A Survey on Public Knowledge and Awareness about Antibiotic Use and Resistance in MjiniMagharibi- Unguja, Zanzibar

Abstract

Background: Antibiotics are among drug groups that have, for centuries, played a key role in treating and combating infectious diseases worldwide. This key role is being compromised by antibiotic resistance, driven by many factors, such as low-quality antibiotics and improper use of antibiotics. Antibiotic resistance is scrutinized as a major threat to global health today. It is estimated that in 2050, more than 10 million deaths and 100 trillion USD will be lost due to antibiotic resistance if no substantial actions are taken to end this emerging threat.

Methods: It was across-sectionalstudy conducted in MjiniMagharibi. Only people over 18 who live in MjiniMaghrib and non-medical personnel were allowed to participate in our research. A Purposive sampling technique was used to target specific individuals of interest. Questionnaires were distributed to the participants, and data were analyzed using SPSS computer software version 22. The study involved 200 people from MjiniMagharibi-Unguja.

Results: The study showed that 64.4% of the participants were female, and 61.5% were 18-24 years. 47.5% of all respondents obtained antibiotics after getting a prescription from a doctor or nurse and received advice from a doctor or nurse on how to use the antibiotics.

The study also showed that 35.5% of the participants get antibiotics from a doctor or nurse. 72.5% of all respondents disagreed that it was okay to use antibiotics given to friends or family members as long as they were used to treat the same illness. Among the respondents,46.5% disagreed thatbuying or requesting the same antibiotics from a doctor was okay. 57.5% take all of the antibiotics as prescribed.

Lastly, our study assesses the level of education on knowledge of antibiotic resistance, and 65.5%, 61.5%, and 71.5% of all respondents did not hear of antibiotic, antimicrobial, or drug resistance.

Conclusion: Poor knowledge and awareness of antibiotic resistance existed across the study area, irrespective of gender and age. This proves a population problem, as seen in many other studies. The study sheds light on significant gaps in public knowledge, which can guide future educational programs and policy decisions. The topic is highly relevant globally, and this research adds valuable insights from a region not frequently studied.

Keywords:

Antibiotic Resistance, MjiniMagharibi-Unguja, Knowledge and Awareness, Rational use of antibiotics

1. INTRODUCTION

Antibiotics are among drug groups that, for over centuries, have played a key role in treating and

combating infectious diseases worldwide, though reports show that this key role is being compromised by antibiotic resistance occurring everywhere.

Antibiotic resistance is scrutinized as a significant threat to global health today. If no substantial actions are taken to end this emerging threat in 2050, more than 10 million deaths and 100 trillion USD will be lost due to AR [1]

A recent multi-country public awareness survey conducted by the World Health Organization in 2015 in 12 member states showed that most respondents in developing countries believed that antibiotics could be used to treat viral infections [2]. This shows that there is a big gap in knowledge about AR in both developing and developed countries.

In 2020, research was done on the "existence of bacterial resistance to some reserved antibiotics in tertiary hospitals in Tanzania" (Muhimbili National Hospital). 201 clinical samples were tested, and bacterial resistance to clindamycin, cefepime, and meropenem was 68.9%, 73.2%, and 8.5%, respectively. This concluded that bacterial resistance to clindamycin and cefepime was high and low in meropenem [3].

One study in Jordan showed that the Jordanian community generally had poor knowledge and awareness of antibiotic use and AR [4].

Results in the French population highlight the need to continue informing the French public about antibiotic resistance. Indeed, the French population does not understand this phenomenon sufficiently and seems to have erroneous beliefs about it and its causes [5].

In Africa, a multi-country public awareness survey about antibiotic resistance was conducted, and the results showed that respondents classified as having no education are more likely to have taken antibiotics in the past six months. 42% of respondents without education had taken antibiotics within six months compared to 35% of those with basic and 32% with further education [2].

Another study was conducted on Nigerian public, and the findings showed that about a third of the public consumes antibiotics obtained without a prescription, and respondents overall have a poor understanding of antibiotic resistance and proper antibiotic use[6].

A study was conducted in Tanzania mainland among MD and non-MD second-year students of the University of Dodoma. The findings showed a high rate of self-medication with antibiotics and AMR illiteracy among undergraduate students, which proved the necessity of an educational program [7].

Several studies have been conducted to assess the level of awareness and knowledge about antibiotic use and resistance; no single study has been done in the MjiniMagharibi public.

1.1 Broad Objective

Objective

To evaluate public knowledge and awareness of antibiotic use and resistance in MjiniMagharibi-Unguja.

1.2 Specific Objectives

SPECIFIC OBJECTIVES

1. To evaluate knowledge on when to use antibiotics

- 2. To evaluate knowledge on the importance of completing prescribed drugs.
- 3. To evaluate knowledge on antibiotic resistance.

2. METHODOLOGY

2.1 Description of the Study Area

A cross-sectional survey was conducted atMjiniMagharibi-Unguja, located approximately 25 km (about 15.53 mi) off the coast of Mainland Tanzania. Zanzibar comprises two central Islands, Unguja and Pemba, with a projected population of 1.8 million people, of which Unguja has 1.4 million (78%). Unguja has three regions: MjiniMagharibi, Kaskazini, and Kusini, with 121 Shehia[8].

2.2 Study Population

This includes both males and females who are above 18 years old and are in MjiniMagharibi-Unguja.

2.3 Study Design

A descriptive cross-sectional design was used in this study to determine the awareness of antimicrobial use and antimicrobial resistance among the general population in Unguja

- 2.4 Sampling Technique: A Purposive sampling technique was used to target specific individuals of interest
- 2.5 Sample Size Determination

The sample population can be estimated using Cochran's formula $n = \underline{Z2pq}$ e2

Whereby

n=estimated sample size

Z = z score, which is 1.96 at 95% confidence interval p= proportion (0.5)

q=1-p

e = marginal error of width (0.07)

Sample size- N = $\frac{1.962X0.5X(1-0.5)}{0.072}$ =196

The Minimum Sample size was 196; however, for convenience, we used 200

2.6 Inclusion Criteria

• Both male and female in MjiniMagharibi over 18 years old

- They must be in MjiniMagharibi- Unguja.
- 2.7 Exclusion Criteria
- Both males and females within the age bracket who refused to participate
- •They are not Unguja residents
- Medical personnel
- 2.8 Study Variable
- 2.8.1 Dependent variables: Public Knowledge and Awareness of Antibiotic use and resistance
- 2.8.2 Independent variables
- Social demographic factors: Age, Gender and Educational status.

2.9 Data Collection

The following methods were employed ingathering information for this study.

Questionnaires: To collect data from the selected subjects, a self-administered pre-tested questionnaire was adapted with some improvements that correlate with the needs of our settings [2].

Interview: This was used to cover respondents who could not read the questionnaire. Information was gathered from them by asking questions from the prepared questionnaire and including those who did not understand the items.

3.0 Data Analysis

Data wasanalyzed using Statistical Package of Science and Social Sciences (SPSS) software version 20. Logistic regression was used to compare the degree of associations. A p-value of

< 0.05 was considered as significant.

4.0Results:

Table 1:Demographicdata: Thestudy comprised200people from the MjiniMagharibipublic.

GENDER	FREQUENCY (n=200	PERCENTAGE(%)
MALE	71	35.5
FEMALE	129	64.5

LEVEL OF EDUCATION	FREQUENCYN(n=200)	PERCENTAGE(%)
NO SCHOOLING COMPLETED	14	7
PRIMARY EDUCATION	20	10
SECONDARY EDUCATION	65	32
HIGHER EDUCATION	101	50
AGE	FREQUENCYN(n=200)	PERCENTAGE(%)
18-24	123	61.5
24-34	45	22.5
35-44	13	6.5
45-54	7	3.5
55-64	7	3.5
>65	5	2.5

THE USE OF ANTIBIOTICS

Respondents were asked several questions concerning the use of antibiotics.

Fig. 1 HOWPEOPLEOBTAINEDANTIBIOTICS



The survey finds relatively slight variation in how respondents reported getting their antibiotics. About 47.5% got antibiotics from a doctor or nurse, and 27.0% did not remember where they obtained them.

Fig. 2: WHETHERPEOPLERECEIVEDADVICEFROMMEDICALPROFESSIONALONHOWTOTAKE ANTIBIOTICS



The vastmajorityofrespondentssurveyed (47.5%) saidtheyhad received advice from amedical professional on howtotaketheantibioticstheylasttook:38.0%did notreceiveadvicefrom a doctorornurse, and 14.5% could not remember if they received advice from a doctor or nurse.

Fig 3: Where respondents got their antibiotics from



PERCENTAGE OF RESPONSES FROM ALL RESPONDENTS TO "WHERE DID YOU _____GET ANTIBIOTICS"

Respondents were asked where they got antibiotics, and the percentage of respondents who obtained antibiotics from a doctor or nurse was 35.5%. 30.0% obtained antibiotics from a pharmacy, 10.5% from astallor hawker, 2.5% from a friendor family member, 1.5% from the internet, and 1.5% from someone else.

Fig. 4: Is it okay to use antibiotics prescribed to a friend or family member?



About 72.5% of respondents did not agree on whether it is okay to take antibiotics from friends or family members), where 17% responded that it was true, and 10.5% responded that they did not know.

Fig.5: Is buying antibiotics without a doctor's prescription okay?



PERCENTAGE OF RESPONSE FROM ALL RESPONDENTS ''IS IT OKAY TO BUY THE SAME ANTIBIOTICS OR REQUEST THESE FROM A DOCTOR ''

About46.5% of respondents did not agree with (is itokay to buy antibiotics without a prescription), where 37.5% responded True, and 16.0% responded that they did not know.

Fig.6



About 57.5% of respondents were asked when to stop using antibiotics after starting them, and they answered when they had taken all of the antibiotics as directed. 24.5% asked when they felt better, and 18.0% did not know.

KNOWLEDGEOFANTIBIOTICRESISTANCE

The final part of this report presents responses to questions exploring levels of a wareness of antibiotic

resistance.

Awarenessofkeytermsrelatedtoantibioticresistance

Respondentswereaskedwhethertheyhadheardofaseriesoftermscommonlyusedabout the issue of antibiotic resistance. These included:

- ✓ Antibioticresistance
- ✓ Drug resistance
- ✓ Antimicrobial resistance









KNOWLEDGEABOUTDRUGRESISTANCE

Fig.9



HAVE YOU HEARD OF DRUG RESISTANCE

Fig.10

PERCENTAGE OF RESPONSES FROM ALL RESPONDENT TO "WHERE DID YOU HEAR ABOUT ANTIBIOTIC RESISTANCE?'





WHERE DID YOU HEAR ABOUT ANTIMICROBIAL RESISTANCE

Fig.12



61.5% of the respondents have heard about antimicrobial resistance; only 34.5% have heard about antibiotic resistance, while 28.5% said they heard about drug resistance. Also, a lower level of respondents (37.93% and 37.68%) claimed they have heard about antimicrobial and antibiotic resistance, respectively, from either a doctor or a nurse.

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RELATIONSHIPBETWEENKNOWLEDGEOFGETTINGANTIBIOTICSFROMAFRIENDAND GENDER

Alogistic regression was performed to ascertain the effect of gender on knowledge of taking antibiotics from a friend; the logistic regression model was not statistically significant with a p-value of 0.449 (p<0.05), although males were 1.3 times more knowledgeableabout taking antibiotics from a friend than female, gender is not a strong predictor of knowledge of getting antibiotics from a friend.

RELATIONSHIPBETWEENKNOWLEDGEOFGETTINGANTIBIOTICSFROMAFRIENDAND LEVEL OF EDUCATION

Alogistic regression was performed to ascertain the level of education on knowledge of getting antibiotics from a friend; the logistic regression model was not statistically significant with a p-value of 0.648 (p<0.05), high level of education was 0.765 times more on having good knowledge on where to get antibiotics than a lowlevelofeducation but also remain a poor predictor on the knowledge of getting antibiotic from a friend.

RELATIONSHIPBETWEENKNOWLEDGEOFWHENTOSTOPUSINGANTIBIOTICSAND GENDER

Alogistic regression was performed to ascertain the effect of gender on knowledge of when to stopusing antibiotics; the logistic regression model was not statistically significant with a p-value of 0.632 (p<0.05), males were 0.8 times less on having good knowledge of when to stop using antibiotics than female. Gender is a poor predictor of knowledge of when to stop using antibiotics.

RELATIONSHIPBETWEENKNOWLEDGEONWHENTOSTOP **USING**ANTIBIOTICSAND LEVEL OF EDUCATION

Alogisticregressionwasperformedtoascertaintheeffectoflevelofeducationonknowledgeof when to stop using antibiotics; the logistic regression model was not statistically significant with p- the value of 0.284 (p>0.05), Highly educated respondents were 0.493 times less having good knowledge and level of education is a poor predictor on knowledge of when to stop using antibiotics.

5.0 DISCUSSION

The inappropriate use of antibiotics and the associated risk of antimicrobial resistance will remain a public health problem globally [9] and particularly in low-income countries [10]

This study presents several important findings regarding the use of antibiotics, levels of knowledge about appropriate use, and understanding of the problem of antibiotic resistance and what can be done about it across MjiniMagharibi.

These findings can help shape future public awareness efforts and aid the evaluation of their impact. Antibiotic resistance is one of the biggest threats to global health. It can affect anyone at any age in any country. The results of this survey showed that there is much to be done. Although people recognize the problem, they do not fully understand what causes it or what they can do about it.

The results of the survey questions on antibiotic use demonstrate how frequently antibiotics are taken, with a considerable majority of respondents.

Only 47.5% of respondents across MjiniMagharibi got their last course of antibiotics or a prescription from a doctor or nurse. Theyalso received advice from a medical professional on how to take them (47.5%). These factors indicate that antibiotics are more likely to be taken to treat an inappropriate condition and in an inappropriate fashion.

This is in contrast to other studies [2], in which a doctor or nurse prescribed 81% of antibiotics and 86% advised on how to use them.

Although 47.5% of respondents got a prescription from a doctor, only 35.5% were given those antibiotics directly by a doctor and 30% obtained them from a pharmacy, while 24.5% them obtained from other places

The results of evaluating the knowledge of when to stop using antibioticsshowthat 57.5% of respondents stopped after finishing the prescribed doses. In comparison, 24.5% stopped when they felt better, and the remaining 18% did not know. This shows good adherence to the antibiotic doses compared to those who do not finish

the dose, though the percent is still not satisfactory.

However, this finding differs from research done in Nigeria [6], where only 26.1% stopped using antibiotics when they felt better.

The study also recorded interesting findings where 34.5% had heard about antibiotic resistance, 38.5% had heard about antimicrobial resistance, and 28.5% had heard about drug resistance. They had heard it from a doctor or nurse (37.68%,37.93%, and 28.07%).

This implies that most respondents had not heard of these terms before, and doctors or nurses still have played a significant role. However, their contribution to spreading antibiotic, antimicrobial, and drug resistance awareness remainsunsatisfactory.

In this study, awareness of antimicrobial resistance was poor, with 61.5% of the participants having no knowledge. It has been reported that one-third of the population from low and middle-income countries has inadequate knowledge about antimicrobials and their roles [10]. A study in Kenya [11] reported that 82% of respondents had not received public information on proper antibiotic use. More than 86% of the respondents incorrectly answered their structured questions on antibiotic use, thereby displaying poor knowledge. In China, the knowledge and awareness of antimicrobial resistance was even lower compared to this study, where only 9.7% had good knowledge, while in this study we had 38.5% of the participants had good knowledge of the awareness of antibiotic resistance [12]

In contrast, a study in Bulgaria found good knowledge and attitude about awareness of antimicrobial resistance; about 93.6% knew that antibiotics are used to treat bacterial infections [13]. In a study in Beirut [14], almost 78% of respondents from health-related majors scored higher in knowledge of antibiotic use than 41% of non-health-related majors.

6.0.CONCLUSION

Overall, there was poor knowledge and awareness of antibiotic resistance across the study area, irrespective of gender and age. This proves it is a population problem, as seen in many other studies. Steps can, therefore, be taken at all levels of society to reduce the impact and limit the spread of resistance by only using antibiotics when prescribed by a certified health professional, taking the entire course, and never sharing or using left-over antibiotics.

7.0. RECOMMENDATION

The government should put more strategies into spreading awareness about antibiotic, antimicrobial, and drug resistance.

This is by emphasizingdoctors' and nurses' efforts and investing in other ways of reaching more people, such as using media, specific campaigns, and the Internet. People need to change their behaviour regarding the use of antibiotics.

8.0 LIMITATIONS

- Self-reported data in surveys can introduce biases
- The study's geographic focus may limit generalizability

CONSENT AND ETHICAL APPROVAL

The Zanzibar Health Research Institute granted ethical approval, and the consent forms were presented to the research participants in Swahili and English.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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