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Education on The Use of Antibiotics to Reduce Resistance Rates in Integrated Coaching Post for The Elderly

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Abstract: Antibiotic resistance is a serious public health problem because it has the potential to pose a serious threat to health services if not treated, and could trigger another pandemic. The use of antibiotics in Indonesia is quite high and inappropriate, this will increase the incidence of resistance. Antibiotic resistance is reported to increase in direct proportion to the increase in consumption, this occurs due to irrational use of antibiotics and inadequate public education. Therefore, this community service activity is carried out with the aim of providing education to increase and expand public knowledge about the correct use of antibiotics, as well as to increase public awareness about the importance of using antibiotics correctly to reduce the incidence of resistance. The method used to provide education in the lecture method using LCD (Liquid Crystal Display) and Leaflet media, to present information on the correct use of antibiotics. Respondents are given the opportunity to ask questions followed by discussion. To measure the level of knowledge, 30 respondents were asked to answer 15 questions in a list of questions related to the material provided. The results showed that before education the knowledge level category was good as many as 18 respondents (60%), after education it increased to 29 respondents (96.0%), the knowledge level category was not good before education as many as 12 respondents (40.0%), after education it became 1 respondent (3.0%). The conclusion is that there is an increase in knowledge among respondents who are educated about how to use antibiotics correctly.

Keywords: Antibiotics; Educational Lectures; Elderly; Knowledge level; Resistance

1. INTRODUCTION

Infectious diseases account for more than 13 million deaths per year in developing countries (Nurmala, 2020). Infectious diseases in Indonesia are still among the ten highest diseases, so by 2050 deaths due to antibiotic resistance will reach 10 million per year and will be the highest cause of death among other causes. The high and inappropriate use of antibiotics in Indonesia will increase the incidence of resistance (Kemenkes,RI, 2011). Antimicrobial resistance (AMR) is a challenge to human well-being worldwide and is one of the more serious public health problems. AMR has the potential to become a serious threat to health services if not treated, and could trigger another pandemic (Aljeldah, 2022).

The level of bacterial resistance in Indonesia continues to increase, according to the Antimicrobial Resistance Control Committee from 2013, 2016, to 2019. Resistant bacteria are increasing from 40%, 60%, and 60.4% in 2019. The increase in the incidence of resistance is caused by uncontrolled use of antibiotics. Resistant bacteria can occur due to misuse of antibiotics (Kemenkes RI, 2011). Studies in European countries show that resistance to antibiotic drugs increases in direct proportion to the increase in consumption, this occurs due to irrational use of antibiotics and inadequate public education (Ferri et al., 2017).

In Indonesia, research at Dr. Soetomo and Dr. Kariadi conducted in 2008 showed that 84% of patients in hospitals received prescriptions for antibiotics, 53% were given as therapy, 15% were given as prophylaxis, and 32% were for unknown indications (Hadi et al., 2008). Appropriate and wise use of antibiotics will reduce the level of resistance. Understanding the people who receive antibiotic drugs is very important for the success of therapy and avoiding the occurrence of resistance. So the role of pharmacists in this case is very important in terms of providing drug information to patients who are given antibiotics. Disciplined use of antibiotics according to the instructions for use will improve the quality of the patient's health, whereas use without regulations will result in the effectiveness of antibiotics being reduced.

A lack of knowledge about the role of antibiotics was observed, whereby more than half of the respondents incorrectly believed that antibiotics can treat viral infections (53.5%) and colds and coughs (53.7%). Also, 67.9% of respondents incorrectly believed that antibiotic resistance occurs when the body becomes resistant to antibiotics. Almost half of the respondents would expect antibiotics for symptoms of self-limiting viral infections. Respondents who answered correctly for the role of antibiotics in viral infections were more likely not to expect antibiotics for cold, flu and cough ($p < 0.001$). Respondents who answered correctly regarding the need to adhere to antibiotics were more likely to have completed their antibiotic course ($p < 0.001$). Future educational initiatives should provide key information on the role of antibiotics and the importance of complying with antibiotics in this population (Lai San Kong, et.al. 2019).

2. METHOD

This activity was carried out in an effort to empower the community to improve their health status, especially regarding the appropriate use of antibiotics. Knowledge level data was collected from the total number of respondents present using a list of questions related to the material provided. The respondents were a community of elderly women at the Integrated Coaching Post for the elderly Flamboyan, RW.7 commercial residential complex, Bojong Baru, Bojong Gede, Cibinong. This activity was carried out at that location because of the large number of elderly patients visiting the Harapan Sehati Cibinong hospital and receiving antibiotics.

Apart from that, this activity is also a form of collaboration between the Faculty of Mathematics and Natural Sciences, Universitas Pakuan and the related hospitals. Respondents only need to mark one of the answers they consider correct. The question list consists of 15 questions. The correct answer is worth 1, and the wrong answer is worth 0, with a total score of 15. The data obtained was then analysed descriptively to describe knowledge of antibiotic use before and after being educated about antibiotic use.

Educational material on the use of antibiotics, provided by lecturers from the Pharmacy Study Program, Faculty of Mathematics and Natural Sciences, Universitas Pakuan. The media used to support the provision of education include LCD and Leaflets. The aim of providing education is to increase and expand public knowledge about the correct use of antibiotics, as well as to increase public awareness about the importance of using antibiotics correctly to reduce the incidence of resistance. This activity was carried out at the Integrated Coaching Post for the elderly Flamboyan, RW.7 commercial residential complex, Bojong Baru, Bojong Gede, Cibinong on November 16 2023 with a duration of approximately 3 hours.

3. RESULT AND DISCUSSION

Implementation of activities consists of 2 (two) stages, namely the preparation stage and the implementation stage. In the preparation stage, it begins with submitting a letter of application to carry out Antibiotic Education followed by conducting field observations. Direct coordination is carried out with the Head of the Integrated Coaching Post to determine the technical implementation, time and place, as well as the target number of participants. After that, the team prepared educational material, including material choices on the

use of antibiotics, as well as creating a list of questions to measure the level of public knowledge about the use of antibiotics.

At the implementation stage, it can be reported that this activity was carried out on Thursday 16 November 2023 at Integrated Coaching Post for the elderly Flamboyan, RW.7 commercial residential complex, Bojong Baru, Bojong Gede, Cibinong, with a total of 30 women participating. The following is a data in **Table 1.** on respondent characteristics.

Table 1. Frequency Distribution of Respondent Characteristics

Variabel	Frequency (N= 30)	Percentage (%)
Age (years)		
40 – 50	9	30,0%
51 – 60	7	23,33%
>60	14	46,66%
Education		
Elementary school	2	6,66%
Junior high school	6	20,0%
Senior high school	18	60,0%
College	4	13,33%
Work		
Housewife	25	83,33%
Government employees / Self-employeed	5	16,66%

Based on table 1 above, it can be seen that most of the respondents were elderly women. Older patients are at high risk of infections, which often present atypically and are associated with high morbidity and mortality. Antimicrobial treatment in older individuals with infectious diseases represents a clinical challenge, causing an increasing burden on worldwide healthcare systems; immunosence and the coexistence of multiple comorbidities determine complex polypharmacy regimens with an increase in drug–drug interactions and spread of multidrug-resistance infections. Aging-induced pharmacokinetic and pharmacodynamic changes can additionally increase the risk of inappropriate drug dosing, with underexposure that is associated with antimicrobial resistance and overexposure that may lead to adverse effects and poor adherence because of low tolerability. These issues need to be considered when starting antimicrobial prescriptions (Soraci et al., 2023).

A series of community service events entitled "Education on the Use of Antibiotics" has gone very well and smoothly. The event began with an opening from the Head of the community service team, followed by

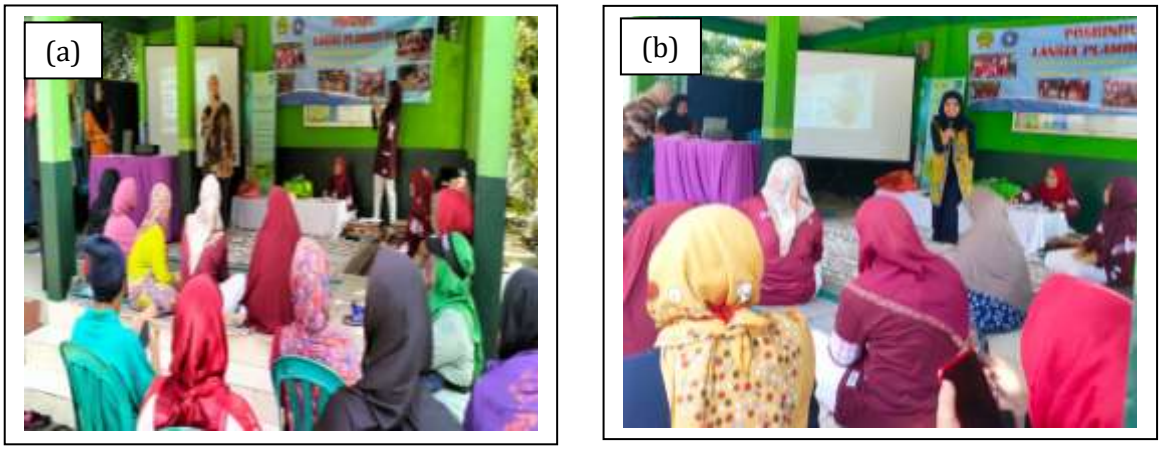

Figure 1.: **(a)** Speech from apt. Eni Koniah., S.Si., M.Farm and
(b) Delivery material by Dr. apt. Lusi Agus. S., M.Farm

the provision of educational materials (**Figure 1.**). Before the educational material was given, respondents were asked to answer a list of knowledge level questions about the use of antibiotics, then participants were asked to answer the list of questions again after the educational material had been given. The following is **Table 2.**, data from measuring respondents' level of knowledge before and after education.

Table 2. Distribution of results measuring the level of knowledge of antibiotic use Before and After Education

Knowledge level	Before Education (N=30)		After Education (N=30)	
	Amount	Percentage (%)	Amount	Percentage (%)
Good (score 11 – 15)	18	60,0%	29	96,0%
Not-good (score 0 – 10)	12	40,0%	1	3,0%

Based on Table 2 it can be seen that there has been an increase in knowledge of antibiotic use, where before education the level of knowledge was good for 18 respondents (60%) and after education there were 29 respondents (96.0%). The level of knowledge was poor before education as many as 12 respondents (40.0%) and after education it became 1 respondent (3.0%). The data results in **Table 2.** above show that respondents finally learned that antibiotics were only used to treat bacterial infections, therefore antibiotics such as Amoxicillin could not be used to treat symptoms caused by viruses such as coughs and colds.

In addition, because antibiotics are hard drugs, they can only be purchased with a doctor's prescription. Respondents also finally learned that drugs such as Amoxicillin and Ciprofloxacin are antibiotics, so these drugs cannot be purchased and obtained in pharmacies without a doctor's prescription. Respondents'

knowledge also increased regarding how to use antibiotics correctly, for example, antibiotics cannot be taken at any time when they feel sick, because to consume antibiotics, respondents first need to get advice from a doctor to decide whether their illness can be treated with antibiotics or not.

Doctors need to know the patient's allergy history, medical history, doctors need to be informed if they are taking supplements, medicines or herbal products, if there are plans for vaccination in the near future, whether they are pregnant, breastfeeding or planning to become pregnant, to ensure that The antibiotics that will be used are safe and effective. If the respondent is prescribed antibiotics, the use of these antibiotics should not be stopped even if the symptoms and complaints of the disease have disappeared. Antibiotics must be consumed until they are finished, because if not, they can result in resistance. a study compared data on antibiotic resistance and antibiotic consumption in the elderly between hospital, Nursing Home and community settings. Antibiotic resistance, as well as antibiotic consumption, in Nursing Homes appear to be closer to those in the community setting than those in Hospitals for *E. coli* and *P. mirabilis*. Patients living in Nursing Homes should not be considered at greater risk of multidrug resistant E. coli infections than patients living in the community (Biguenet, et.al, 2023).

Bacterial resistance to bacteria can lead to fatal consequences. Infectious diseases caused by bacteria that are resistant to treatment result in an increase in the length of time a person suffers from an illness, an increased risk of death and a longer hospital stay. The results of measuring the level of knowledge also show that after respondents received educational material, they finally learned that antibiotics such as Tetracyclines and Quinolones are recommended not to be consumed together with milk because milk can reduce the efficacy of antibiotics so that they are not effective in killing bacteria and the disease may not be cured.

The correct way to store antibiotics, such as in a clean, dry place and protected from sunlight, can maintain the quality of the antibiotics themselves. Apart from that, several side effects that can arise from using antibiotics that are generally known to respondents include nausea, vomiting, diarrhoea, flatulence, muscle and joint pain, and decreased appetite. Age-related changes in pharmacokinetics (PK) and pharmacodynamics (PD) processes increase the risk of drug underexposure that predisposes to the emergence of resistance, as well as of drug overexposure with potential adverse effects and drug discontinuation for poor tolerability.

Multiple chronic diseases and polypharmacy complicate the choice of proper antimicrobial treatment and further increase the risk of adverse effects (Soraci et al., 2023).

The participants were quite happy and enthusiastic about the community service program from the Department of Pharmacy, Faculty of Mathematics and Natural Sciences, Universitas Pakuan as an effort to improve health, especially knowledge about the appropriate use of antibiotics to prevent resistance.

Figure 2. Discussion activities with respondents

In general, the success of implementing community service activities this time can be measured based on the achievement of the target number of participants, namely 30 attendances, and the achievement of educational objectives which can be said to be good because there is an increase in knowledge about the correct use of antibiotics and in sufficient time. The respondents' ability to understand the material using the lecture method followed by discussion supports the respondents' ability to increase their knowledge about the correct use of antibiotics. The community service activities that were held received a very good response from the participants (**Figure 2.**). This education can increase knowledge about the appropriate and rational use of antibiotics, which in turn can also be an effort to improve the health and welfare of the family.

Combating Antimicrobial Resistance (AMR) requires an improved and coordinated global effort from all international governmental and non-governmental agencies along with strong political momentum. Integration and the cooperation of policymakers, researchers, public health practitioners, pharma companies, hospital administrators, agriculture industry leaders, and members of the public are important in this

endeavour. The unified and eventual goal of this collaboration is to decelerate the ongoing trends in AMR to minimize the health and economic burdens on people. Establishing antimicrobial stewardship and rigorous compliance of antibiotic policy in healthcare settings are invaluable strategies to combat antibiotic resistance (Salam, et.al. 2023)

4. CONCLUSION

From this activity it can be concluded that there is an increase in knowledge of antibiotic use, namely the level of good knowledge before education was 18 respondents (60%) and after education it was 29 respondents (96.0%). The method used to provide education according to the respondents' needs was the lecture method using an LCD followed by discussion, apart from that, respondents were also given flyer media. To measure the respondent's level of knowledge before and after being educated, a list of questions related to the material provided was used. This activity is expected to be useful in increasing knowledge about the appropriate and rational use of antibiotics so that it can reduce resistance rates which in turn can improve the health and welfare of families, and the area coverage of this activity in the future can be expanded, especially in suburban areas.

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