



Pharmacists in antibiotic resistance prevention education at Makassar Mandai Market

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ABSTRACT

Antibiotics are drugs that are used to treat bacterial infections. The thing that must be considered by pharmacists is the use of antibiotics without a doctor's prescription where if used incorrectly it will cause the problem of antibiotic resistance in a population. Therefore, efforts are needed to increase public basic knowledge of current treatment by providing drug information or education to the community. This activity was carried out by gathering 50 respondents to conduct interviews (pre-test and post-test) and public education on the theme of antibiotic resistance. Based on the results obtained, the community's understanding in terms of the use of antibiotics is increasing regarding the rules for use and when to use antibiotics. The public understands for free to buy antibiotics without a doctor's prescription is bad choice and there people who based knowledge about antibiotic resistance, antimicrobial resistance, or drug resistance addition. Public understanding of the use of antibiotics is still low. This was proven when people bought antibiotics freely anywhere.

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1. INTRODUCTION

Pharmacists have the responsibility to carry out pharmaceutical work which includes quality control of pharmaceutical preparations, security, procurement, storage and distribution or distribution of drugs, drug management, drug services on doctor's prescription, including drug information services (Kates et al., 2021). The partner for this activity is the Mandai Market, Makassar City administrator. City health department informed that most of the people there often use drugs without proper regulation and control from doctors or pharmacists. The location which is far from the city center, universities, and health facilities means that health information is not maximal, especially about drugs. One thing that must be considered as a pharmacist is the service of drugs on a doctor's prescription. Drugs prescribed by doctors for patients aim to be able to cure disease, relieve symptoms, and prevent disease from appearing or occurring by using the right dosage so that the drug will work optimally. Drugs have

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different activities in curing and or preventing a disease. Minor illnesses caused by bacterial infections are common in everyday life, such as diarrhea, ulcers, urinary tract infections, and etc. The bacteria will infect certain areas and can spread quickly. The spread of bacteria can be through direct contact with sufferers or through media intermediaries that have been contaminated with these bacteria (de Brito et al., 2019; Toh et al., 2017).

Treatment of minor illnesses caused by bacterial infections with antibiotics. Antibiotics are antimicrobial drugs used to treat bacterial infections. The high prevalence of infectious diseases has increased the use of antibiotics in public (Ivoryanto, 2017). Antibiotics must be used with a doctor's prescription. Several developing and developed countries have experienced an increase in the use of antibiotics without a doctor's prescription and have the potential for resistance due to the use of antibiotics. Antibiotics used inappropriately will trigger Multiple Drug Resistance (Thoma et al., 2022). The problem of resistance caused by uncontrolled use of drugs, especially antibiotics, is one of them due to their use without a doctor's prescription. Public easily get antibiotics without recommendations or prescriptions from authorized health workers, especially doctors and pharmacists, which is a trigger factor for antibiotic resistance. The purchase of antibiotics at health facilities, especially in pharmacies, is carried out by the community in the context of self-medication without getting an explanation and lack of knowledge about the rules for using antibiotics and the appropriate indications (Spaulding et al., 2018).

One of the efforts to increase public compliance and awareness of current medication is to provide direct drug information or education. Information provided to patients can increase knowledge, change behavior, provide motivation and increase awareness in drug use. The knowledge possessed by pharmacists is expected to be a starting point for changes in patient attitudes and lifestyles which in turn will change their behavior and can increase patient adherence to medication (Ahmed et al., 2021; Arrang et al., 2019; Drekonja et al., 2021). Communication between pharmacists and the community is called direct education, and this is one form of implementation of pharmaceutical care (Rusmini, 2019). This service aims to be a form of professional application for the community around Mandai Market, Makassar City in increasing awareness and compliance in recognizing antibiotics and the risk of antibiotic resistance that might occur in people who especially do not have a health background. This is the basis for young pharmacist candidates to devote themselves to providing solutions and education regarding this matter.

This service aims to be a form of professional application to increase awareness and compliance of the community around Mandai Market, Makassar City in recognizing antibiotics and the risk of antibiotic resistance that might occur because people do not have knowledge about health. This is the basis for young pharmacist candidates to devote themselves to providing solutions and education regarding this matter.

2. METHODS

The educational design of this activity is to provide information to partner visitors to the Mandai Market, Makassar City. The problem with residents around these partners is a lack of understanding of using antibiotics properly or rationally to prevent antibiotic resistance. The dedication was carried out using tools in the form of a questionnaire to find out the respondent's initial knowledge about antibiotics. In this activity the number of samples in public education at the Mandai Market reached 50 respondents who were determined using the consecutive sampling method, namely all subjects who were willing to be taken as respondents. Location of implementing community education practices with the theme of antibiotic resistance health education in Mandai Market, Pai Village, Biringkanaya District, Makassar City, South Sulawesi Province. The implementation procedures includes:

Activity Preparation

Preparations are made to support the success of community service activities and overcome any technical problems during implementation. Preparation for community service activities begins on June 18 2022 and is in the form of: (1) Formation of group members (education team); (2) Group discussions via online; (3) Location observation and assessment of service activity partners (Mandai Market); (4) Preparation of tools and materials needed (gifts, masks, hand sanitizer, consumption, brochures, list of antibiotics); (5) Determining the location of interview points to assess respondents' knowledge and provide health education on antibiotic resistance; (6) Selection of respondents using the consecutive sampling method in the Mandai Market environment, Biringkanaya District based on the independent consent of the respondents

Activities Implementation

Health promotion activities with the theme of antibiotic resistance health education were carried out on Monday 27 June 2022. This activity was carried out by gathering 50 respondents to conduct interviews (pre-test and post-test) to find out and compare the respondents' initial knowledge and see any changes after being given education. Education on the proper and rational use of antibiotics is useful for increasing knowledge or strengthening respondents' perceptions if they already understand antibiotics beforehand. All Pre-test and Post-test questions (<https://bit.ly/kuesioner-amr-angk12>) are made in the form of online filling in real time and the data taken is also recorded manually. Respondents who had finished were then given gifts as thanks.

3. RESULTS AND DISCUSSION

Results

At the time of data collection, which began with a session on the characteristics of the respondents, it was aimed at knowing the characteristics of the respondents who were in the Mandai Market. Table 1 shows the distribution of characteristic virgins from all respondents who participated in community service activities. The characteristics of the respondents from the results obtained were 50 people, in the Mandai Market, Sudiang Village, Biringkanaya District, Makassar City regarding antibiotic resistance education, as in the Table 1.

Table 1 shows the biographies of most of the respondents who have a high school education level with an age range of 45-54 years and the average respondent is from the Bugis ethnic group. In the second session, shows the description of the respondent getting antibiotics and the history of their use. The results of interviews with 50 respondents at the Mandai Market, Sudiang Village, Biringkanaya District, Makassar City regarding the use of antibiotics.

Table 2 is data showing that there are 74% of respondents who have used antibiotics. Respondent data included around 50% getting antibiotics from doctors and 34% who were not from doctors. Then, 52% of respondents received information about how to use these antibiotics and 20% did not know the information. About 80% of respondents got antibiotics from pharmacies and 6% from friends or family of respondents. After knowing how to use antibiotics in the Mandai Market community, results were also obtained regarding the respondents' knowledge of antibiotics.

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Table 1. Characteristics of respondents

Characteristic	Number of Respondents
Gender	
Male	19
Female	31
Age	
25-34 years old	5
35-44 years old	14
45-54 years old	21
55-64 years old	7
>65 years old	3
Level of Education	
Elementary School	8
Junior High School	12
Senior High School	23
Diploma 3	1
Bachelor Degree	6
Ethnicity	
Bugis	29
Makassar	17
Jawa	1
Mandar	1
Sumatera	1
Maros	1
Total	50

Table 2. Use of antibiotics in public (respondents)

Item	Questions	∑ Respondents (50)	Percentage (%)
When was the last time you took/used antibiotics?			
1	Last month	12	24%
	Last 6 months	14	28%
	Last year	7	14%
	More than a year	4	8%
	Never	3	6%
	Forgot	10	20%
Did you get the antibiotics from the doctor?			
2	Yes	25	50%
	No	17	34%
	Forgot	8	16%
Did you get information from your doctor, pharmacist or nurse about how to use antibiotics?			
3	Yes	26	52%
	No	10	20%
	Forgot	14	28%
Where do you get these antibiotics?			
4	Pharmacy	40	80%
	Friends or family	3	6%
	Forgot	7	14%

Table 3. Respondents' knowledge of antibiotics

Questionnaire type	Respondent's answer		
	If you're feeling better	If you have finished antibiotics	Forgot
Pre-test	36	10	4
Post-test	0	50	0

Table 3 is a variable to see the respondent's knowledge about the limitations of using antibiotics when using them. Respondents' knowledge in the Mandai Market about antibiotics varied quite a lot among the 50 people. Among them, 36 respondents answered that they stopped taking antibiotics when they felt better, 10 respondents answered that they stopped using antibiotics when they finished their antibiotics, and 4 respondents did not remember the rules for taking them. However, after being given an understanding that antibiotics should be taken until they run out, the number of respondents who answered that they had to spend antibiotics increased, namely there were 50 respondents. After knowing how to use antibiotics, the results of the respondents' knowledge about terms related to antibiotics were also obtained.

Table 4. Pre-test terms knowledge

Terms	Pre-test							Never
	Yes							
	D/N	P	FM/ FR/M	Media	GP	O	F	
Antibiotic resistance	1	0	0	0	0	0	0	48
Superbugs	0	0	0	0	0	0	0	50
Antimicrobial resistance	1	0	0	0	0	0	0	49
AMR	0	0	0	0	0	0	0	49
Drug resistance	1	0	0	1	0	0	0	48
Resistant bacteria	0	0	0	0	0	0	0	50

The results are illustrated in Table 4, it can be seen that out of 50 respondents in Mandai Market, only 1 knew or had heard of antibiotic resistance, antimicrobial resistance, or drug resistance from doctors/nurses. Another thing, there is a respondent who knows about drug resistance from the media. Other respondents had never heard of or knew about some of the terms of antibiotic resistance.

Table 5. Post-test terms knowledge

Terms	Post-test							Never
	Yes							
	D/N	P	FM/ FR/M	Media	GP	O	F	
Antibiotic resistance	1	49	0	0	0	0	0	0
Superbugs	0	50	0	0	0	0	0	0
Antimicrobial resistance	1	49	0	0	0	0	0	0
AMR	1	49	0	0	0	0	0	0
Drug resistance	0	50	0	0	0	0	0	0
Resistant bacteria	0	49	0	0	0	0	0	1

Description: (1) D/N = Doctor/Nurse; (2) P = Pharmacist; (3) FM/FR/M = Family/Friends/Media (Newspaper, Television, Radio) ; (4) GP = Government Program; (5) O = Others; (6) F = Forgot

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Table 5 shows that most of the information related to drugs is obtained by the public through pharmacists. Apart from being a pharmacist's competence, this also shows a direct picture that pharmacists need to be in contact with the community in practicing and educating about drug use. Pharmacists who communicate directly with the public can foster a sense of trust in the competence of pharmacists and become a separate branding as a health worker.



Figure 1. Antibiotic Resistance Education Implementation Team



Figure 2. Documentation of the implementation of antibiotic resistance education

Documentation of this community service activity can be seen in Figure 2 when conducting interviews with visitors and market traders. The enthusiasm of the respondents can be seen in the picture to participate. Market manager really like this activity because it can be a management reporting activity to the city office. The team implementing this activity consists of lecturers and pharmacist students as shown in Figure 1.

Activity Material

In this activity direct interviews were conducted to obtain information from respondents. The questions used are adaptations of WHO information related to antibiotic resistance (Zang et al., 2013). The first statement that says "Antibiotic resistance is caused because the body rejects the drug so that the antibiotic no longer functions properly" the exact answer is wrong because antibiotic resistance is not caused by the body rejecting the drug but bacteria that are in the body that have the ability to fight antibiotics. As many as 28 respondents said the statement above was true and only 22 respondents said it was wrong.

Furthermore, the second statement "Infectious diseases that are resistant/resistant/not resistant to antibiotics are increasing" the dominant respondent gave the appropriate statement, namely "true" because more and more diseases are caused by bacteria, for example *Staphylococcus aureus* bacteria

which are no longer able to be treated with antibiotics methicillin group. As many as 36 respondents stated that the statement above was true and the remaining 14 respondents stated that it was wrong. For the third statement "If the bacteria are resistant/immune to antibiotics, it will be very difficult or impossible to cure", is a true statement because bacteria that have undergone gene mutations for a group, for example methicillin, will be very difficult to cure with the methicillin group, for example MRSA, as many as 15 respondents said it was true and 35 respondents said it was wrong.

The fourth statement is "Antibiotic resistance is an event that can happen to me and my family." The correct answer at this point is "true" because everyone has the possibility of developing antibiotic resistance in themselves if they don't use antibiotics properly, this is according to the respondent's answer, namely as many as 35 stated true and 15 respondents stated wrong. The fifth statement is "Antibiotic resistance only occurs in other countries, but does not occur here", this statement is a "false" statement because antibiotic resistance is a worldwide health problem not only in one country or only in foreign countries but also occurs in Indonesia, at this point as many as 9 respondents said they were right and 41 respondents said they were wrong. The sixth statement is "Antibiotic resistance occurs only in people who use antibiotics regularly", as many as 12 respondents said this was true and 38 respondents said it was wrong, antibiotic resistance also occurs in people who use antibiotics regularly but are not used properly, for example the use of antibiotics without a doctor's prescription and stop taking antibiotics if you feel the pain is improving.

The seventh statement "Bacteria that are resistant/resistant to antibiotics can be transmitted to other people" this statement is appropriate because bacterial resistance is a disease that is transmitted to fellow humans. 10 respondents said the above statement was true and 40 respondents said it was wrong. The eighth statement is "Infection caused by resistant/immune bacteria will increase the risk of harm from medical procedures such as surgery, organ transplantation and cancer treatment" as many as 33 respondents stated that the above was true and only 17 respondents considered the above to be false. The above statement is true, because when a person suffers from an infection caused by bacteria that are resistant to a class of antibiotics, the risk of danger in medical procedures such as surgery increases. The last statement "In your opinion, are antibiotics widely used in animal husbandry and agriculture in our country" as many as 9 respondents said it was true and 41 other respondents stated the statement above was wrong, the statement above is a true statement because of the use of antibiotics that are often used in animal husbandry and agriculture which is one of the big problems causing antibiotic resistance today.

Discussion

This community education activity was carried out with the aim of increasing the community's knowledge and skills in the use of antibiotic drugs. Based on the National Health System, health is not only the responsibility of health workers but requires community participation. In order to achieve a better degree of public health, integrated and comprehensive health efforts are carried out in the form of individual health efforts and community health efforts. Problems regarding health at the Mandai Market, Pai Subdistrict, Biringkanaya District, Makassar City, one of which is related to public awareness and knowledge regarding the proper and good use of antibiotics is still lacking. Society still needs a harder effort from all parties, especially health workers to be able to understand the wise and rational use of antibiotics (Atmaja & Rahmadina, 2019; Farida et al., 2016; García-Robles et al., 2018).

Based on the interview results it is known that the percentage of respondents' characteristics is more dominant female (31 people) than male (19 people), with an age distribution of 25-34 years old as many as 5 people, 35-44 years old as many as 14 people, 45-54 years old years as many as 21 people,

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aged 55-64 years as many as 7 people, aged over 65 years as many as 3 people. This activity shows that the percentage of respondents using antibiotics was 57 people (94%) using antibiotics and there were 3 respondents (6%) who had never used antibiotics. Some of the respondents had received antibiotics based on a doctor's prescription as many as 25 people (50%) and there were 17 respondents who had received antibiotics without a doctor's prescription (34%). Most of the respondents also received information on how to use it either from doctors, pharmacists or through other media with a percentage (52%).

For testing the level of knowledge of respondents about antibiotics, it shows that some respondents have a very minimal level of knowledge about antibiotics. This is indicated by the number of respondents who stopped using antibiotics when they felt better. Most of the respondents know that antibiotics are drugs used to treat diseases caused by bacteria but at the same time they also think that antibiotics can also be used to treat diseases caused by viruses such as colds, measles and fever. This happens because it is possible that the public still thinks antibiotics are "magical drugs" or "cures for all diseases" so that misunderstandings arise in the community regarding indications that can be cured using antibiotics. Based on the data, it is known that the percentage of respondents' knowledge about the term resistant is very minimal, especially the terms SUPERBUG, antimicrobial resistance, and AMR.

Table 5 shows that the percentage of respondents' knowledge about antibiotic resistance is still lacking, as evidenced by the data on the percentage of respondents' answers that are still wrong on matters relating to antibiotics (Dewi, 2018; Lakhundi & Zhang, 2018). The constraints encountered during the activity process were during the process of filling in the questionnaire data because the network was in an unstable location, there were some respondents who did not understand the questions, and some respondents refused to be interviewed due to misunderstandings.

4. CONCLUSION AND RECOMMENDATIONS

This service activity is a form of concern for young pharmacists for the middle to lower class of society regarding the understanding of antibiotics. This community education activity with the theme of antibiotic resistance shows that people's understanding in terms of the use of antibiotics does not sufficiently understand the rules for using and when they should use antibiotics. The number of people using antibiotics freely is still high and they can buy antibiotics without a doctor's prescription or advice from a pharmacist. The number of people who understand about antibiotic resistance and anti-microbial resistance is still small.

The limitation in this service is that it is carried out in public places with a fairly high level of activity which makes the concentration of activities divided, but places like this are universities that can have direct contact with the community. Thus, it can be suggested that the implementation of this service can be carried out in a multi-centre manner for certain community groups. Meanwhile, for health professionals, especially pharmacists, it is very necessary to conduct widespread education regarding understanding related to antibiotic resistance and also how to prevent it so that it can reduce the risk of developing antibiotic resistance among the general public.

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