These include bone development abnormalities, low birth weight, and defects in the urinary tract. As pharmacists, they play a vital role in assessing the evidence supporting the optimal use of antibiotics and developing effective treatment strategies (Matok et al., 2009). In addition, over 600,000 new cases of antibiotic-resistant infections are being reported globally every year. Antibiotic resistance has emerged as a leading cause of mortality worldwide (World Health Organization [WHO], 2017). The increasing prevalence of infections caused by antibiotic-resistant pathogens is associated with prolonged hospitalization periods. A study by Chandy et al. (2014) demonstrated that patients infected with resistant strains experienced more severe clinical outcomes compared to those with susceptible infections. Furthermore, the study reported a significantly longer duration of hospital stay among patients in the resistant group (Chandy et al., 2014). The survey results indicated that 92.2% of respondents answered question three correctly, while 7.8% provided incorrect responses. Emerging

evidence suggests that cancer patients are at a heightened risk of developing infections caused by antibiotic-resistant pathogens. Such infections may progress to sepsis and are associated with an increased mortality risk (Williams et al. 2004; Vázquez-López et al. 2019).

In addition to being a professional responsibility of healthcare providers, antimicrobial stewardship also necessitates governmental intervention to curb the dissemination of antibiotic resistance. This can be effectively addressed by implementing integrated, multisectoral programmes involving collaboration among hospitals, pharmaceutical companies, and local authorities. Item four of the survey revealed a high rate of incorrect responses, with approximately 77.1% of participants selecting the wrong answer, compared to only 24.3% who answered correctly. This disparity may be attributed to the respondents' perception that healthcare professionals are primarily responsible for controlling and preventing the transmission of antibiotic-resistant bacteria.

Moreover, inappropriate practices concerning antibiotic use are widespread within the community. For instance, individuals frequently self-administer antibiotics without a valid prescription or reuse leftover medications during subsequent episodes of illness. In the livestock industry, the misuse of antibiotics is primarily driven by breeders who administer these agents for prophylactic purposes, often without appropriate oversight. This practice frequently occurs without veterinary supervision or monitoring by other relevant personnel within the sector. Consequently, enhancing community awareness and engagement may be critical in promoting responsible antibiotic use and mitigating the spread of antimicrobial resistance.

Inappropriate use of antibiotics in agriculture and livestock farming has been recognized as a contributing factor to the emergence of antimicrobial resistance. This phenomenon may occur through ingesting food products or animal-derived commodities contaminated with residual antimicrobial agents, which can subsequently facilitate the selection and proliferation of resistant microbial strains in the human body. This could result in the emergence of bacteria that can resist antibiotics (Bryan-Wilson, 2016). One of the factors that can contribute to antibiotic resistance is the improper use of antibiotics. This is because the correct answer to question 5 was not obtained. The percentage results show that there were still people who did not understand the statement because they did not participate in the discussion and did not keep up with developments regarding the issue of antibiotic resistance. In addition, the lack of proper policies and activities in controlling the use of antibiotics has affected the level of knowledge about the subject (Rukmini, Siahaan, & Sari, 2019).

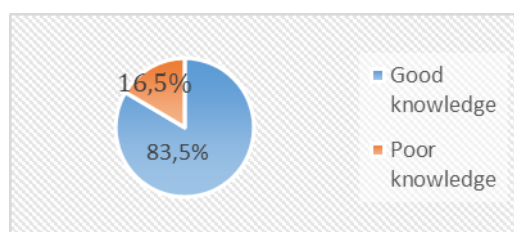


Figure 1. Responses of pharmacists regarding knowledge about antibiotic resistance

Figure 1 indicates the level of knowledge about antibiotic resistance that can be divided into two categories: medium (17.5%) and high (84%). The results show that most people have a high level of understanding about this subject, while only a small percentage have moderate knowledge. The results are in line with the findings of a previous study conducted by Tang et al., which revealed that 65.3% of the 294 participants had good knowledge about the use of antibiotics and their resistance. The mean score among the study participants was 10.1 out of a maximum of 13 (95% confidence interval: 9.95–10.31) (Tang et al., 2020). The researchers assessed antibiotic resistance knowledge among pharmacists in inpatient and ward pharmacy units, representing 86% of the sample.

Pharmacists in these units demonstrated a significantly higher level of understanding compared to those working in other departments, with correct response rates of 86% versus 59%, respectively ($p < 0.001$).

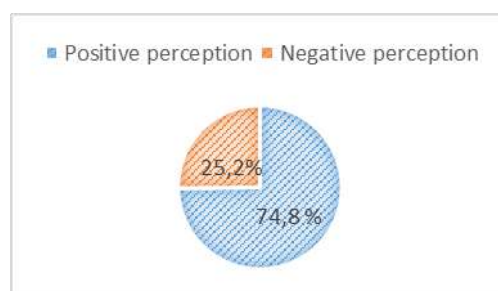


Figure 2. Responses of pharmacists regarding the perception of antibiotic use

Figure 2 illustrates the respondents' perceptions regarding the use of antibiotics. According to their responses, 74.8% expressed a positive view of antibiotics, while only 25.2% held a negative outlook. These results align with the findings of a previous study conducted by Chichonyi Kalungia and colleagues, which indicated that the respondents had appropriate attitudes towards antimicrobial resistance (AMR) and antimicrobials.

The majority of respondents concurred that the overuse of antimicrobials in healthcare should be curtailed. A study by Tang and colleagues in 2020 also found that 80% of pharmacists support implementing the Antimicrobial Resistance Management programme. This suggests that they believe patients and doctors share a collective responsibility regarding the use of antibiotics.

Tabel 3. Association between the perception of respondents and knowledge of antibiotic resistance

Knowledge of antibiotic resistance	Perception of antibiotic resistance		Total	P-Value (0,05)
	Positive	Negative		
Good Knowledge	76	25	101	0,416
Poor Knowledge	1	1	2	
Total	77	26	103	

Table 3 summarises the results of the Chi-square test conducted on the relationship between pharmacists' perceptions of antibiotic resistance and their level of knowledge. It indicates no correlation between perceptions of resistance and knowledge about it. These findings contrast with a study conducted by Zhao and colleagues in 2019, which revealed that a high level of knowledge regarding antimicrobial resistance positively correlates with perception. This study is akin to one conducted by Sarwar and colleagues in 2018, which found that a substantial amount of knowledge about antimicrobial susceptibility detected a positive correlation with perceived knowledge. However, it also noted a disconnect between perception and practical application, as good knowledge of AMS can foster a favourable outlook but may also lead to problematic practices. This disconnect may stem from a lack of collaboration between healthcare professionals and pharmacists regarding the use of antibiotics. Other studies have shown that there is no relationship between perception and knowledge when it comes to the decision of pregnant women to utilise VCT. Regarding the decision of pregnant women to use VCT (Lahdji, ah, & Baratarini, 2018).

A study conducted in Zambia revealed that most health professionals believe that AMR is a problem in their practice, with only a few doctors and pharmacists having attended training programmes related to this issue. Despite their positive perception of the topic, they still possess little knowledge about its significance. This suggests a need to develop educational programmes that will

assist health professionals in improving their understanding of this issue (Chichonyi Kalungia et al., 2019). Another contributing factor to the gap between the perception and knowledge regarding the use of antibiotics is the lack of education on their safety. According to a study conducted in Spain, pharmacists continue to prescribe antibiotics despite knowing that this practice can lead to the development of resistance. This practice is also linked to the attitudes of patients and healthcare providers (Vázquez-López et al., 2019). Studies conducted in 2020 revealed that variations in the opinions of doctors and patients concerning the use of antibiotics can influence how they are prescribed in hospitals (Tang et al., 2020).

Conclusion

Most hospital pharmacists in Indonesia possess extensive knowledge and accurate views on antibiotic utilization and resistance.

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