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Lay People Knowledge, Attitudes and Practices about Antibiotics Use and Resistant in the Southern Area of the Gaza Strip

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Lay People Knowledge, Attitudes and Practices about Antibiotics Use and Resistant in the Southern Area of the Gaza Strip

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Jerusalem – Palestine

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Dedication

This thesis proudly dedicated to

To the soul of my loving mother and my respected father

My dear sisters and brothers

My faithful friends

Thank you for your help and your continued support.

Declaration

I certify that this thesis submitted to the degree of master is the result of my own research, except where otherwise acknowledged, and that this thesis or any of its parts has not been submitted for higher degree to any other university or institution.

Signature:

Dr. Maha Sadat Sobhi Alfaqawi

Date: 12 /8 /2023

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Abstract

Background Antibiotic resistance is one of the greatest dangers issues to global health in the 21st century. Antibiotic resistance develops when microorganisms acquire the capacity to resist the antibiotics targeted to eradicate them. Antibiotic resistance is a natural happening, but the misuse of antibiotics accelerates the process. This study aimed to assess lay people knowledge, attitudes, and practices about antibiotics and antibiotic resistant.

Methods: Four hundred participants from south Gaza, Khan-Younis and Rafah, participated in this study by completing a questionnaire, as well as 20 doctors and pharmacists were included in this study through key Informant Interviews. Limited expand

Results: Participants' knowledge overall weighted mean was 62.25%, attitudes overall weighted mean was 67.75%, and practices overall weighted mean was 61.75%. Mid-age participants have the highest knowledge, most positive attitudes, and better practices toward antibiotics compared to younger and older age groups. Females have more positive attitudes (p-value .000) and better practices (p-value .021) than males. Participants with advanced education, have higher knowledge score (p-value .041). On the other hand, the participants received primary education or less have better practices about antibiotics compared to those have advanced education (p-value .017). The employee participants have the highest knowledge (p-value .000), most positive attitudes (p-value .000) and better practices (p-value .000) toward antibiotics. Participants who suffer from poverty and severe poverty have less knowledge (p-value .022) and lower practices score (p-value .045) than non-poor participants.

Conclusion: The overall participants' knowledge, attitudes, practices towards antibiotics is relatively good, but they could be improved if educational programs conduct for both public people and health care providers with activation and applying for polices and regulations to regulate antibiotics prescriptions and purchasing.

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List of Abbreviations

AMR	Anti-Microbial Resistance
ASPs	Antimicrobial Stewardship Programs
CDC	Centers for Disease Control and Prevention
CRP	C-Reactive Protein
EDL	Essential Drug List
GDP	Gross Domestic Product
GPs	General Practitioners
IPCU	Infection and Prevention Control Unit
IV	Intravenous
KAP	Knowledge, Attitudes and Practices
KII	Key Informant Interviews
MDROs	Multi-Drug-Resistant Organisms
MoH	Ministry of Health
MRSA	Methicillin-Resistant Staphylococcus Aureus
MSF	Médecins Sans Frontières
MSSA	Methicillin -Sensitive Staphylococcus. Aureus
MSSA	Methicillin-Susceptible Staphylococcus Aureus
NGOs	Non-Governmental Organizations
NIS	New Israeli Shekel
OTC	Over the Counter
PCBS	Palestinian Central Bureau of Statistics
PCPs	Primary Care Physicians
SPSS	Statistical Package for Social Sciences
URTIs	Upper Respiratory Tract Infections
USD	United States Dollar
WHO	World Health Organization

Chapter One

Introduction

1.1 Background

Antibiotic resistance is one of the greatest dangers to global health, food security, and global development in the 21st century (World Health Organization (WHO), 2020). Antibiotic resistance develops when microorganisms acquire the capacity to resist the antibiotics targeted to eradicate them (Centers for Disease Control and Prevention (CDC), 2022). Antibiotic resistance is a natural occurrence, but the misuse of antibiotics may accelerate the manner. Globally, antibiotic resistance is increasing to alarmingly high levels. Developing and expanding internationally, new resistance mechanisms threaten our capacity to treat common infectious illnesses. As antibiotics become less effective, it becomes more difficult and perhaps impossible to treat a growing number of illnesses, without immediate action, we will enter a post-antibiotic period when routine diseases and mild injuries may once again be fatal (WHO, 2020).

Globally widespread misuse of antibiotics is the leading cause of antibiotic resistance. Misuse leads to the proliferation of Multidrug-Resistant Organisms (MDROs). MDRO caused infections are difficult to cure, and occasionally impossible. In many situations, they need prolonged hospital stays, more follow-up medical visits, and expensive and hazardous alternatives that raise morbidity, mortality, food insecurity, and expenditures (CDC, 2022).

This study was conducted to evaluate the public knowledge and attitudes about antibiotics and antibiotic resistant, and their practices as well, using a qualitative and quantitative approach. The purpose of this study is to describe and analyze public knowledge, attitudes

and practices about antibiotics resistant and their practices with highlighting determinant factors behind it in Gaza Strip.

1.2 Statement of the Problem

Anti-Microbial Resistant (AMR) is no just a concern for human health; it now poses a major threat to the national and global economy, food security, and human health. AMR are estimated to kills around 700,000 people yearly worldwide, a figure that is estimated to climb to 10 million by 2050 if effective steps are not implemented today (Hodin, 2023). In addition, AMR would cause a 3.8% decline in the global gross domestic product (GDP) over the same time frame (Ahmed S et al, 2018). It also forecasts, based on mathematical calculations, that by 2030, AMR would push 24 million individuals into poverty because to the high expense of treatment over an extended period (Hodin, 2023).

Many studies showed that antibiotics resistant is certainty in the Gaza Strip (see the literature review 2.2.12) but few studies described lay people knowledge, attitudes, and practices (KAP) about antibiotics and antibiotics resistant, therefore this study was conducted to assess lay people KAP toward antibiotics and antibiotics resistant with analysis of the factors behind the results that found.

1.3 Justification of the study

It is difficult to assess the magnitude of the AMR problem and its causes because there is a lack of information on the publics' KAP toward antibiotics and antibiotic resistance in the Gaza Strip. This is due to the absence of a comprehensive national surveillance system on AMR and high-quality published data. In addition, there is a dearth of background knowledge on the community's abusive practices towards antibiotics and the role they play in the development of antibiotic resistance. As a result, this study may be of assistance to

help the lay people by assessing their KAP toward antibiotics and antibiotics resistant with highlighting the factors affect it, which could be improved such as the education. Moreover, the study analyzed deeply doctors and pharmacists' roles in antibiotics consumption, which could help those in charge of making decisions on the establishment of policies to regulate antibiotics purchasing, side by side with strengthening of public KAP, both of which may result in a drop in the misuse of antibiotics and, as a result, a reduction in AMR. Palestinian Ministry of Health (MoH) and other related stakeholders could use this study also as a baseline to assess the progress in publics' KAP about antibiotics and antibiotics resistant after implementation of improvement steps to improve them. In addition, MoH and other related stakeholders could benefit from this study to choose the best decisions and plans for public KAP enhancement toward antibiotics and antibiotics resistant.

1.4 Objectives

- **General objective**

To assess public KAP about antibiotics resistant and spot light on determinant factors affect them in south Gaza Strip**.**

- **Specific objectives**
  - To shed light on public knowledge about antibiotic resistance and misuse
  - To describe public attitudes about antibiotic resistance and misuse
  - To assess public practices about antibiotic resistance and misuse
  - To set recommendations for preventing antibiotics misuse and improving public awareness about antibiotic resistance and rational use.

1.5 Study Context

Based on population estimates prepared by Palestinian Central Bureau of Statistics (PCBS), there are about 14.5 million Palestinians in the world in mid-2023, of whom about 5.48 million in the State of Palestine; 2.78 million males and 2.70 million females. The estimated population of the West Bank was 3.25 million. While the estimated population of Gaza Strip was 2.23 million in the same year (PCBS), 2023).

There are 673,844 people living in the south region, which is comprised of the governorates of Khan-Younis and Rafah. The population of the Gaza Strip lives in an area that is 365 square kilometers in size and has a population density of around 5,936 persons per square kilometer. Palestinian men have a life expectancy of 73.2 years, while Palestinian females may expect to live 75.4 years. Nearly 44.1% of Palestinians are under the age of 17, while just 5.5% are 60 or older, making the Palestinian population as a whole mostly comprised of younger people (PCBS), 2023).

1.5.1 Health profile

With one of the youngest populations in the region, Palestine is undergoing demographic and epidemiological change. In 2022, the total fertility rate was 3.8. It is high but falling compared to previous years' rate. Infant mortality reached 10.4 deaths per 1000 live births, while the mortality rate for children under five reached 12.7 deaths for every 1,000 births in 2022. This is a huge improvement compared to past years' mortality rates. Palestine had a maternal mortality rate of 21.9 per 100,000 live births in 2022. (Palestinian MoH, 2023)

1.5.2 Causes of deaths, Palestine, 2022

Non-communicable diseases are predominantly major causes of mortality in Palestine (Palestinian MoH, 2023). According to Health Annual Report of Palestinian MoH in 2023,

ischemic heart disease was the main cause of death in Palestine causing 22.2% of all deaths, followed by cancer causing 14.3% of all deaths (Palestinian MoH, 2023). In West Bank, statistics showed that COVID-19 dropped from the first cause of death in 2021 to the fifth rank, causing 8.3% of all deaths (Palestinian MoH, 2023). In Gaza Strip, COVID-19 dropped from the second cause of death in 2021 to the fourth rank, causing 6.8% of all deaths (Palestinian MoH, 2023). In Gaza Strip, top ten causes of reported deaths in 2022 were cardiovascular diseases (17.8%), cancer (15.1%), cerebrovascular diseases (11.6%), COVID-19 (6.8%), unknown cause (5.8%), respiratory diseases (4.3%), Congenital Malformations (3.9%), hypertension (3.8%), Diseases in the perinatal period (3.3%), and Diabetes Mellitus (3.2%) (Palestinian MoH, 2023).

1.5.3 Health services and infrastructure

In the West Bank and the Gaza Strip, there are four primary providers of health care services: the government, including the MoH and Military Health Services, the United Nations Relief and Works Agency for the Palestinian Refugees (UNRWA), Non-Governmental Organizations (NGOs), and private medical services, each with its own network of primary health care centers and hospitals. The Palestinian MoH, UNRWA, Military Health Services, NGOs, and private sector provide primary, secondary, and tertiary health care services. In the occupied Palestinian territories, there are 749 basic healthcare clinics and 87 hospitals. Bed capacity is around 1.3 per 1000 people and 3.03 per 1000 population for physicians (Palestinian Central Bureau of Statistics, 2022). In 2022, the number of pharmacists who are practicing pharmacy profession in Palestine was 9,657 pharmacists, with a rate of 18 pharmacists per 10,000 populations, and there were 1,960 pharmacies in Palestine, with rate of one pharmacy per 2,732 population (Palestinian MoH, 2023). The ongoing siege and multiple hostilities have affected the Gaza Strip's health sector capability.

1.5.4 The Infection and Prevention Control Unit (IPCU) and National Protocol for Infection Prevention and Control

The Palestinian Ministry of Health has allocated an integrated unit for infection prevention and control. It monitor infection control and prevention and follow up the work at the infection control and patient safety departments in the health care centers distributed in the Palestinian governorates. In addition, the Palestinian Ministry of Health launched the National Guide to Infection Control and Patient Safety in cooperation with WHO in 2022. This guide was developed in conjunction with the emergence of the global pandemic of the Corona virus (Covid-19) in order to unify concepts and work mechanisms in Palestinian centers and hospitals. It includes policies and work procedures related to infection control using what is available and applicable in the region and in the world, according to the recommendations of the WHO and the American CDC. This would lead to the development of a special system for measuring the extent to which health centers and hospitals adhere to work policies and to provide better level of quality, in order to ensure the safety of the service provided and its impact on infection control in health centers and hospitals. This guide was prepared by Palestinian hands with expertise and higher degrees in the field of specialization such as Egyptian fellowship, and professional diplomas in the fields of infection control and patient safety, to be a scientific reference to be used in the State of Palestine. (Palestinian MoH, 2022)

1.5.5 Health financing

The percentage of current health expenditure to GDP in Palestine at current prices was 10.4% in 2021 and 10.3% in 2020. Total health expenditure per capita was 383.9 United States Dollar (USD) in 2021 and 332.3 USD in 2020 (PCBS, 2023).

The government health insurance covers primary health care services including maternal and child health services, secondary health care services, prescription medicines on the essential medicines list, and tertiary care services needed (WHO, 2019). Palestinian MoH had Expended 379,488,303 New Israeli Shekel (NIS) on Medicines from central medical stores in 2022, and 171,739,405 NIS for Medicines from central drug stores in the same year (Palestinian MoH, 2023). In 2022, MoH had expended 16.7% from the total health expenditure on medicines, vaccines & medical supplies (Palestinian MoH, 2023).

1.5.6 Pharmaceutical regulatory agency

Antibiotics have been classed as essential medications and account for 57% of the essential drug list's (EDL) total pharmaceuticals. By applying the laws and directives of the Palestinian Ministry of Health, the General Directorate of Pharmacy guarantees that effective, safe, and high-quality pharmaceuticals are inexpensive, readily accessible, and rationally utilized. One of the requirements for registering antibiotics with the MoH is that the label clearly indicate that the medicine is accessible exclusively with a prescription. The Ministry of Health has issued a global directive to all physicians and pharmacists in all health centers in Palestine. This issue is instructing them to comply with the directive that antibiotics should not be dispensed without a prescription under legal accountability, particularly in the private sector. In addition, physicians should not prescribe unnecessary antibiotics to patients, particularly in diseases caused by viruses such as influenza, flu, colds, congestion, and others. MoH has authorized a list of over-the-counter (OTC) medications that pharmacists may sell to patients without a prescription, the antibiotics were excluded from this list. Furthermore, pharmaceutical corporations are prohibited from advertising antibiotics via the media (National Action Plan for Antimicrobial Resistance 2020-2024).

The pharmacy legislation in Palestine is not practical, since second and third generation antibiotics may be purchased without a prescription. In the West Bank, 82.6 percent of pharmacists stated that patients requested antibiotics without a prescription, while 60.8 percent of pharmacists reported providing antibiotics upon patient demand (Abu Al- Halawa, et al, 2019).

1.6 Operational definitions

- **Very good score**

In this study, very good score refers to having a score between 75-100 %.

- **Good score**

In this study, good score refers to having a score between 50-75 %.

- **Poor score**

In this study, poor score refers to having a score between 25-50 %.

- **Very poor score**

In this study, very poor score refers to having a score between 0-25%.

Chapter Two

Conceptual Framework and Literature Review

2.1 Conceptual Framework

2.1.1 Antibiotic resistant

Antibiotics are medications used to prevent and treat bacterial infections. Antibiotic resistance happens when the germs no longer respond to the antibiotics designed to eradicate them. That means the germs are not executed and continue to grow. It does not mean our body is resistant to antibiotics (CDC, 2022).

Antibiotics resistant is naturally occurs, but antibiotics misuse could accelerate the process (WHO, 2020). Peoples' antibiotics use may associate to their knowledge and attitudes toward antibiotics, which also could be affected by many factors both related to people characteristics and their society where they live. Antibiotics resistant results from antibiotic misuse that associated with people knowledge, attitudes, and antibiotics use practices, which also linked with many factors include educational level, sociodemographic factors, socioeconomic factors, health care provider effect, pharmacists' effect and antibiotics prescription laws in country, which summarized in the framework below:

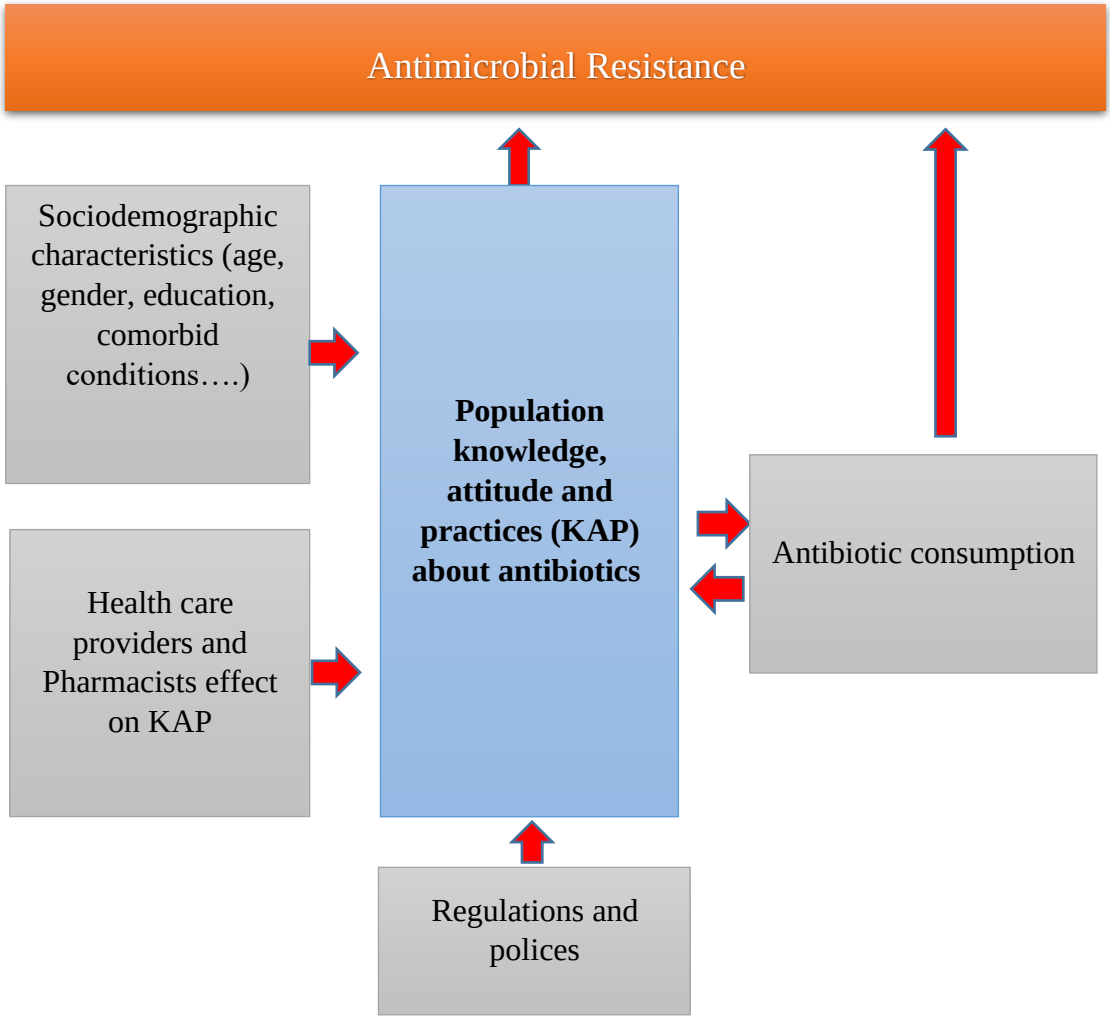

Figure 2.1: Conceptual Framework

2.1.2 Knowledge, attitudes and practices

This study was conducted to analyze people KAP toward antibiotics and antibiotic resistant. Knowledge means the understanding of antibiotics and how its resistant occurs, which includes its risk factors, and complications. Peoples' Knowledge is acquired by many different ways include their own experiences, experiences of others, and from books, articles, and other sources of information. It is also acquired through formal education, or taking a course.

Attitudes encompasses believes or perceptions, threat, susceptibility and seriousness that the study participants may have towards antibiotics and antibiotics resistant. Peoples'

attitudes towards antibiotics may vary depending on their knowledge, culture, and their experiences. For example, some people rely on antibiotics to treat even minor infections. This can lead to the overuse of antibiotics, which can also contribute to antibiotic resistance. On the other hand, some people may afraid of taking antibiotics, either because they are concerned about the side effects or because they believe that antibiotics will weaken their immune system. This fear can also lead to the underuse of antibiotics, which can also contribute to antibiotic resistance. Therefore, it is important to have a good understanding of antibiotics and their use in order to have positive attitudes towards them.

Practices refers to actions based on the participants' knowledge and attitudes towards antibiotics and antibiotics resistant. It includes using antibiotics without doctor prescription, not taking the full course of antibiotics, which can lead to antibiotics resistance, sharing antibiotics with others, using antibiotics in animals without expert consultation, and other practices.

2.1.3 Sociodemographic characteristics

People sociodemographic characteristics may affect their KAP about antibiotics and antibiotic resistant. These characteristics include participants' age, gender, educational level, income, health status, and others. Many literatures showed that Peoples' KAP toward antibiotics vary related to their sociodemographic and socioeconomic characteristics. The literature evaluation indicates that poverty and material deprivation are significant risk factors for antibiotic misuse and resistance. The majority of investigations discovered a correlation between lower socioeconomic indicators and increased antibiotic resistance rates. Educational level has an association with peoples' KAP toward antibiotics and antibiotic resistant. Commonly KAP toward antibiotics and antibiotic resistant is better in people has better educational level. Age, gender, health status also may affect peoples' KAP toward antibiotics and antibiotic resistant (see literature review page 12).

2.1.4 Health care providers and pharmacists

Health care providers and pharmacists may affect antibiotics consumptions and as a result affect antibiotics resistant. Literature showed that doctors and pharmacists have main role in antibiotics resistant by antibiotics prescribing and purchasing. Doctors responsible for rationalized antibiotics prescriptions, the right choose for the type of antibiotics for the right diagnosis, not for patients' pressure or uncertainty of diagnosis. The pharmacists' role is mainly linked for delivering antibiotics; they should not purchase antibiotics without doctors' prescriptions. While both doctors and pharmacists should estimate antibiotics safety issues with patients.

2.1.5 Regulations and polices

The country's' regulations and policies that control antibiotics purchasing and prescribing have a main role in antibiotics consumption, which influence antibiotics resistant as well. But it is important to note that regulations and policies alone cannot solve the problem of antibiotic resistance. They should be applicable with good monitoring and updating system. The regulations and polices should include antibiotics prescriptions by health care providers and antibiotics delivering by pharmacists. As well as the use of antibiotics for animals or plants and educating the public about antibiotic resistance which could help people to understand the risks of antibiotic misuse for encouraging them to use antibiotics only when necessary.

2.2 Literature review

2.2.1 Antibiotic resistance:

Antibiotics are medicines used to prevent and treat bacterial infections. Antibiotic resistance happens when bacteria alter its response to these medicines. Antibiotic resistance develops in microbes, not humans or animals. These microbes can infect people or animals, and the infections they cause are more difficult to cure than those caused by bacteria that are not resistant. A rising number of infections, such as pneumonia, tuberculosis, gonorrhea, and salmonellosis, are becoming harder to treat as the antibiotics used to treat them become less effective. Antibiotic resistance leads to longer hospital stays, higher medical prices and increased mortality (WHO, 2020).

Antibiotic resistance is becoming a more serious worry worldwide. AMR can be shifted across bacteria via genetic elements, resulting in the fast creation of MDR in germs from animals, posing a risk to human health (McMillan, et al, 2019). Antimicrobial resistance has the possible to affect people at any phase of their lives, as well as the healthcare, and agriculture industries. This makes it one of the world's most crucial public health concern. Bacteria does not have to be resistant to every antibiotic to be dangerous. Resistance to even one antibiotic can mean serious problems. For example: Antimicrobial-resistant infections that require the use of second- and third-line managements can harm patients by producing serious side effects, like organ failure, and prolong care and recovery. Many therapeutic advances are dependent on the ability to fight infections using antibiotics, such as joint replacements, organ transplants, cancer therapy, and the treatment of chronic diseases like diabetes, asthma, and rheumatoid arthritis. In some cases, these infections have no treatment choices. Antibiotic-resistant bacteria are difficult to handle and, sometimes, nonsensical.

Antibiotic-resistant infections often require more extended hospital stays, more doctor visits, and expensive and dangerous alternative managements. (CDC, 2022)

According to a comprehensive review of the worldwide burden of bacterial antimicrobial resistance in 2019, an estimated 4.95 million fatalities were related to bacterial AMR in 2019, with 1.27 million deaths directly attributable to bacterial AMR (Murray, et al 2022).

2.2.2 Socioeconomic factors effect on antibiotics use

The literature evaluation indicates that poverty and material deprivation are significant risk factors for antibiotic misuse and resistance. The majority of investigations discovered a correlation between lower socioeconomic indicators and increased antibiotic resistance rates. In univariate (p 0.01) and multivariate analyses (p 0.01), there is a small but consistent negative association between socioeconomic factors and overall antimicrobial resistance (Allel, et al., 2020). In African studies, a medium income was associated with 19% greater odds of antibiotic storage (OR 1.19) and 18% greater odds of any form of antibiotic misuse (OR 1.18). High wealth was related with a 51% reduced likelihood of antibiotic non-adherence (OR 0.49). In upper-middle wealth countries, high income was also associated with an 11% increase in the odds of any antibiotic misuse (OR 1.11) (Mallah, et al 2021).

In Abu Taha and his colleagues' study they found that participants with a high family income were more likely to be aware of appropriate antibiotic use than participants with a low family income (P-value <0.001) (Abu Taha, et al 2016). The same was found in study conducted in Jordan, participants with better income were generally more knowledgeable about appropriate antibiotics use and its resistance than those with lower educational level and less income (Yosef, et al 2018). The same was found in other study, where there was an association between a higher monthly income and a better level of knowledge (Mazi´nska, Struzycka, and Hryniewicz, 2017) (Nepal, et al, 2019).

Different findings were found between the level of monthly income and the level of knowledge related to efficacy, mode of action, use of antibiotics and AMR. The results obtained in study was conducted in Romania show that people with higher incomes do not have better knowledge about antibiotics, in addition, the findings expose that people with higher levels of income as well as an undisclosed income are more likely to have improper attitudes towards antibiotic use than people with the lowest income level (Pogurschi, et al, 2022).

2.2.3 Sociodemographic factors effect on antibiotics use

Age, gender, and several other sociodemographic factors were shown to be associated with differences in antibiotic usage due to differences in knowledge and attitudes according to age, gender, educational level, and several other sociodemographic issues.

In similar Ethiopian study, participants' knowledge level was significantly attributable to many sociodemographic characteristics, including education level ($p < 0.01$), marital status ($p < 0.01$), occupation ($p < 0.01$), house ownership ($p = 0.01$) and position in the house ($p < 0.01$). Likewise, participants' attitudes levels were significantly influenced by their education level ($p < 0.01$), marital status ($p < 0.01$), occupation ($p < 0.01$), and position in the house ($p = 0.01$). . Moreover, education level ($p < 0.01$) and occupation ($p < 0.01$) had a significant influence on the study participants' practices level (Dejene, Birhanu, and Tarekegn, 2022)

In study was conducted in Jordan, findings showed that participants' personal characteristics were significantly associated with the public's knowledge (e.g., age, education, and monthly income) as well as their attitudes (e.g., monthly income) (Zaidi, et al, 2021)

In other a study was conducted in Romania, which that older people appear to have more accurate knowledge than younger people, The most significant difference was observed in the 55–64 age group, which was approximately 4 times less likely (p-value = 0.014) to have inaccurate knowledge of antibiotics compared to people between 18–24 years, the study also revealed that people with high level of education have a better level of knowledge about antibiotics, which found that higher levels of education were significantly associated with a reduced likelihood of having poor knowledge about antibiotics and antibiotic resistance., Pogurschi and his team also showed that women were approximately twice less likely (p-value < 0.001) than men to have inaccurate knowledge of antibiotics and antibiotic resistance, the same for married participants, who had more knowledge than single participant. People who had a postgraduate education were approximately 10 times less likely (p-value < 0.001) to have poor knowledge compared to people who only had a secondary education. The study also found that 52.73% of participants try to store an antibiotic in their houses and large percentage of participants (83.64%) had an appropriate attitudes toward the statement: of "If a family member feels unwell, I usually give them an antibiotic" by disagreeing, but 30.13% of participants had improper attitudes toward antibiotic use when the symptoms are cold or flu, which is simmer to what Nepal, and his team found in their study (Nepal, et al, 2019) (Pogurschi, et al, 2022).

The Romanian study also found that attitudes toward antibiotic use and consumption differed

according to other demographic characteristics, as people aged (25-34) years were half as likely to have improper attitudes about antibiotic consumption, compared to younger people. The findings of this study reveal that 78.86% of respondents use antibiotics only when prescribed by the doctor. This finding is similar to those reported by other European studies, where 95% of the population stated that they use antibiotics only when prescribed by the

doctor (Data Europa, 2022). Inappropriately, 29.19% of participants stated that when symptoms disappeared and they felt better, they stopped the antibiotic treatment, regardless of its duration. Other studies have shown that other populations are less controlled according completing antibiotic treatment. For example, 55.1% of the participants from Western Saudi Arabia stopped their course of antibiotics if their symptoms improved (Zaidi, et al, 2021).

Other study showed that participants' attitudes toward antibiotics were also significantly difference ($p < 0.05$) according to their educational level, marital status, occupation, and position in their houses (Dejene, Birhanu, and Tarekegn, 2022). Similar findings were found in study conducted in Palestine, participants with a higher educational level, university, had a good attitudes towards antibiotic than those with a less education with significant P-value <0.001. In addition, participants with a higher income were more aware of proper antibiotic use than participants with lower income with significant P-value <0.001 (Abu Taha, et al, 2016). Females were less likely to have improper attitudes compared to males. A like but stronger finding was noticed for people with higher levels of education, who were less likely to have appropriate attitudes compared to those with the lowest level of education. Other study showed the high level of education is correlated with proper attitudes. (Jamhour A, et al, 2017) (Pogurschi, et al, 2022).

The probability of inappropriate antibiotic use increased threefold in adults over the age of 50 (OR 3.11), fivefold in those between the ages of 35 and 49 (OR 4.88), and sevenfold in those between the ages of 21 and 34 (OR 6.58). Persons between the ages of 21 and 34 had an odds ratio that was significantly higher than those between the ages of 35 and 49, and the same was true for people between the ages of 35 and 49 (Guo, et al., 2022). Romanian study found that 80.1% of participants showed proper practices for the use of antibiotics. Participants with age group (35–44) year-old were half as likely to have improper practices

towards antibiotics, compared to other age groups of participants. Single participants were relatively twice as likely to have improper practices compared to married participants (Pogurschi, et al, 2022).

Respondents' practices levels were also significantly associated ($p < 0.05$) with their educational level and occupation (Dejene, Birhanu, and Tarekegn, 2022)-use paragraphs

In other study was conducted to assess self-medication in developing country, the Self-medication was found to be significantly correlated with the lower educational level ($P = .036$), while the socioeconomic status, gender and age did not associate with self-medication (Jamhour, et al, 2017).

2.2.4 Educational level effect on antibiotics use

Antibiotic use may be influenced by educational level, as those with a high level of education are less likely to misuse antibiotics than those with a low or medium level of education. In Abu Taha and his colleagues' study which was conducted in Palestine they found that participants with a higher educational level (university) had a good attitudes towards rational antibiotic use than those with a lower education level (P-value <0.001) (Abu Taha, et al 2016). A meta-analysis including 85 research from 42 countries with varying socioeconomic position revealed that those with low education (9 years) and medium education (> 9–12 years) abuse antibiotics more often than those with high education (> 12 years). The connection is stronger in the Middle East and nations with lower-middle economies (OR = 0.67, 95% confidence interval). In Europe, a high level of education is connected with a 25% increased risk of antibiotic abuse (OR = 1.25, 95% confidence interval). In lower-middle economies (OR = 0.96; 95%) and the Middle East (OR = 0.96; 95%), each extra year of schooling was linked with a 4% reduction in the likelihood of antibiotic abuse (Mallah, et al, 2022).

Other study confirmed this as participants scored higher in attitudes score followed by knowledge and practices scores among medical student comparing with other college students. The average attitudes score was 76% (95% CI: [75, 78%]) compared to 59% for knowledge (95% CI: [58, 60%]) and 45% (95% CI: [44, 47%]) for practice. The results suggest that overall, medical students scored remarkably better than non-medical students did on KAP of antibiotic use, respectively ($p = 0.0001$), ($p = 0.000$) and ($p = 0.002$) (Jairoun, et al, 2019).

2.2.5 Health care providers and pharmacists effect on antibiotics use

Pharmacists and health care providers may play a role in the overuse of antibiotics. According to the WHO poll, pharmacists are among the best positioned to influence the proper use of antibiotics and, thus, have a vital role to play in AMR alongside physicians, who are responsible for the hidden portion of the AMR issue (WHO, 2014). Doctors responsible for rationalized antibiotics prescriptions, the right choose for the type of antibiotics for the right diagnosis, not for patients' pressure or uncertainty of diagnosis. The pharmacists' role is mainly linked for delivering antibiotics; they should not purchase antibiotics without doctors' prescriptions. While both doctors and pharmacists should estimate antibiotics safety issues with patients.

According to study conducted in Palestine, physicians has good knowledge and attitudes scores (39.6%) and 194 (61.4%), respectively. More than half (58.2%) had good antibiotic prescription practices. Females reported significantly more favorable practices than males. It also showed that knowledge about antibiotic prescriptions had a considerable influence on changing their practices. Conversely, physicians’ attitudes toward antibiotic prescriptions did not have a significant role in determining their practices. Most of the physicians were knowledgeable about what follow improper usage of antibiotics and how it can lead to

antimicrobial resistance. More than two-thirds of physicians avoiding unneeded antibiotics prescriptions. The same also was showed in practicing antimicrobial stewardship where the majority used a conservative approach with many antibiotics prescribed or did not prescribe due to patient pressure (Maraqa, et al, 2023).

A systemic review and meta-analysis study showed that the proportion of non-prescription supply of antibiotics was 62%, the proportion of non-prescription supply of antibiotics following a patient request was 78% and based on pharmacy staff recommendation was 58%. Antibiotics were usually provided without a prescription to patients with symptoms of urinary tract infections (68%) and upper respiratory tract infections (67%) (Auta, et al, 2019) However, why some patient asking managements from pharmacists instead of doctors? One pharmacist explains it by these words: *"Patients feel this practice is easier and spreader, not for economic causes"*. That seem realizable, as the access to governmental or non-governmental medical services is relatively inexpensive in Gaza Strip comparing to other countries. According to study conducted in Saudi Arabia, lack of patient readiness to consult a doctor for a non-serious infection (69.9%) and an incapability to afford a consultation with a doctor (65.3%) were the most common reasons for asking antibiotics from pharmacists without doctor prescriptions. There was statistically significant association between the number of antibiotics dispensed and educating patients about the importance of adherence and completion of the full course of antibiotics ($p = 0.007$) (Abdul Hadi, et al, 2016).

2.2.6 Regulations and polices effect on antibiotics use

The regulations and policies in the country that control antibiotics purchasing and prescribing have main role in antibiotics consumption. Antibiotics have been grouped as essential medications and account for 57% of the essential drug list's (EDL) total pharmaceuticals. By applying the laws and directives of the Palestinian Ministry of Health,

the General Directorate of Pharmacy guarantees that effective, safe, and high-quality pharmaceuticals are inexpensive, readily accessible, and rationally utilized. One of the requirements for registering antibiotics with the MoH is that the label clearly indicate that the medicine is accessible exclusively with a prescription. The Ministry of Health has issued a global directive to all physicians and pharmacists in all health centers in Palestine. This issue is instructing them to comply with the directive that antibiotics should not be dispensed without a prescription under legal accountability, particularly in the private sector. In addition, physicians should not prescribe unnecessary antibiotics to patients, particularly in diseases caused by viruses such as influenza, flu, colds, congestion, and others. MoH has authorized a list of OTC medications that pharmacists may sell to patients without a prescription, the antibiotics were excluded from this list. Furthermore, pharmaceutical corporations are prohibited from advertising antibiotics via the media (National Action Plan for Antimicrobial Resistance 2020-2024). According to study conducted in Saudi Arabia, 200 community pharmacists more than two-thirds (70.5%) of the pharmacists were not aware that selling antibiotics without medical prescription is illegal practices (Abdul Hadi, et al, 2016).

2.2.7 Antimicrobial stewardship programs

Efforts have been made to educate medical professionals and patients in several nations in an effort to alter their antibiotic use patterns. Guidelines, instructional workshops on effective antibiotic prescription, educational sessions on the diagnosis and treatment of infectious illnesses, reviews of prescribing data for practices, interviews with local pharmacists, broadcasts, etc. are all examples of necessary interventions.

Twenty studies, eight of them were conducted in the Kingdom of Saudi Arabia, five in Qatar, two each in Lebanon and Jordan, and one each in Palestine and UAE; there was also one

multinational study. Different Antimicrobial Stewardship Programs ASP practices, including prospective auditing and feedback, pre-authorization, tracking, antibiotic restriction, education, de-escalation, and intravenous-to-oral switch, were reported. ASP practices correlated with improved susceptibility rates and decreases in antimicrobial use. The outcomes of this review reveal the scarcity of data on ASP practices. The introduction of ASPs in hospitals in Middle Eastern countries has led to favorable clinical effects (Ababneh, Nasser, and Rababa'h, 2021).

Other review showed that formal inclusion of nurses in antimicrobial stewardship activities has been associated with improved nurse knowledge, nurse confidence, and in some cases improved clinical outcomes for patients (Gotterson F, Buising K, and Manias E, 2021).

Other study showed that ASP positively reduced antimicrobial consumption, with no statistically significant effect on the overall mortality rate (Aiesh, et al, 2023)

In other study for MSF found that MSFs' antibiotic stewardship programs have trained clinicians to rationally use antibiotics in projects in the Middle East, from an orthopedic reconstructive surgery project for conflict-related injuries in Jordan, to an acute trauma facility in Yemen, and with future activities planned in Gaza and Iraq. On-site coaching is used to establish the programs and ongoing, off-site clinical and operational support are always provided. However, human resources remain challenging in all of these settings. Point-of-care diagnostic tools would improve antibiotic targeting for inpatients and outpatients and could help clinicians manage expectations when antibiotics are requested but unnecessary (Kanapathipillai, 2019).

2.2.8 AMR in Gaza Strip

The abuse of antibiotics and the resulting rise in antibiotic resistance is a problem in the Gaza Strip, just as it is everywhere in the world. Overall, studies have shown a high prevalence of multidrug-resistant gram-negative bacteria, especially E. coli, Enterobacter, Kebsiella, Acinetobacter, and Pseudomonas aeruginosa, during the study period, as shown in a review of 20 years for Anti-microbial resistance of bacterial isolates from the clinical and hospital environment in Gaza Strip. Vancomycin-resistant enterococci and methicillin-resistant Staphylococcus aureus were common among Gram-positive bacteria. Staphylococcus aureus was found in 62 (31%) of the 200 healthcare workers at Al-Shifa hospital, with 51 (82.3%) being MRSA (El Aila, et al., 2017). The majority (48) of the 51 MRSA isolates tested were resistant to oxacillin. Each one of the methicillin-resistant Staphylococcus aureus (MRSA) and methicillin-susceptible Staphylococcus aureus (MSSA) isolates showed a complete lack of sensitivity to penicillin (El Aila et al., 2017). Furthermore, MDR bacteria were discovered in the middle ear fluid of Gaza Strip babies (Elmanamaa, Abu Tayyema, and NassrAllah, 2014).

Other study were conducted to review the current situation of AMR in Gaza Strip. It considered the published articles over the period 2002-2021.Thirty five articles were included in this study, which showed the spread of antibiotic resistant in the clinical and hospital environments in Gaza Strip. The reviews' discussed studies done on antibiotic resistant bacteria found in a wide range of environments including clinical samples, foods, poultry, costal water, hospital wastewater, and hospital environments. The findings of study showed that the spread of antibiotic resistant bacteria is affected by many factors like unsuitable and unwise use of antibiotics and the un-regulated access of antibiotics to the environment (Elmanama, Abu Tayyem, and Sjölander, 2021).

According to the international non-governmental organization Médecins Sans Frontières (MSF), antibiotic-resistant infections are a "certainty" in Gaza, where many young patients have sustained lower limb gunshot wounds and open fractures due to the violent response of Israeli forces to Palestinian protests in Gaza. Many patients came in hospitals with insufficient infection control measures after prior surgical operations. For several of these patients, wound collapse, tibial non-union, osteomyelitis, and amputation were inevitable complications (MSF, 2018).

Chapter Three

Methodology

3.1 Study Design

This study was a mixed study method that involves utilizing both quantitative and qualitative approach. The mixed method approach capitalizes on the advantages of the quantitative and qualitative methods while offsetting the drawbacks of each. In general, quantitative method seeks to understand the causal or correlational relationship between variables, whereas qualitative method seeks to understand a phenomenon within a real-world context. Quantitative method produces objective data, free from the subjectivity. Its results can be clearly communicated through statistics and numbers. In addition, quantitative method can be quickly formed with the benefit of data computing software. While the qualitative method allows for creativity and flexibility. The scope of the research may change as more information is gathered. Moreover, it gives a rich details and often emotionally driven insights based on the personal views of those you interview.

Study design was a cross sectional design for both quantitative and qualitative parts. It reflects the presented facts at one point of time of data collection. Cross sectional studies are relatively quick, cheap, and could study many outcomes. Cross-sectional studies provide a clear 'snapshot' of the outcome and the characteristics associated with it, at a specific point in time. It is focused on finding relationships between variables at one moment in time.

3.2 Study setting

The study was conducted in south Gaza, Khan- Younis and Rafah cities, where healthy adult visitors were reached in the major hospitals.

3.3 Study period

The study was conducted between Septembers 2021 to April 2023.

3.4 Study population

Study population for the quantitative part was the inhabitants of south Gaza Khan- Younis and Rafah cities. The total south Gaza inhabitants is 673844. While the study population for the qualitative part was doctors and pharmacists work in south Gaza.

3.5 Sample Size

According to sample size calculation programs, with confidence level of 95% and confidence limits 5%, a sample of 384 participants was involved, we raised this number to 400 participants to participate in quantitative part of study. The sample was selected from the hospitals' healthy visitors. Participants was selected via non-probability convenient sampling technique with 100 participants from each hospital. Hospitals included in this study are Nasser Medical Complex, European Gaza Hospital, Martyr Mohammed Yousef Al-Najjar Hospital, and Emirates Crescent Hospital (see Annex 5). The Sample size for qualitative part of the study was ten health care providers and ten pharmacists they were selected via non- convenient sampling technique. Key informant interviews were conducted with pharmacists and health care providers using different questionnaires, designed based on our objectives and literature review to analyze deeply what found in quantitative component

3.6 Eligibility criteria

For the quantitative part, eligibility criteria were being adult, 18 years old or more, found in the major hospitals, and not a patient staying in the hospitals, in south Gaza at study period. While the eligibility criteria for qualitative study was being a doctor or pharmacist in south Gaza at study period.

- **Including criteria**

For the quantitative part of the study

- Adult, 18 years old or more
- live in south Gaza
- Found in the major hospitals in south Gaza at study period.

For the qualitative part of the study

- Doctor work in south Gaza at study period
- Pharmacist work in south Gaza at study period

Exclusion criteria

For quantitative part:

- People less than 18 years
- People found in south Gaza at study period in the major hospitals but they are not south Gaza inhabitants, as visitors or tourists.
- Patients staying in the major hospitals in south Gaza at study period.
- Employee at the major hospitals in south Gaza at study period

For quantitative part:

- Doctors do not practice medicine.
- Pharmacists do not practice pharmacy
- Doctors and pharmacists who do not work in south Gaza at study period

3.7 Ethical Consideration move ahead

Ethical permission was obtained from hospitals that data collection was conducted in. Furthermore, written informed consent was obtained from all participant before answering the questionnaire. An ethical approval was obtained from the ethical committee in Gaza Strip (Helsinki Committee) (see Annex 8).

3.8 Data Collection procedures

- Quantitative component

Pilot study was conducted by 10 questionnaires and not including in the study. The data collectors collected the data using face-to-face interviews and they filled the answers in the questioner forms.

- Qualitative component

The interviews were conducted with doctors and pharmacists at their work place. Each interview was separate from the other and took sufficient time with the interviewee.

3.9 Tools composition

- Quantitative component

Structured Arabic language, self-administrated questionnaire was developed to collect data after conducting a review of comparable studies. The questionnaire was divided into many sections. One section includes demographic information such as age, gender, marital status, occupation, income, and level of education. The second and third parts investigate

participants' knowledge and attitudes toward antibiotic use and resistance. The fourth section of questions focused on participants' antibiotic use practices (see annex 1). The questionnaire was checked by expects before applying for participants (see Annex 7)

- **Qualitative component**

Key informant interviews were conducted with pharmacists and health care providers using different questionnaires, designed based on our objectives and literature review to analyze deeply what found in quantitative component (see Annex 3 and 4). The questionnaires were checked by expects before applying for participants (see Annex 7).

3.9.1 Pilot study

Ten participants included in a pilot study by filling out the quantitative parts' questionnaire. They not included in the study sample. The pilot study helped in checking the questionnaire and its simplicity to apply for the participants.

3.9.2 Response rate

Very good response rate was observed in this study that reached 97%. Participants who refused to participate were replaced by other participants to reach the required number of samples size.

3.10 Study Rigors

- **Validity**

Qualitative and quantitative questionnaires was reviewed by local experts in the field and adapted according to their feedback (see Annex 7).

- **Reliability**

All data collectors were received training about data collection. Data from uneducated participants was gathered through interviews. Then, data collector collected completed questionnaires from participants, and the questionnaires were checked for accuracy. Incomplete questionnaires were returned to participants in the study for completion. The questionnaires were labeled and coded using the questionnaire number after completion. A pilot study involving 10% of the participants who were not include in the final study was used to ensure smoothness and accuracy in question design and language.

3.11 Data Management and statistical Analysis:

The Statistical Package for Social Sciences (SPSS 23) was used to enter and analyze data. Add variable frequency and data cleaning. Add Recoding of some variables. Continuous variables (such as age) were presented as means and standard deviations while categorical variables (such as gender) were be presented as frequency and percentages. Likert Scale analysis was used by measuring the mean and weighted mean for all variables related to Knowledge Attitudes and Practice. To measure relationship between KAP and the independent study variables, independent t test was use for 2 categorical independent variables and One-way ANOVAs were used for more than 2 categorical variables to compare the mean scores and assess the relationship between independent variables and knowledge, attitudes, and practices of patients on AMR and use. The Chi-square test was used to assess the association between knowledge, attitudes, and practice. P-value < 0.05 was used to determine statistical significance.

3.12 Limitations

- Financial limitation as there no fund received to conduct this study.
- The incapability to generalize the results to all of Palestine because the sample population will be limited to the southern region of Gaza Strip only**.**

- The sample was selected randomly.

Chapter Four

Results and Discussion

4.1 Demographic data

Four hundred participants contribute in this study with response rate of 97% included different ages, most of them was middle age, followed by younger age, with mean age of 35.45 ± 12.65.

Table 4.1: Distribution of the study population by Demographic data

	No	%
Age group		
≤30	143	35.8
31- 50	201	50.2
>50	56.0	14.0
Total	400	100
Gender		
Male	230	57.5
Female	170	42.5
Total	400	100
Marital status		
Single	101	25.3
Married	260	65.0
Widow	24.0	6.0
Divorced	15.0	3.8
Total	400	100
Educational level		
Primary school or less	23.0	5.80
Secondary school	115	28.7
Bachelor's or more	262	65.5
Total	400	100
Occupation		
Employee	172	43.0
Private work	33.0	8.3
Retired	11.0	2.8
Student	53.0	13.3
No work	131	32.8
Total	400	100
Residency		
Rafah	246	61.5
Khan-Younis	154	38.5
Total	400	100
Refugee status		
Refugee	356	89.0
Non-refugee	44.0	11.0
Total	400	100
Having a relative work in health field		
Yes	229	57.3
No	171	42.8
Total	400	100
Poverty status*		
Sever poverty	134	75.7
Poverty	13.0	7.3
No poverty	30.0	16.9
Total	177	100

* Not all participants responded to this field questions in the questionnaire

There was relatively similar participation between males and females, most of them were married. More than half of participants received bachelor's education or more with percentage of 65.5%. However, 32.8 of participants has no work. More than half (75.5%) of participants were sever poor, under the poverty line. Most of participants were from Rafah than Khan-Younis, and 89% were refugee. About half of participants has relatives work in health field included doctors, nurses, pharmacists, and others.

4.2 Participants' Health status

Table 4.2: Distribution of the study population by participants' health status

Variable	No	%
Having a chronic disease		
Yes	60.0	15.0
No	340	85.0
Total	400	100
Times you got seriously sick last year		
One or less	100	25.0
2-3	179	44.75
More than three	121	30.25
Total	400	100
Consuming antibiotics times last year		
0-1	100	25.0
2-3	177	44.2
More than three	123	30.8
Total	400	100

Fifteen percent of participants have chronic diseases, mostly hypertension and diabetes mellitus. When participants were asked about times they get seriously sick last year, more than third of participants (44.75%) got seriously sick from two to three times, and about third of them got sick more than three times (30.25%) mostly respiratory diseases. When participants was asked about times they consume antibiotics last year, more than third of participants (44.2%) got seriously sick from two to three times, and about third of them got sick more than three times (30.8%).

4.3 Information about antibiotics source

Antibiotics information mostly delivered from health care practitioners and educational classes, and the least from advertising, which seems respectable as people have scientific source of their antibiotics' information instead of advertising, internet, relatives or friends' experiences, which mostly not reliable.

Table 4.3: Information about antibiotics source

Information about antibiotics source	No.	%
Relatives and friends experience	190	47.5
Education classes (school, university …etc)	284	71.0
Health care practitioners	344	86.0
Advertising	129	32.3
Internet	261	65.3

4.4 Knowledge, attitudes, and practices overall means with weighted means

In this study, participants showed good knowledge, attitudes, and practices scores towards antibiotics and antibiotics resistant, with overall weighted means 62.25%, 67.75%, and 61.75% respectively. That may due to good educational level of participants, more than half of them received bachelor's education or more.

Table 4.4: Knowledge, attitudes, and practices overall means with weighted means

Domain	Overall Mean	Over all weighted mean
Knowledge	2.49	62.25 %
Attitudes	2.71	67.75 %
Practice	2.47	61.75 %

4.5 Knowledge

Participants showed good knowledge according to antibiotics and antibiotics resistant, with good overall weighted mean that was 62.25%. Moreover, the knowledge direction, after treating the inverted questions, was (Agree) that equal 3/4, except the item of (knowing what is antibiotics), which was (Strongly agree) direction; the best knowledge was reported for knowing what is antibiotics, what is antibiotic Resistant and for seriousness of incomplete

courses that resulted in decreasing the effectivity of antibiotics if use other times (items 1, 2, and 20). The least knowledge was for the items related to the use of the antibiotics as its uses to treat common cold/flu, and lack of knowledge related to presence or laws and regulations regarding the use of antibiotics (items 5, 8, and 22).

Participants agreed that, antibiotics resistant is a serious global issue, and it can affect their health or their family health negatively. Good knowledge also was found within participants according how antibiotics resistant occurs and antibiotics misuse is one of the causes of its resistant. In addition, participants have good knowledge about antibiotics safety, they agreed that antibiotics not completely safe drugs, they could have serious side effects, they may interact with other drugs or some types of food harmfully, and they have specific storage methods and expiratory date. These finding may due to the good educational level of participants, which may affect their general knowledge about the antibiotics without going for details of the proper use or the legislation for the Antibiotic use. In recent study was conducted in Ethiopia, the participants' mean knowledge score was 13.137 out of a 18 points. Approximately 48% of respondents had a moderate knowledge, 35% had high knowledge, and 17% had low knowledge about antimicrobial resistance and use. Otherwise, 54.5% of participants were aware that antimicrobials were effective against bacteria. In addition, half of the participants (51.5%) agreed that antimicrobials help with cold recovery. About 47% disagree that antimicrobials are effective against the virus (Dejene, Birhanu, and Tarekegn, 2022).

Other study was conducted in Saudi Arabia showed that nearly one third of participants had poor knowledge about antibiotics (30.5%), 54.6% of participants thought antibiotics could be used to treat viral infections, and 55.1% thought it was acceptable to stop taking antibiotics if symptoms start to improve. Moreover, 49% thought that taking antibiotics would help them get better more rapidly when suffering from the common cold (Zaidi, et al, 2021).

In similar study conducted on Romanian population, findings showed that the knowledge of the public in Romania regarding antibiotics effectiveness, mode of action and antibiotic resistance is considerably limited, a significant percentage of the population is quite unsure about the effectiveness of antibiotics on viruses or bacteria, a high percentage of the population found antibiotics to be the solution for most diseases, inappropriately, the general population in Romania often link antibiotics with toothache, flu or cough, only 22.23% of the respondents correctly agreed on the statement "Antibiotics kill bacteria" and nearly half, 49.19%, to the statement "Antibiotics treat the majority of diseases". There was a confusion about the effectiveness of antibiotics on viruses, as only 32.88% correctly disagreed on the statement "Antibiotics treat viral infections", and 37.51% believed that antibiotics treat viral infections and 29.61% were uncertain. Furthermore, the majority of respondents inaccurately agreed on three statements regarding the effectiveness of antibiotics: "Antibiotics reduce pain and inflammation" (52.31%), "Antibiotics significantly reduce fever" (47.27%) and "Antibiotics help a lot with dental pain" (47.12%), and just one third disagreed (31.17%, 30.18% and 31.22%), more than half of participants (53.87%) responded correctly to the statement "Excessive antibiotic use leads to AMR", while those unsure or those who did not agree with this statement were 24.31% and 21.82%, respectively. Good antibiotics safety issues knowledge was found within participants, as 73.77% and 81.77% correctly stated that antibiotics could cause allergies and that antibiotic have side effects, respectively. Good percentage (57.35%) was aware that antibiotic treatment should not be stopped when symptoms have disappeared. However, 24.99% presented an incorrect answer for this statement (Pogurschi, et al, 2022). These results relatively differ what we find in our study, as participants have good knowledge score in all items including the knowing of antibiotics, importance to complete antibiotics courses, ineffectively of antibiotics to treat viral diseases, and other knowledge items.

Many pharmacists, who participated in KII, stated that they notice good knowledge level within public populations when they purchase antibiotics, especially when they discuss with them antibiotics safety issues. One pharmacist stated: "*Most people concern about the antibiotics safety issues, they ask seriously about the right methods of take it, store it, its dose, frequency, and other safety related issues, especially mothers when they inquiry about her child antibiotics managements"*. On the other hand, doctors participated in KII have different opinion as they noticed that public people have poor knowledge about antibiotics that it appears clearly in their practices. On doctor said*:" how does patient know? he knows that antibiotics with incomplete courses lead to its resistant, and in reality, incomplete his antibiotics course? Mostly he does not know enough about antibiotics and it's resistant".*

Table 4.5a: Distribution of the study population by knowledge domains about antibiotics and antibiotics resistant (N=400)

No.	Items	0. SD	1. D	2. N	3. A	4. SA	Mean	Weighted Mean %	K direction and rank
		%	%	%	%	%			
1	I know what is antibiotics	5	9.5	9.5	20	56	3.13	78.25	SA (1)
2	I know what is antibiotics resistant	7.2	6.5	18.5	25.3	42.5	2.89	72.25	A (2)
3	I know of how antibiotics resistant occurs	11.8	9.8	22	29	27.5	2.51	62.75	A(11)
4	Antibiotics use to treat bacterial infections	15.5	9.5	23.8	20.3	31	2.42	60.50	A(14)
5	Antibiotics use to treat viral infection (R)	26.3	11.5	24.3	18.8	19.3	2.07	51.75	A (21)
6	Antibiotics cure all deceases (R)	33.5	12.8	18.8	18.5	16.5	2.28	57	A(18)
7	Antibiotics used to drop fever (R)	35.5	12.8	17.3	14.2	20.3	2.29	57.25	A(17)
8	Antibiotics used to treat common cold/flu (R)	27.3	11.8	21.5	19.5	20	2.06	51.5	A (22)
9	Antibiotics used to treat simple diarrhea (R)	41.3	14.5	16.5	17.3	10.5	2.58	64.5	A(10)

Table 4.5b: Distribution of the study population by knowledge domains about antibiotics and antibiotics resistant (N=400)

No.	Items	0. SD	1. D	2. N	3. A	4. SA	Mean	Weighted Mean %	K direction and rank
		%	%	%	%	%			
10	Antibiotics used to treat skin allergy (R)	34.8	16.3	22.5	17.5	9	2.5	62.5	A(12)
11	The more expensive antibiotics are the more effective (R)	29.8	14.2	18.8	19	18.3	2.18	54.5	A(19)
12	Antibiotics are completely safe drugs (R)	31.5	17.3	19.3	16.3	15.8	2.32	58	A(15)
13	Some antibiotics has serious side effects	13.3	10.8	21.5	22	32.5	2.5	62.50	A(12)
14	Antibiotics may interact with some types of food	11.5	11	19	21.5	37	2.62	65.50	A(7)
15	Antibiotics may interact with other drugs harmfully	10.8	11.3	20	21.8	36.3	2.62	65.50	A(7)
16	Antibiotics have specific storage methods	8.8	9.5	20.8	19.5	41.5	2.76	69.00	A(4)
17	Antibiotics has no expiratory date (R)	48.5	8.5	15.8	12.3	15	2.63	65.75	A(5)
18	antibiotics resistant is serious global issue	11.3	12.3	24	19.5	33	2.51	62.75	A(5)
19	Antibiotics misuse a causes of antibiotics resistance	12.5	9.3	20.8	19.8	37.8	2.61	65.25	A(9)
20	Incomplete courses decrease the effectivity of antibiotics if use other times	7.5	10.8	17.5	21	43.3	2.82	70.50	A (3)
21	Antibiotics resistant can affect negatively on your health or your family health.	18.3	12	20	20.8	29	2.3	57.50	A(16)
22	There are laws and regulations in your country to regulate the use of antibiotics	22.8	11.8	22.3	15.8	27.5	2.14	53.50	A (20)
Overall mean 2.49 overall weighted mean 62.25 SA: strongly agree, A: agree, D: disagree, SD: strongly disagree, (R): reverse question									

4.6 Attitudess

In this study, participants have good weighted attitudes mean of 67.75%. Most attitudes directions, after treating the inverted questions, were (Strongly agree) and (Agree). The beat attitudes found within participants are for the importance of reading the instruction label of antibiotics before use it, the doctor consultations if there any concern about antibiotics

course, and the presence of serious side effects for some types of antibiotics (items 2, 9, and 1), which reflect good safety attitudes towards antibiotics use. One doctor who participated in KII mentioned that:*" many people consult me in some side effect they found in the instruction label of antibiotics, even it is very rare to happen, which reveal good safety attitudes they have towards antibiotics use".*

The participants had (Disagree) direction according the antibiotics consider an expensive drug, the same according the superiority of intravenous (IV) antibiotics than oral types and if the price of antibiotics affect its consumptions and the least attitudes was for believing in effectivity of some types of antibiotics only (items 10, 7, 11, and 8). These findings reflect respectable attitudes that participants have, which may due to the good participants' knowledge.

In similar study was conducted in Ethiopia, more than half of the study participants (53.75%) were found to have positive attitudes, 27.25% had a neutral attitudes, and 19% had a poor attitudes toward antibiotics use and AMR. The mean attitudes score for all participants was 18.06 out of 24 points. Half of the participants agreed with the statement “to finish the course of treatment even if they feel better.” About 35% of them polled agreed that they would seek antibiotics from relatives or friends rather than from health care providers. Conversely, more than half of the participants (60.75%) disagreed with this statement. Similarly, the majority (74%) of respondents had a positive attitudes (disagree) toward the statement, “I prefer to be able to buy antibiotics from the pharmacy without a prescription”, and (21.5%) of participants agreed to do so, while (4.75%) remained uncertain. Moreover, (37%) of participants agreed with the statement: “When I have a minor illness, I prefer to use an antimicrobial and feel better quickly” (19.75%) were unsure, and (43.25%) disagreed (Dejene, Birhanu, and Tarekegn, 2022).

Other study was conducted in Romania a total of 83.32% of the participants agreed with the statement (I use antibiotics according to the instructions for use). More than half of the participants (59.4%) disagreed with the statement (I most often use antibiotics when the symptoms are cold/flu), similarly, 54.23% of respondents showed correct attitudes towards the statement (I most often use antibiotics when the symptoms are related to toothache) by disagreeing. Similar percentages of respondents gave appropriate answers to a question that appeared reformulated in both the knowledge and attitudes sections, which suggests that participants who had adequate knowledge of antibiotics were more likely to also have positive attitudes toward the use of antibiotics. Thirty two percent of participants were unsure if the statement (There are many interactions between antibiotics and food consumed) (Pogurschi, et al, 2022).

Doctor participated in KII mentioned that: *"patients have good attitudes toward antibiotics, as a part of their attitudes toward their health, but this good attitudes don't guarantee proper practice"*.

Both doctors and pharmacists participated in KII noticed that female patients have more positive attitudes toward antibiotics than males.

Table 4.6a: Distribution of the study population by attitudes domains about antibiotics and antibiotics resistant (N=400)

No.	Items	0. SD	1. D	2. N	3. A	4. SA	Mean	Weighted Mean %	A direction and rank
		%	%	%	%	%			
1	I am aware that some antibiotics have serious side effects	7	33	11.8	18.8	54.3	3.05	76.25	SA (3)
2	I am aware that I should read the label of antibiotics instruction before I use it	3.5	30	11.3	18.8	59	3.22	80.50	SA (1)
3	I am aware that some types of antibiotics shouldn't be taken together with some types of food	7.2	29	14.2	25.3	46	2.96	74.00	A(5)
4	I am aware that some types of antibiotics shouldn't be taken together with some types of other drugs	6.8	25	21	20.3	45.8	2.92	73.00	A(6)

Table 4.6b: Distribution of the study population by attitudes domains about antibiotics and antibiotics resistant (N=400)

No.	Items	0. SD	1. D	2. N	3. A	4. SA	Mean	Weighted Mean %	A direction and rank
		%	%	%	%	%			
5	I am aware that antibiotics have specific storage methods	4.8	36	17.3	21.3	47.8	2.98	74.50	A(4)
6	I should pressure the health care provider to add antibiotic in my management plan (R)	34.8	43	21.3	17.3	16	2.3	57.4	A(10)
7	I prefer the IV. Antibiotics than oral one (R)	22.3	40	22	22.8	23	1.86	46.5	D (12)
8	I believe in effectivity of some types of antibiotics only (R)	16	55	23.8	15.8	30.8	1.68	42	D (14)
9	I should consult doctor if there any concern about my antibiotic course	3.8	27	12.3	24.3	53	3.16	79.00	SA (2)
10	Antibiotics are an expensive drug (R)	15	68	29	20	19	1.89	47.25	D (11)
11	The price of antibiotics could affect its consumption (R)	15	62	26.8	21.3	21.5	1.81	45.25	D (13)
12	I aware that regulations in my country will reduce antibiotics misuse use	13.8	36	19	19	39.3	2.61	65.25	A(9)
13	I aware that antibiotics resistant is serious problem all over the world	10.8	38	18.3	21.5	40	2.71	67.75	A(8)
14	I aware there are hazards of that antibiotics resistant that could affect me or my family	11.5	29	18.8	21.8	40.8	2.73	68.25	A(7)
Overall mean 2.71 overall weighted mean 67.75 SA: strongly agree, A: agree, D: disagree, SD: strongly disagree, (R): reverse question									

4.7 Practices:

Good overall weighted mean was found for practices which 61.75%. Practices direction, after treating the inverted questions, was “mostly frequently”, these results reflect generally good practices within participants according using antibiotics, which may due to participants' good knowledge and attitudes towards antibiotics.

In similar study was conducted in Ethiopia, all participants had a mean practices score of 17.96 out of 24 points. About half of the participants had a good practice, 39% had fair practice, and 11.25% had poor practices (Dejene, Birhanu, and Tarekegn, 2022).

- **Distribution of the study population by practices domains**

The consumption of antibiotics domain had the best overall weighted mean which was 68.75 % followed by 61.75% for the safety of antibiotics use domain, general practices of antibiotics use domain came behind by overall weighted mean 60.75%, the least was for antibiotics access domain with 58.75% weighted mean.

Table 4.7: Distribution of the study population by practices domains (N=400)

Practices domain	Overall mean	Overall weighted mean
Access to antibiotics	2.35	58.75
Consumption of antibiotics	2.75	68.75
General Practices of antibiotics use	2.43	60.75
Safety of antibiotics use	2.47	61.75

- **Access to antibiotics**

The practices domain of antibiotics access has the least overall weighted mean which 58.75%. It showed the best practices for getting antibiotics by doctor prescriptions either at hospitals or at private clinics (Items 6 and 7), while the poorest practices which was seldom was for buying antibiotics from pharmacy as the participants needed by themselves or by any one of their family members, getting antibiotics easily when participants want, and storing antibiotics at home (Items 3, 1, and 2). This seems realistic practices follow good knowledge and attitudes.

In similar study conducted in Romania, 78.86% of participants get antibiotics only on the doctor's prescription and over half of the participants (52.73%) always try to have an antibiotic in their houses (Pogurschi, et al, 2022). Other study was conducted in Saudi Arabia

found that 51.0% of participants had used antibiotics without any prescriptions (Zaidi, et al, 2021).

One of the pharmacists who participated in KII states that: *"the access of antibiotics is very easy, as anyone could buy any type of antibiotics, he wants any time even without medical prescriptions"*. One primary health care doctor commented that: *"some patients asked for antibiotics with previous prescriptions and re-asked for antibiotics using the same previous prescriptions"*.

Table 4.8: Practices domain 1 / Access to antibiotics (N=400)

No.	Items	0. N %	1. S %	2. ST %	3. F %	4. A %	Mean	Weighted Mean %	P direction and rank
1	I can get antibiotics easily when I want	23	12.5	13.3	17	34.3	1.73	43.25	S (7)
2	I store some antibiotics in my home	27.3	13.8	16.8	21	21.3	2.05	51.25	S (6)
3	Buy antibiotics from pharmacy as needed by me or any family member	13	11.3	19.5	22.3	34	1.47	36.75	S (8)
4	I get antibiotics from the governmental clinics as described by the physician	8.3	12	17	23	39	2.73	68.25	F (3)
5	I get antibiotics from hospital doctor as described by the treating physician	7.8	12.5	15.5	26	38.3	2.75	68.75	F (2)
6	I get antibiotics from pharmacy by from official prescription from a private doctor.	9.5	9.3	15.3	24.8	41.3	2.79	69.75	F (1)
7	I pressure the healthcare provider to prescribe antibiotics	35.5	14.5	18.5	15	16.5	2.37	59.25	F (5)
8	I get antibiotics from my relatives or friends	42.8	13.8	18	14.5	11	2.63	65.75	F (4)
Overall mean 2.35 overall weighted mean 58.75 N: never, S: seldom, ST: sometimes, F: frequently, A: always									

- **Consumption of antibiotics**

The second practices domain was antibiotics consumptions, which has the highest overall weighted mean of practices domains (68.75%). It revealed good practices also, all items was

frequently occur, with the best for antibiotic consumption regularly at time (Item 5). However, the lowest was for the consumption of the same type of antibiotic every time the participant use it (Item 1).

Table 4.9: Practices domain 2 / Consumption of antibiotics (N=400)

No.	Items	0. N	1. S	2. ST	3. F	4. A	Mean	Weighted Mean %	P direction and rank
		%	%	%	%	%			
1	I consume antibiotics once I feel sick	38.8	18.3	19	10.5	13.5	2.58	64.50	F (5)
2	I consume the same type of antibiotic every time I use it (R)	36	18.3	21	12.5	12.3	2.53	63.25	F (6)
3	I consume antibiotics when my relatives or friends advise me to do (R)	46.3	13.8	19.8	12	8.3	2.78	69.50	F (3)
4	I consume drugs exactly as prescribed by Doctor	8.5	11.3	17.8	18.5	44	2.78	69.50	F (3)
5	Antibiotics consumption is regular exactly by time	6	7	18	19.5	49.5	3	75.00	F (1)
6	When I forget the pill in the morning, I take twice in the evening (R)	52.3	10.5	16.8	11.3	9.3	2.85	71.25	F (2)
Overall mean 2.75 overall weighted mean 68.75 **N :never, S: seldom, ST: sometimes, F: frequently, A: always (R): reverse question**									

- **General practices of antibiotics use**

General practices of antibiotics use domain reflect good practices within participants with overall weighted mean 60.75%. The superior practices were for changing the antibiotics after doctor advice not pharmacists, friends, family members, or either no one, and consulting doctor before starting antibiotics, as well as the reverse item of sharing antibiotics with others (ex. family members or friends (Items 8, 1, and 5). On the other hand, the poorest practices were consulting pharmacist or pharmacy outlet before starting new antibiotics, and consulting specialists if participants use antibiotics for pets or plants (Items 2, 15, and 17), which consider respectable practice.

In study was conducted in Saudi Arabia findings showed that 51.0% of participants had used antibiotics without any doctors' prescriptions (Zaidi, et al, 2021)-link sentences

In similar study was conducted in Romania, findings showed that 10.29% of participants used an antibiotic when they fell sick, with or without prescriptions. According to participants, when they fell sick, more than half of respondents (53.82%) went to see a doctor. Almost one-third (29.92%) reported that they were informed of the symptoms on the Internet. Less than 10% of respondents (8.52 %) said they were based on their own experience when they feel sick. The pharmacists' advice was sought by the fewest participants when they felt unwell (7.74%). Among the participants, 71.79% first went to the doctor following symptoms of a disease and only then used antibiotics. Only 10.39% of respondents considered that the passage of time did not help at all. This population adopted an inappropriate practices of using antibiotics when the symptoms of the disease appeared. They declared that, immediately after the onset of the symptoms of the disease, they used antibiotics (Pogurschi, et al, 2022).

Other Ethiopian study showed that (54.25%) of participants said they always consult a doctor before beginning antimicrobial therapy. However, 10.5% of the participants took antimicrobials without consulting a health professional. Of the study participants, 61.25% always completed the full course of their antibiotics, 16.25% sometimes did, and 22.5% never finished. Additionally, 60.5% of animal owners had never treated their animals with an antibiotic prescribed for humans. However, 28% and 11.5% of participants, respectively, treated their animals with antibiotics prescribed for humans. Half of the participants (50%) confirmed that they always complete the full course of treatment for their animals, 28.25% occasionally, and 21.75% never (Dejene, Birhanu, and Tarekegn, 2022).

Table 4.10: Practices domain 3 / General practices of antibiotics use (N=400)

No.	Items	0. N	1. S	2. ST	3. F	4. A	0. N	Weighted Mean %	P direction and rank
		%	%	%	%	%	%		
1	I consult doctor before starting antibiotics	10.3	6.8	13.8	20.5	48.8	2.91	72.75	F (2)
2	I consult pharmacist or pharmacy outlet before starting antibiotics (R)	12	9.3	21.8	21	36	1.4	35	S (17)
3	I consult my relatives and friends before starting antibiotics (R)	45.5	16.3	18	13.5	6.8	2.8	70	F (5)
4	I do not consult any one before starting antibiotics, Medication (R)	52.8	10.8	16.5	12	8	2.88	72	F (4)
5	I share antibiotics with others (ex. family members or friends) (R)	52.8	13.3	13	13.3	7.8	2.9	72.5	F (3)
6	I complete the antibiotics courses	10.5	10.8	18.8	23.5	36.5	2.65	66.25	F (10)
7	I change antibiotics if I don't feel better (R)	35.3	12.8	19.3	16.8	16	2.34	58.5	F (11)
8	I change the antibiotics after doctor advice	11.8	7	12.8	14.5	54	2.92	73.00	F (1)
9	I stop antibiotics if I feel better (R)	28.7	13	14.8	21.8	21	2.07	51.75	F(14)
10	I save the remaining antibiotics for the next time I get sick (R)	36.5	13.8	15.5	18.8	15.5	2.37	59.25	F (9)
11	I give leftover antibiotics to others (ex. friends and family members) (R)	50.2	13.5	11.5	14	10.8	2.78	69.5	F (7)
12	I use herbs as medicine instead of prescribed drug (R)	26.8	13.3	25.3	16.8	18	2.14	53.5	F (12)
13	I combine herbs with antibiotics (R)	29.8	17.3	20	16.8	16.3	2.27	56.75	F(13)
14	I use antibiotics for pets management (R)	49.3	8.8	16.3	13.8	12	2.69	67.25	F (8)
15	If yes, I do this use after specialized doctor advice	34.8	9.5	19.8	15.5	20.5	1.78	44.50	S (15)
16	I use antibiotics for plants (R)	51.2	9.3	17.3	11.8	10.5	2.79	69.75	F (6)
17	If yes, I do this use after specialist advice	37.3	12.3	16	13.5	21	1.69	42.25	S(16)
Overall mean2.43 overall weighted mean 60.75 N :never, S: seldom, ST: sometimes, F: frequently, A: always, (R): reverse question									

- **Safety of antibiotics use**

The safety domain of practices reflects good practices of antibiotics use among participants with overall mean 61.75%. The best practices were always for checking antibiotics expiry

date before consuming it and for doctor consultation if there is any concern about antibiotics managements (Item 4 and 5), although the poorest was for the reverse items which were consulting pharmacist or consulting family members and friends if the participants have any concern about their antibiotic course (Items 6 and 8).

In similar study was conducted in Romania, findings showed that the pharmacists' advice only influenced 3.84% of the participants according antibiotics use, and the experience of friends/acquaintances in the use of antibiotics influenced a small number of participants, 7% (Pogurschi, et al, 2022).

Table 4.11: Practices domain 4 / Safety of antibiotics use (N=400)

No.	Items	0. N	1. S	2. ST	3. F	4. A	0. N	Weighted Mean %	P direction and rank
		%	%	%	%	%	%		
1	I experienced some side effects after consuming antibiotics	31.5	10.8	18.8	17	22	1.87	46.75	S (10)
2	I check antibiotics side effects before consuming it	9.5	10.5	17.3	22.8	40	2.73	68.25	F (7)
3	I check antibiotics instructions label before consuming it	7.2	9.5	19.3	19.8	44.3	2.9	72.50	F (3)
4	I check antibiotics expiry date before consuming it	9.5	5	15	16.5	54	3.01	75.25	A (1)
5	If I have any concern about my antibiotic course I will consult doctor	10.3	6.5	15	18.3	50	2.91	72.75	F (2)
6	If I have any concern about my antibiotic course I will consult pharmacist (R)	9	9.5	16.3	21.8	43.5	1.19	29.75	S (12)
7	If I have any concern about my antibiotic course I will do internet search about my concern (R)	39.5	10	19.3	17.3	14	2.44	61	F (9)
8	If I have any concern about my antibiotic course I will consult family members and friends (R)	18	11.5	25.5	24	21	1.81	45.25	S (11)
9	I check drug-drug interactions before I consuming antibiotics (ex. from the antibiotic label)	10.8	9	17.5	20.3	42.5	2.75	68.75	F (6)
10	I check drug-food interactions before I consuming antibiotics (ex. from the antibiotic label)	15.8	9.5	20.5	20.5	33.8	2.47	61.75	F (8)
11	I store the antibiotics by the right method shown in its instruction label	7.2	11.3	16.5	19	46	2.85	71.25	F (4)
12	I dispose of the antibiotic by the right method shown in its instruction label	12.5	9.3	12.8	18.3	47.3	2.79	69.75	F (5)
Overall mean2.47 overall weighted mean 61.75									
N :never, S: seldom, ST: sometimes, F: frequently, A: always, (R): reverse question									

4.8 Inferential Statistics:

4.8.1 Relationship between participants' knowledge, attitudes and their practice.

There is a positive association between participants' knowledge and their attitudes according to antibiotics, which is statistically significant association with p value of <0.001, as participants' knowledge increase, their attitudes will be improved. The same was found in Abu Taha study, they stat that a significant positive correlation was between participants' knowledge scores and participants' attitudes scores towards antibiotic use (R = 0.344, P = 0.001) (Abu Taha, et al 2016). Similarly, the association between participants' attitudes and their practice, there is statistically significant positive association with p value of .000. Participants' knowledge also has positive association with their practices about antibiotics with p value of <0.001, it seems as a series, as participants' knowledge increase, their attitudes will rise leading to practices improvement. In similar study was conducted in Ethiopia there was a significant relationship between participants' knowledge and attitudes ($p \leq 0.01$), knowledge and practices ($p \leq 0.01$), and attitudes and practices ($p \leq 0.01$) (Dejene, Birhanu, and Tarekegn 2022). In the other hand other study was conducted in Romania found that there is no correlation between practices and knowledge regarding antibiotic use and antibiotic resistance but, overall, participants who had less proper knowledge were more likely to have improper attitudes toward antibiotic use (Pogurschi, et al, 2022).

Table 4.12: Correlations between participants' knowledge, attitudes and their practices

Items	Correlation	P value
Knowledge - Attitudes	.62	.000
Knowledge - Practice	.49	.000
Attitudes - Practice	.57	.000

4.9 Factors affect participants' knowledge

Socioeconomic and sociodemographic variables

Table 4.13 shows the relationship between knowledge and Socioeconomic and sociodemographic variables. The knowledge overall score has different associations with the sociodemographic participants' characteristics. Mid-age participants have the highest knowledge compared to younger and older age groups, which may because their active engagements in their societies activities rather than younger or older groups. However, this difference in age group knowledge has no statistically significant value. These findings differ what found in similar study conducted on Romanian population, which found that that older people appear to have more accurate knowledge than younger people, The most significant difference was observed in the 55–64 age group, which was approximately 4 times less likely (p-value = 0.014) to have inaccurate knowledge of antibiotics compared to people between 18–24 years old (Pogurschi, et al, 2022). As we have relatively equal education chances for both genders, there was slight differences between male and female knowledge, which also do not reach statistically significant p value, Pogurschi and his team found other results showed that women were approximately twice less likely (p-value < 0.001) than men to have inaccurate knowledge of antibiotics and antibiotic resistance (Pogurschi, Petcu C, et al, 2022). According to marital status, the highest knowledge found whiten married participants. As expected, participants with advanced education, have higher knowledge score with statistically significant p value .001, the same was found in Romanian study, which found that higher levels of education were significantly associated with a reduced likelihood of having poor knowledge about antibiotics and antibiotic resistance. People who had a postgraduate education were approximately 10 times less likely (p-value < 0.001) to have poor knowledge compared to people who only had a secondary education (Pogurschi , et al, 2022). The occupation also has significant differences, p value < 0.001,

the employee participants have the highest knowledge. According to poverty situation, the knowledge within those who suffer severe poverty and poverty less than non-poor participants with significant p value of 0.022. The same was found in study conducted in Jordan, participants with superior education and better income were generally more knowledgeable about appropriate antibiotics use and its resistance than those with lower educational level and less income (Yosef, et al, 2018). The literature evaluation indicates that poverty and material deprivation are significant risk factors for antibiotic misuse and resistance. The majority of investigations discovered a correlation between lower socioeconomic indicators and increased antibiotic resistance rates. In univariate (p 0.01) and multivariate analyses (p 0.01), there is a small but consistent negative association between socioeconomic factors and overall antimicrobial resistance (Allel, et al., 2020). In African studies, a medium income was associated with 19% greater odds of antibiotic storage (OR 1.19) and 18% greater odds of any form of antibiotic misuse (OR 1.18). High wealth was related with a 51% reduced likelihood of antibiotic non-adherence (OR 0.49). In upper-middle wealth countries, high income was also associated with an 11% increase in the odds of any antibiotic misuse (OR 1.11) (Mallah, et al, 2021).

In similar Ethiopian study, participants' knowledge level was significantly attributable to many sociodemographic characteristics, including education level ($p < 0.01$), marital status ($p < 0.01$), occupation ($p < 0.01$), house ownership ($p = 0.01$) and position in the house ($p < 0.01$). (Dejene, Birhanu, and Tarekegn, 2022).

In Abu Taha and his colleagues' study they found that participants with a high family income were more likely to be aware of appropriate antibiotic use than participants with a low family income (P-value <0.001) (Abu Taha, et al, 2016). The same was found in study conducted in Jordan, participants with better income were generally more knowledgeable about appropriate antibiotics use and its resistance than those with lower educational level and less income (Yosef, et al 2018). The same was found in other study, where there was an association between a higher monthly income and a better level of knowledge (Mazi´nska, Struzycka, and Hryniewicz, 2017) (Nepal, et al, 2019).

Different finding Pogurschi and his team found in their study, they found that statistically significant difference between people earning more monthly to those earning less monthly, people earning more income having an increased likelihood (p-value = 0.036) to have less accurate knowledge about antibiotics and antibiotic resistance (Pogurschi, et al, 2022)

In study was conducted in Saudi Arabia, findings showed that participants' personal characteristics were significantly associated with the public's knowledge (e.g., age, education, and monthly income) (Zaidi, et al, 2021).

People live in Khan-Younis and Rafah has the same knowledge, but it differs according to participants' citizen, the knowledge is more in non-refugee than refugee with significant p value (0.023), while Pogurschi and his team found that there were no significant differences noticed in terms of civil status of participants (Pogurschi, et al, 2022).

Table 4.13: Relationship between Knowledge and sociodemographic variables

Categorical independent variable	n	mean (SD)	t	F	p-value
Age (years)					
≤30	143	2.41		2.027	0.113
31-50	201	2.54			
>50	56	2.47			
Gender					
Female	170	2.47	.419	3.936	0.676
Male	230	2.49			
Marital state					
Single	101	2.39		1.562	0.198
Married	260	2.53			
Widow	24	2.49			
Divorced	15	2.34			
Education					
Primary or less	23	2.4		8.342	0.000
Secondary	115	2.31			
BA. Or more	262	2.57			
Occupation					
Employee	172	2.7		10.689	0.000
Private work	33	2.33			
Retired	11	2.35			
Student	53	2.33			
Non work	131	2.48			
Poverty status					
Sever poverty	134	2.41		3.88	0.022
Poverty	13	2.39			
Non poverty	30	2.74			
Residency					
Khan-Younis	154	2.48	.065	1.208	0.948
Rafah	246	2.48			
Refugee Status					
Refugee	356	2.46	-2.28	.080	.023
Non refugee	44	2.67			
Relative work in health					
Yes	229	2.48	-.236	2.11	.814
No	171	2.49			

Relationship between participants' knowledge and participants' health status.

Table (4.14) shows the relationship between participants' knowledge and participants' health status. The participants with chronic diseases and participants without have relatively the same knowledge about antibiotics, and the similar about knowledge comparing with times participants got seriously sick last year. In Panagakou and his group study, it found that being

without experience in recurrent URTIs were significantly associated to inadequate knowledge about antibiotics (Panagakou, et al, 2012). However, participants used antibiotics more than three times last year has highest knowledge about antibiotics than other participants use it less, as they might had received doctors or pharmacists' advices and recommendation about their antibiotic courses.

In systemic review study, 24 study were included in the meta-analyses, there was a lack of knowledge about antibiotics, as 33.7% of the sample did not know that antibiotics can treat bacterial infections, and 53.9% of them did not know that antibiotics are not useful against viruses. While 59.4% of the sample was aware of antibiotic resistance, 26.9% of them did not know that misuse of antibiotics leads to antibiotics resistant. Moreover, 47.1% of the participants would not complete their antibiotics courses when they start feeling better (Gualano, 2014).

Table 4.14: Relationship between knowledge and participants' health status.

Categorical independent variable	n	mean (SD)	t	F	p-value
Have chronic disease					
Yes	60	2.49	.117	2.45	.907
No	340	2.48			
Times got seriously sick last year					
One or less	100	2.49		.046	.955
2-3	179	2.47			
4 or more	121	2.49			
Times of Anti biotic use last year					
One or less	95	2.55		2.29	.102
2-3	284	2.45			
>3	21	2.68			

4.10 Factors affect participants' attitudes

Socioeconomic and Sociodemographic variables

Table 4.15 shows the relationship between attitudes and Socioeconomic and sociodemographic variables. The attitudes overall score has different relations with the sociodemographic participants' characteristics. As knowledge, mid-age participants have the highest attitudes compared to younger and older age groups with no statistically significant p value, which also may because their engagements in social activities more than other groups, gaining better knowledge lead to better their attitudes towards antibiotics and its resistant. Females has more attitudes than males with statistically significant p value of .021. According to marital status, the highest attitudes found whiten widow participants and the same for participants received primary education or less with no statistically significant p value. Conversely, the attitudes differences compared to participants' occupation, p value .000, the employee participants have the more attitudes than others do. The non-poor participants have better attitudes than those suffer poverty or severe poverty. Simmerer findings were found in study conducted in Palestine, participants with a higher educational level, university, had a good attitudes towards antibiotic than those with a less education with significant P-value <0.001. In addition, participants with a higher income were more aware of proper antibiotic use than participants with lower income with significant P-value <0.001 (Abu Taha, et al, 2016). Other study participants' practices levels were also significantly associated ($p < 0.05$) with their educational level and occupation (Dejene, Birhanu, and Tarekegn, 2022). Other study showed that participants' attitudes toward antibiotics were also significantly difference ($p < 0.05$) according to their educational level, marital status, occupation, and position in their houses (Dejene, Birhanu, and Tarekegn, 2022)

In study was conducted in Saudi Arabia, findings showed that participants' personal characteristics were significantly associated with the attitudes (e.g., monthly income) (Zaidi, et al, 2021). In Similar study was conducted in Romania, finding showed that middle age group has better attitudes than other age groups, and females found to be less likely to have improper attitudes compared to males, moreover people with higher levels of education were less likely to have proper attitudes compared to those with the lowest level of education. Single people were approximately twice as likely (p-value = 0.001) than married people to have poor attitudes towards antibiotics use. Similar was observed for levels of income, with people with higher levels of income found to be more likely to have improper attitudes towards antibiotic consumption than people with the lowest income level (Pogurschi, et al, 2022).

Participants live in Khan-Younis and Rafah have faintly different attitudes towards antibiotics use, but non-refugee participants have more attitudes than refugees with statistically significant p value of .025. Participants have relative work in health field have the same attitudes compared to those have not.

Table 4.15a: Relationship between attitudes and sociodemographic variables

Categorical independent variable	**n**	**mean (SD)**	**t**	**F**	**p-value**
Age (years)					
≤30	143	2.54			
31-50	201	2.61		2.3	.102
>50	56	2.43			
Gender					
Female	170	2.63	-2.31	.	.021
Male	230	2.5		.917	
Marital state					
Single	101	2.54			
Married	260	2.56		.432	.730
Widow	24	2.67			
Divorced	15	2.49			

Table 4.15b: Relationship between attitudes and sociodemographic variables

Education					
Primary or less	23	2.61		2.17	.115
Secondary	115	2.47			
BA. Or more	262	2.59			
Occupation					
Employee	172	2.73		7.75	.000
Private work	33	2.4			
Retired	11	2.36			
Student	53	2.49			
Non work	131	2.43			
Poverty status					
Sever poverty	134	2.56		2.15	.119
Poverty	13	2.41			
Non poverty	30	2.74			
Residency					
Khan-Younis	154	2.59	-1.52	.058	.127
Rafah	246	2.51			
Refugee status					
Refugee	356	2.54	.389	-2.25	.025
Non refugee	44	2.73			
Relative work in health					
Yes	229	2.56	.403	-.09	.929
No	171	2.56			

Relationship between participants' attitudes and participants' health status

Table 4.16 shows the relationship between participants' attitudes and participants' health status. The participants with chronic diseases and participants without have relatively the same attitudes about antibiotics, and the similar for attitudes comparing with times participants got seriously sick last year. In Panagakou and his group study, they found that being without experience in recurrent URTIs were significantly associated to inappropriate attitudes towards antibiotics (Panagakou, et al, 2012) However, participants used antibiotics more than three times last year has highest attitudes about antibiotics than other participants use it less, as they have better knowledge as mentioned before.

Table 4.16: Relationship between attitudes and participant health status.

Categorical independent variable	n	mean (SD)	t	F	p-value
Have chronic dx					
Yes	60	2.53	.226	-.444	.657
No	340	2.56			
Times got seriously sick last year					
One or less	100	2.56		.136	.873
2-3	179	2.54			
4 or more	121	2.58			
Times of Ab use last year					
One or less	95	2.54		2.98	.051
2-3	284	2.54			
>3	21	2.84			

4.11 Factors affect participants' practices

Socioeconomic and sociodemographic

Table 4.17 shows the relationship between practices and Socioeconomic and sociodemographic variables. The practices overall score has different associations with the sociodemographic participants' characteristics. As knowledge and attitudes, mid-age participants have better practices compared to younger and older age groups with no statistically significant p value, which may be as result of having good knowledge and attitudes lead to well practices in this age group. In similar study, older age group of participants had improper practices towards antibiotics comparing to younger age groups, despite their better knowledge about antibiotics and antibiotic resistant (Pogurschi, et al, 2022). Moreover, females have superior practices than males with statistically significant p value of .041, which also may consequence of the better attitudes among females than males. In addition, one doctor said: *"Females patients asking and consulting more when they had prescribed antibiotics and they are more compliance to their antibiotics management".*

The practices also found better in married participants more than widow, single or divorced groups. Unexpectedly, participants received primary education or less have better practices than those have advanced education with statistically significant p value of .017, some

doctors and pharmacists explain this finding by that patients have poor education have more compliance to their advices than those received advanced education. However, in other study was conducted to assess self-medication in developing country, the Self-medication was found to be significantly correlated with the lower educational level (P = .036), while the socioeconomic status, gender and age did not associate with self-medication (Jamhour, et al, 2017).

Table 4.17: Relationship between practices and sociodemographic variables

Categorical independent variable	n	mean (SD)	t	F	p-value
Age (years)					
≤30	143	2.42		1.067	.345
31-50	201	2.5			
>50	56	2.46			
Gender					
Female	170	2.53	-2.04	.233	.041
Male	230	2.42			
Marital state					
Single	101	2.40		.972	.406
Married	260	2.50			
Widow	24	2.47			
Divorced	15	2.36			
Education					
Primary or less	23	2.66		4.1	.017
Secondary	115	2.36			
BA. Or more	262	2.49			
Occupation					
Employee	172	2.63		8.56	.000
Private work	33	2.26			
Retired	11	2.25			
Student	53	2.3			
Non work	131	2.39			
Poverty status					
Sever poverty	134	2.43		3.16	.045
Poverty	13	2.52			
Non poverty	30	2.66			
Residency					
Khan-Younis	154	2.39	.052	-2.35	.019
Rafah	246	2.52			
Refugee status					
Refugee	356	2.46	.006	-.611	.541
Non refugee	44	2.51			
Relative work in health					
Yes	229	2.45	.573	-.566	.571
No	171	2.48			

The practices difference compared to participants' occupation has statistically significant p value of .000, the employee participants have the better practices than others do. The non-poor participants have better practices than those suffer poverty or severe poverty with statistically significant p value of .045, different results were found by Pogurschi and his team in their study that did not show a direct association between monthly income and proper practices (Pogurschi, et al, 2022). Participants live in Rafah have well practices than Khan-Younis participants, p value .019, and non-refugee participants have better practices than refugees. Participants have relative work in health field relatively have the same practices compared to those have not.

In similar Ethiopian study, participants' education level ($p < 0.01$) and occupation ($p < 0.01$) had a significant influence on their practices level toward antibiotics use (Dejene, Birhanu, and Tarekegn, 2022).

Participants' health status.

Table 4.18 shows the relationship between participants' practices and participants' health status. The participants with chronic diseases and participants without have relatively the same practices according to antibiotics, but people got sick less last year has better practices others got sick more with statistically significant p value of .033. This difference was also showed in Panagakou and his group study, they found that being without experience in recurrent URTIs were significantly associated to wrong practices (Panagakou, et al, 2012). Participants use antibiotics one time or less last year have relatively the same practices as others use it three times or more.

Table 4.18: Relationship between practices and participant health status.

Categorical independent variable	n	mean (SD)	t	F	p-value
Having chronic diseases					
Yes	60	2.48	.630	.232	.802
No	340	2.46			
Times got seriously sick last year					
One or less	100	2.56		3.43	.033
2-3	179	2.47			
4 or more	121	2.37			
Times of antibiotics use last year					
One or less	95	2.56		2.56	.078
2-3	284	2.43			
>3	21	2.54			

4.12Doctor effect on antibiotics prescriptions

Ten KIIs were conducted with ten doctors, most of them state there are misuse in antibiotics prescription among doctors, especially new doctors, lots of them may prescribe antibiotics when it is not needed or use broad-spectrum antibiotics for minor infections due to different causes include uncertainty of diagnosis, fear of complications, or patients' pressure. According to patient characteristics that could affect doctor antibiotics prescription decision, which mainly patients age, comorbidity, and socioeconomic status. Older patients have higher chance to get unneeded antibiotic prescriptions, the same for patients with chronic diseases and low socioeconomic status. For example, one doctor justified his antibiotics prescription to patient as: *"he is known patient for us, has asthma, even he had URTI, I will give him antibiotic course, fearing of complication Moreover the patient will be not satisfied if there is no antibiotics in their management plan, and will seek the management from other sources"*. General practitioners frequently assert that the patients they have seen are exceptional and require antibiotics. In reality, clinicians believe that antibiotic use is linked to a speedier recovery or is necessary because the patient has a coexisting condition such as

asthma, chronic lung disease, smoking, or purulent sputum. Doctors rarely estimate the antibiotics safety when prescribe it, except the most common and serious safety issues, and they try to build good communications with patients about management plan when it contains antibiotics, explain why it sometimes not needed, and discuss its alternatives. In doctor- patient communication, educational role to their patient according to antibiotics use and the complication consequences after its misuse is very essential, but some doctors said: "*There is no time for patients' education, it may be the role of nurses to explain the alternatives of antibiotics to patients and how antibiotics resistant follow its misuse*"

According to study conducted in Palestine, physicians have good knowledge and attitudes scores (39.6%) and 194 (61.4%), respectively. More than half (58.2%) had good antibiotic prescription practices. Females reported significantly more favorable practices than males. It also showed that knowledge about antibiotic prescriptions had a considerable influence on changing their practices. Conversely, physicians' attitudes toward antibiotic prescriptions did not have a significant role in determining their practices. Most of the physicians were knowledgeable about what follow improper usage of antibiotics and how it can lead to antimicrobial resistance. More than two-thirds of physicians avoiding unneeded antibiotics prescriptions. The same also was showed in practicing antimicrobial stewardship where the majority used a conservative approach with many antibiotics prescribed or did not prescribe due to patient pressure (Maraqa, et al, 2023).

4.13Pharmacists effect on antibiotics prescriptions

Ten KIIs were conducted with ten pharmacists, whose show that most patients seek antibiotics by doctors' prescriptions, even governmental or private doctors, but some patients seek antibiotics without doctor prescriptions and pharmacists would deliver antibiotics to them. Eight of ten pharmacists said: *"I will sell people antibiotics, even they haven't doctor prescriptions"*. Other pharmacists stated *"The patients sometimes asking managements for*

their symptoms, which mostly respiratory symptoms, and I will give them antibiotics if I feel they need, even without clinical examination or any investigations". A systemic review and meta-analysis study showed that the proportion of non-prescription supply of antibiotics was 62%, the proportion of non-prescription supply of antibiotics following a patient request was 78% and based on pharmacy staff recommendation was 58%. Antibiotics were usually provided without a prescription to patients with symptoms of urinary tract infections (68%) and upper respiratory tract infections (67%) (Auta, et al, 2019) However, why some patient asking managements from pharmacists instead of doctors? One pharmacist explain it by "*Patients feel this practices easier and spreader, not for economic causes".* That seem realizable, as the access to governmental or non-governmental medical services is relatively inexpensive in Gaza Strip comparing to other countries. According to study conducted in Saudi Arabia, lack of patient readiness to consult a doctor for a non-serious infection (69.9%) and an incapability to afford a consultation with a doctor (65.3%) were the most common reasons for asking antibiotics from pharmacists without doctor prescriptions. There was statistically significant association between the number of antibiotics dispensed and educating patients about the importance of adherence and completion of the full course of antibiotics ($p = 0.007$) (Abdul Hadi, et al, 2016). Conversely to doctors, pharmacists estimate the antibiotics safety when selling antibiotics and clarify it to the patients, including the dose, time, drug-drug interaction, drug food interaction, and other safety issues.

Generally, Pharmacists and health care providers may play a role in the overuse of antibiotics. According to the WHO, pharmacists are among the best positioned to influence the proper use of antibiotics and, thus, have a vigorous role in AMR together with physicians, who are responsible for the unseen portion of the AMR issue (WHO, 2014).

4.14Regulation and lows effect on antibiotics prescriptions

Palestinian ministry of health has developed antimicrobial stewardship to regulate antimicrobial use. However, doctors contribute in KIIs do not know about it, or received training related to it. Similarly, there are Palestinian lows for pharmacists regulate their selling antibiotics, but pharmacists rarely commit these lows and they would be selling antibiotics to patients without doctor prescriptions. Both doctors and pharmacists stated that there is no oversight and monitoring for prescribe or buy any type of antibiotics. According to study conducted in Saudi Arabia, 200 community pharmacists more than two-thirds (70.5%) of the pharmacists were not aware that selling antibiotics without medical prescription is illegal practices (Abdul Hadi, et al, 2016).

In Gaza Antibiotics are often used for the purpose of self-treatment. In a number of different other countries, antibiotics for both humans and animals are accessible on the free market, but this phenomenon is not occurring in Gaza, antibiotics buying just from pharmacy or getting free from primary care clinics.

Chapter Five

Conclusions and Recommendations

5.1 Conclusions

This study help to assess public knowledge, attitudes, and practices about to antibiotics and antibiotics resistant in sought area of Gaza Strip, Rafah and Khan-Younis, which were found relatively good and diverse according to some socioeconomic and sociodemographic factors such age, gender, educational level…etc. Moreover, this study shows the effects of health care provider and pharmacists on antibiotics consumption in the presence of non-applied lows and regulations that insert to control antibiotics delivering and purchasing. In addition, it will provide further insight to encourage essential messages to rationalize antibiotic use by giving attention towards antibiotics knowledge and attitudes, which lead to practice. This should occur in the cooperation of several parts, health care providers, pharmacists, decision-makers, and public people. Everyone has a role to do in his place to rationalize antibiotics use. First of them the education for both health care provider and patients. According to doctor education, especially new doctors, it should include antibiotics types and its broad level and which types using against which bacterial infections, and promoting the dangerous of antibiotics resistant that already found, with other important topics, in the Palestinian National Action Plan for Antimicrobial Resistance (National Action Plan for Antimicrobial Resistance 2020-2024), that all doctors should receive training about it.

Effective Doctors communication skills should also improve to encourage the doctor- patient communication that help positively to reduce patients' pressure on health care provider to prescribe antibiotics and decrease the inappropriate antibiotics prescriptions. Side by side, the patients and public people should receive education to improve their knowledge and attitudes about antibiotics, its use, how the antibiotics misuse leads to antibiotics resistant,

and antibiotics consumption safety issues. Once the public knowledge and attitudes about antibiotics improve, their practices will improve respectively as this study finding showed.

The educational effort will be easier if the decision and policy maker contribute in it by encourage community companies including educational lectures in schools, hospitals, public places and others. One thing more needs to reduce antibiotics misuse which activation of the lows and regulations that regulate antibiotics prescribing and selling. Antibiotics misuse is a global serious issue, all of us should collaborate hand by hand to prevent its consequences, including the most dangerous one of them, which is antibiotics resistant.

A number of organizations and agencies should work together to prevent AMR. These stakeholders include MoH, Ministry of Agriculture, Ministry of Education, Ministry of Higher Education, Ministry of Local Governments and Environment authority, universities and teaching institutions, international agencies like UNRWA and WHO, Private Sectors like Humans and Animals health sector (Hospitals and laboratories), and Palestine Red Crescent Society (PRCS) and other related NGOs (National Action Plan for Antimicrobial Resistance 2020-2024).

5.2 Recommendations

For decision maker

1. To apply strict regulations and policies for antibiotics purchasing in pharmacies.
2. To rise knowledge and awareness about antibiotics among the public by conducting community campaigns to increase public knowledge and awareness about antibiotic use, risk of its misuse, and the antibiotics resistant.
3. To use the media for sending messages within public people, which targeted those, have little knowledge, poor attitudes and undesirable practices towards antibiotics.
4. To engage the related stakeholders to apply Palestinian National Action Plan for Antimicrobial Resistance 2020-2024 in Palestine, Policymakers and stakeholders should promote and invest in implementing these programs as an essential component of their healthcare systems.
5. To educate doctors on Palestinian National Action Plan for Antimicrobial Resistance 2020-2024.
6. To ensure easy healthcare access for doctors' consultations to decrease patients self-medication.
7. To encourage conducting more research studying AMR in Gaza Strip.
8. To conduct further research to study knowledge, attitudes and practices towards antibiotics in south area of Gaza Strip and others areas.

For health care provider

9. To contribute in health educational programs for health care providers about antibiotics, and its prescription to rationalize its use and decrease its inappropriate use.
10. To improve doctors-patients communications, which play essential role in decreasing inappropriate antibiotics prescriptions.
11. To conduct auditing and research about antibiotics prescriptions and purchasing in the healthcare facilities, and pharmacist.

For lay people

12. To stop self- mediation by antibiotics.
13. Not to purchase antibiotics without doctor prescriptions.
14. To educate on the alternatives of antibiotics self-medication.
15. To participate in educational and awareness activities about antibiotics.
16. To be more compliance with health care provider advices according antibiotics doses, frequency, safety issues, and others.
17. Not to pressure health care provider to prescribe them antibiotics.

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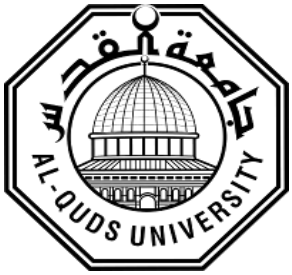
Annexes

Annex 1: English form of Questionnaire



Questionnaire

Study title: Lay people knowledge, attitudes and practices about antibiotics use and resistant in the southern area of the Gaza Strip

Dear participant in this study,

This research purpose to investigate the lay people knowledge, attitudes and practices about antibiotics use in the southern area of the Gaza Strip, and it is part of the requirements for graduation from the Master of Public Health/ Epidemiology Program at Al-Quds University. Therefore, I invite you, the researcher Maha Sadat Sobhi Alfaqawi, to participate in this research, by answering the questionnaire. Finally, be sure of that participation in the research is voluntary with complete confidentiality about the identity of the person who filled out the questionnaire in this research. We would also like to inform you that the analysis of the data would be in general manner, not individually.

We are very grateful for you to participate in this research

Researchers: Maha Sadat Sobhi Alfaqawi

Supervisor: Prof. Dr. Yehia Abed

Serial no.	

Demographic date

Age (years)			
Gender	Male	Female	
Marital status	○ Single ○ Married ○ Divorced ○ Widow		
Educational level	Primary school or less	Secondary school	B.A or more
Occupation	○ Employee ○ Private work ○ Retired ○ Student ○ Non-work		
Residency	Khan-Younis	Rafah	
Citizen	Refugee	Non-refugee	
Have you any family member working in health sector	Yes	No	
Monthly income (ISH)			

Morbidity status

Have you any chronic disease	Yes	No				
If yes, , please mention Ex. DM. HTN, CKD, CVD, …etc						
During the last year, how many times you get sick seriously?	□ 1 □ 2 □ 3 □ More					
Most common diseases I have (excluding the NCDs mentioned)	URTI	UTI	Skin disease	GI. Diseases	Fever	Other
How many times you consumed antibiotic last year	□ 1 □ 2 □ 3 □ More					

Please, fill the following statements (0 to 4) according to your answer
(Zero means totally disagree, never, while four means always or totally disagree)

Knowledge

Q		0	1	2	3	4
1	I know what is antibiotics					
2	I know what is antibiotics resistant					
3	I am aware of how antibiotics resistant occurs					
4	Antibiotics use to treat bacterial infections					
5	Antibiotics use to treat viral infection					
6	Antibiotics cure all deceases					
7	Antibiotics used to drop fever					
8	Antibiotics used to treat common cold/flu					
9	Antibiotics used to treat simple diarrhea					
10	Antibiotics used to treat skin allergy					
11	The more expensive antibiotics are the more effective					
12	Antibiotics are completely safe drugs, have no side effects					
13	Some antibiotics has serious side effects					
14	Antibiotics may interact with some types of food harmfully					
15	Antibiotics may interact with other drugs harmfully					
16	Antibiotics have specific storage methods					
17	Antibiotics has no expiratory date					
18	antibiotics resistant is serious global issue					
19	Antibiotics misuse consider a causes of antibiotics resistance					
20	Antibiotics incomplete courses decrease the effectivity of antibiotics if use other times					
21	Antibiotics resistant can affect negatively on your health or your family health.					
22	There are laws and regulations in your country to regulate the use of antibiotics					

Attitudes

Q		0	1	2	3	4
1	I am aware that some antibiotics have serious side effects					
2	I am aware that I should read the label of antibiotics instruction before I use it					
3	I am aware that some types of antibiotics shouldn’t be taken together with some types of food					
4	I am aware that some types of antibiotics shouldn’t be taken together with some types of other drugs					

5	I am aware that antibiotics have specific storage methods					
6	I should pressure the health care provider to add antibiotic in my management plan					
7	I prefer the IV. Antibiotics than oral one					
8	I believe in effectivity of some types of antibiotics only					
9	I should consult doctor if there any concern about my antibiotic course					
10	Antibiotics is an expensive drugs					
11	The price of antibiotics could affect its consumption					
12	I am aware that regulations in my country will reduce antibiotics misuse use					
13	I am aware that antibiotics resistant is serious problem all over the world					
14	I am aware there are hazards of that antibiotics resistant that could affect me or my family					

Practices

Q		0	1	2	3	4
Access to antibiotics						
1	I can get antibiotics easily when I want					
2	I store some antibiotics in my home					
3	I buy antibiotics from pharmacy as needed by me or any family member					
4	I get antibiotics from official UNRWA clinics as described by the physician					
5	I get antibiotics from the governmental clinics as described by the physician					
6	I get antibiotics from hospital doctor as described by the treating physician					
7	I get antibiotics from pharmacy by from official prescription from a private doctor.					
8	I pressure the healthcare provider to prescribe antibiotics in my management plan					
9	I get antibiotics from my relatives or friends when I or a family member is sick					
Consumption of antibiotics						
10	I consume antibiotics once I feel sick					
11	I consume the same type of antibiotic every time I use it					
12	I consume antibiotics when my relatives or friends advise me to do					

13	I consume drugs exactly as prescribed by the treating Doctor					
14	My antibiotic consumption is regular exactly by time					
15	When I forget the pill in the morning I take twice in the evening					
General Practicesof antibiotics use						
16	I consult doctor before starting antibiotics					
17	I consult pharmacist or pharmacy outlet before starting antibiotics					
18	I consult my relatives and friends before starting antibiotic					
19	I do not consult any one before starting antibiotics, self-medication					
20	I share antibiotics with others (ex. Family members or friends)					
21	I complete the antibiotics courses					
22	I change antibiotics if I don't feel better					
23	I change the antibiotics after doctor advice					
24	I stop antibiotics if I feel better					
25	I save the remaining antibiotics for the next time I get sic					
26	I give leftover antibiotics to others (ex. Friends and family members)					
27	I use herbs as medicine instead of prescribed drug					
28	I combine herbs with antibiotics					
29	I use antibiotics for pets management					
30	If yes, I do this use after specialized doctor advice					
31	I use antibiotics for plants					
32	If yes, I do this use after specialist advice					
Safety of antibiotics use						
33	I experienced some side effects after consuming antibiotics					
34	I check antibiotics side effects before consuming it					
35	I check antibiotics instructions label before consuming it					
36	I check antibiotics expiry date before consuming it					
37	If I have any concern about my antibiotic course I will consult doctor					
38	If I have any concern about my antibiotic course I will consult pharmacist					
39	If I have any concern about my antibiotic course I will do internet search about my concern					
40	If I have any concern about my antibiotic course I will consult family members and friends					
41	I check drug-drug interactions before I consuming antibiotics (ex. From the antibiotic label)					

42	I check drug-food interactions before I consuming antibiotics (ex. From the antibiotic label)					
43	I store the antibiotics by the right method shown in its instruction label					
44	I dispose of the antibiotic by the right method shown in its instruction label					

Antibiotics information resources

		Yes	No
1	I get my information about antibiotics from education classes (school, university…etc.)		
2	I get my information about antibiotics from my relatives and friends (their experience)		
3	I get my information about antibiotics from healthcare practitioners (doctors, nurses, …etc)		
4	I get my information about antibiotics from advertising		
5	I get my information about antibiotics from Internet		

Thanks for participation

Annex 2: Arabic form of Questionnaire

استبانة

معرفة وتوجهات وسلوكيات العامة في استخدام المضادات الحيوية وكذلك مقاومة المضادات الحيوية في المناطق الجنوبية من قطاع غزة

Lay people knowledge, attitudes and practices about antibiotics use and resistant in the southern area of the Gaza Strip

عزيزي المشارك في هذه الدراسة، السلام عليكم ورحمة الله،

أنا الطالبة/ **مها سعدات صبحي الفقعاوي** ، طالب ماجستير في كلية الصحة العامة جامعة القدس/ مسار علم الأوبئة. أنا أعمل على أطروحة الماجستير الخاصة بي والتي تعد مطلبًا لإكمال برنامج الماجستير في الصحة العامة.

هذا البحث يهدف الى قياس مدى معرفة وتوجهات وسلوكيات العامة في استخدام المضادات الحيوية وكذلك مقاومة المضادات الحيوية في المناطق الجنوبية من قطاع غزة. لذلك أدعوك للمشاركة في هذا البحث عن طريق إجابة أسالة الاستبانة.

وأخيراً، نود أن ننوه الى أن المشاركة في هذه الدراسة طوعية وأن السرية التامة حول هوية الشخص الذي قام بتعبئة الاستبانة مضمونة في هذا البحث. كذلك نود إعلامكم بان معالجة المعلومات ستكون بشكل عام وليس بشكل خاص .

ونتقدم بجزيل الشكر والامتنان لإقرارك بالمشاركة في هذا البحث

الباحثة: د. **مها سعدات صبحي الفقعاوي** – جامعة القدس أبو ديس

إشراف: أ. د. يحي عابد

الرقم التسلسلي	

1. البيانات الديموغرافية

العمر (بالسنوات)	
الجنس	□ ذكر □ انثى
الحالة الاجتماعية	□ أعزب □ متزوج □ مطلق □ أرمل
المستوى التعليمي	□ ابتدائي أو أقل □ ثانوي □ جامعي أو اكثر
العمل	□ موظف □ عمل خاص □ متقاعد □ طالب □ لا أعمل
مكان السكن	□ خانيونس □ رفح
المواطنة	□ مواطن □ لاجئ
هل لديك أحد من اقربائك يعمل بالمجال الصحي	□ نعم □ لا
في حال الإجابة بنعم, حدد	□ طبيب □ ممرض □ صيدلي □ غير ذلك
في حال الإجابة بنعم, حدد	□ قريب درجة أولى □ قريب درجة ثانية □ غير ذلك
الدخل (بالشيكل)	

2. الوضع الصحي

هل لديك أمراض مزمنة	□ نعم □ لا				
في حال الإجابة بنعم، اذكر مثال (السكري. الضغط, امراض الكلى, امراض القلب, السرطان, ... الخ					
خلال السنة الماضية, كم من المرات شعرت فيها بالمرض	□ مرة □ مرتين □ ثلاث مرات □ أكثر من ذلك				
أكثر الأمراض التي تصاب بها (باستثناء الأمراض المزمنة)	الالتهابات التنفسية	أمراض الجهاز الهضمي	الأمراض الجلدية	التهابات المسالك البولية	حرارة
كم عدد المرات التي استخدمت فيها مضادا حيويا خلال السنة الماضية	□ مرة □ مرتين □ ثلاث مرات □ أكثر				

الرجاء تعبئة الأسئلة التالية باستخدام الأرقام من صفر-4 حيث أن صفر تعني غير موافق تماما أو أبداً بينما 4 تعني أوافق بشدة او دائماً

3. المعرفة

		0	1	2	3	4
1.	أنا أعلم ما هو المضاد الحيوي					
2.	أنا أعلم ماذا يُقصد بمقاومة المضادات الحيوية					
3.	أنا أعلم كيف تحدث مقاومة المضادات الحيوية					
4.	المضادات الحيوية تستخدم لعلاج الالتهابات البكتيرية					
5.	المضادات الحيوية تستخدم لعلاج الالتهابات الفيروسية					
6.	المضادات الحيوية تعالج جميع الامراض					
7.	المضادات الحيوية تستخدم لتخفيض الحرارة					
8.	المضادات الحيوية تستخدم لعلاج نزلات البرد والانفلونزا					
9.	المضادات الحيوية تستخدم لعلاج حالات الإسهال البسيطة					
10.	المضاد الحيوي يستخدم لعلاج حساسية الجلد					
11.	كلما كان المضاد الحيوي اعلى سعرا, كان ذو فعالية أكثر					
12.	المضاد الحيوي علاج آمن تماما ولا يتسبب بأي آثار جانبية					
13.	بعض المضادات الحيوية لها آثار جانبية مُحتملة وخطيرة					
14.	من الممكن ان يتعارض استخدام بعض أنواع المضادات الحيوية مع بعض أنواع الأطعمة					
15.	من الممكن ان يتعارض استخدام بعض أنواع المضادات الحيوية مع بعض أنواع الأدوية					
16.	يجب حفظ بعض أنواع المضادات الحيوية بطريقة مخصصة					
17.	المضادات الحيوية ليس لها تاريخ انتهاء صلاحية					
18.	تعد مقاومة المضادات الحيوية قضية عالمية جدية وخطيرة					
19.	يؤدي الاستخدام الخاطئ للمضادات الحيوية لمقاومة المضادات الحيوية					
20.	عدم إكمال الفترة المخصصة للعلاج بالمضاد الحيوي يقلل من فعاليته للاستخدام في المرات القادمة					
21.	مقاومة المضادات الحيوية تؤثر سلبا على صحتك أو صحة أفراد عائلتك					
22.	يوجد قوانين مُخصصة لتنظيم تداول واستخدام المضادات الحيوية في بلدك					

4. الإدراك والتوجهات

		0	1	2	3	4
1.	أنا أدرك ان بعض المضادات الحيوية لها آثار جانبية مُحتملة وخطيرة					
2.	أنا أدرك ضرورة الاطلاع على ورقة الارشادات الخاصة باستخدام المضاد الحيوي قبل استخدامه					
3.	أنا أدرك ان بعض أنواع المضادات الحيوية يجب أن لا تُستخدم مع بعض أنواع الطعام					
4.	أنا أدرك ان بعض أنواع المضادات الحيوية يجب أن لا تُستخدم مع بعض أنواع الأدوية					
5.	أنا أدرك ان بعض أنواع من المضادات الحيوية لها طرق مخصصة للحفظ					
6.	يجب أن امارس الضغط على مقدم الخدمة الصحية لإضافة المضاد الحيوي لقائمة العلاج الخاصة بي					
7.	أفضل استخدام المضاد الحيوي الوردي على المضاد الحيوي عن طريق الفم					
8.	أؤمن بفعالية بعض الأنواع للمضادات الحيوية فقط دون غيرها من أنواع المضادات الحيوية					
9.	يجب أن أطلب المشورة من الطبيب في حال وجود أي استفسار حول المضاد الحيوي الموصوف لعلاجي					
10.	المضادات الحيوية تُعتبر من الأدوية باهظة الثمن					
11.	سعر المضادات الحيوي قد يؤثر على استهلاكي لها					
12.	وجود قوانين خاصة باستخدام المضادات الحيوية يؤدي لتنظيم وترشيد استهلاكها					
13.	أنا أدرك ان مقاومة المضادات الحيوية قضية عالمية جدية وخطيرة					
14.	أنا أدرك أن مقاومة المضادات الحيوية قد تؤثر سلبا على صحتي أو صحة أفراد عائلتي					

5. السلوك

		0	1	2	3	4
الوصول للمضادات الحيوي						
1.	باستطاعتي الحصول على المضادات الحيوية بسهولة وقتما أشاء					
2.	أقوم بتخزين بعض المضادات الحيوية في المنزل					
3.	أقوم بشراء المضادات الحيوية من الصيدلية وقتما أحتاج					
4.	أحصل على المضادات الحيوية من عيادات وكالة الغوث بعد وصفها من قبل الطبيب					
5.	أحصل على المضادات الحيوية من العيادات التابعة لوزارة الصحة بعد وصفها من قبل الطبيب					
6.	أحصل على المضادات الحيوية عن طريق وصفة طبية من الأطباء العاملين في المستشفيات الحكومية					
7.	أحصل على المضادات الحيوية عن طريق وصفة طبية من الأطباء العاملين في القطاع الصحي الخاص					
8.	أقوم بالضغط على مقدم الخدمة الصحية لإضافة المضاد الحيوي لقائمة العلاجات الخاصة بي					
9.	أحصل على المضاد الحيوي من أصدقائي واقربائي					
استهلاك المضادات الحيوية						
10.	أتناول المضاد الحيوي فور شعوري بالمرض مباشرة					
11.	أقوم بتناول نفس نوع المضاد الحيوي كل مرة احتاج فيها للمضاد الحيوي					
12.	أتناول المضاد الحيوي عندما ينصحني أصدقائي وأقربائي بذلك					
13.	أتناول المضاد الحيوي عندما يكون موصوفا من الطبيب المعالج فقط					
14.	أتناول المضاد الحيوي تمام كما وصفه الطبيب المعالج (الجرعة. الوقت ...					
15.	عندما أنسى تناول جرعة الضاد الحيوي, أتناول ضعف الجرعة في موعد الجرعة التالي					
استخدام المضادات الحيوية						
16.	أقوم باستشارة الطبيب قبل البدء بتناول المضاد الحيوي					
17.	أقوم باستشارة الصيدلي قبل البدء بتناول المضاد الحيوي					
18.	أقوم باستشارة أصدقائي وأقربائي قبل البدء بتناول المضاد الحيوي					
19.	لا أقوم باستشارة أحد قبل البدء بتناول المضاد الحيوي					
20.	أشارك المضادات الحيوية الخاصة بي مع الآخرين (أصدقائي وأقرائي ..)					
21.	أكمل المضاد الحيوي بالجرعة الكاملة كل مرة					
22.	أقوم باستبدال المضاد الحيوي بآخر عند شعوري بعدم التحسن					
23.	أقوم باستبدال المضاد الحيوي بآخر بعد استشارة الطبيب					
24.	أتوقف عن إكمال جرعات المضاد الحيوي عند شعوري بالتحسن					
25.	أقوم بحفظ المتبقي من جرعات المضاد الحيوي للاستخدام في المرات القادمة التي أشعر فيها بالمرض					
26.	أشارك المتبقي من جرعات المضاد الحيوي مع الآخرين (أصدقائي وأفراد عائلتي)					
27.	أستخدم الوصفات العشبية كبديل للأدوية الموصوفة من قبل الطبيب					
28.	أقوم باستخدام الوصفات العشبية مع المضاد الحيوي					

29.	أستخدم المضاد الحيوي لعلاج الطيور والحيوانات الأليفة					
30.	أستخدم المضاد الحيوي لعلاج الطيور والحيوانات الأليفة بعد استشارة الطبيب المختص					
31.	أستخدم المضاد الحيوي لعلاج النباتات					
32.	أستخدم المضاد الحيوي لعلاج النباتات بعد استشارة الأخصائي الزراعي					
السلامة في استخدام المضادات الحيوية						
33.	واجهت بعض الأعراض الجانبية بعد استخدام المضادات الحيوية (مثل التحسس, الدوار, القيئ .....)					
34.	أتحقق من الأعراض الجانبية للمضادات الحيوية قبل استخدامها					
35.	أتحقق من نشرة الإرشادات للمضادات الحيوية قبل استخدامها					
36.	أتحقق من تاريخ انتهاء الصلاحية للمضادات الحيوية قبل استخدامها					
37.	استشير الطبيب المعالج إن كان لدي بعض الاستفسارات بخصوص المضاد الحيوي الخاص بعلاجي					
38.	أستشير الصيدلي إن كان لدي بعض الاستفسارات بخصوص المضاد الحيوي الخاص بعلاجي					
39.	أستشير أصدقائي وافرد عائلتي إن كان لدي بعض الاستفسارات بخصوص المضاد الحيوي الخاص بعلاجي					
40.	إن كان لدي بعض الاستفسارات بخصوص المضاد الحيوي الخاص بعلاجي ابحث عنها في الانترنت					
41.	أقوم بالتحقق من التفاعلات الدوائية للمضادات الحيوية قبل استخدامها (مثلا, من نشرة الإرشادات)					
42.	أتحقق من تفاعل للمضادات الحيوية مع بعض أنواع الأطعمة قبل استخدامها					
43.	أقوم بحفظ المضاد الحيوي بالطريقة الصحيحة كما في نشرة الإرشادات الخاصة به					
44.	أتخلص من المضاد الحيوي بالطريقة الصحيحة كما في نشرة الإرشادات الخاصة به					

6. مصدر المعلومات المتعلقة بالمضادات الحيوية

		نعم	لا
1.	التعليم (مدرسي, جامعي .....الخ)		
2.	أصدقائي وأفراد عائلتي		
3.	العاملون في القطاع الصحي (أطباء, تمريض ...الخ)		
4.	الإعلانات والتلفزيون		
5.	الإنترنت		

شكرا للمشاركة في تعبئة الاستبانة

Annex 3: KII for doctors

Key Informant Interview

Study title: Lay people knowledge, attitudes and practices about antibiotics use and resistant in the southern area of the Gaza Strip

1. Current antibiotics prescriptions

1.2 Could you describe the antibiotics prescriptions practices among doctors, please?

What are the most common antibiotics types prescribed among doctors?

What about using cultures (blood, urine…etc.) before prescribing antibiotics

1.2 Do you prescribe broad-spectrum antibiotics?

Why?

- *The case requires broad-spectrum antibiotics*
- *Uncertainty of the diagnosis*
- *Fear of the disease complications*
- *Others: patient pressure ,,,*

1.3 Generally, what factors could affect doctors' antibiotics prescriptions

- *Doctor experience,*
- *Antibiotics price,*
- *Frequency of daily dose*
- *The effect of advertisements of pharmaceutical companies*
- *Others*

2. Patients' characteristics

What are the patient variables could affect antibiotics prescriptions practices among doctors?

- Age, Gender, Health state (comorbidities), Educational level, Socioeconomic state, good vs bad hygiene, Others

3. The safety of antibiotics

3.1 Do you estimate the antibiotics safety when prescribe it?

3.2 Do you clarify these points when to patients when prescribe antibiotics?

- *Antibiotics side effects*
- *Allergy signs*
- *Food/drug or drug-drug interactions*
- *Time (frequency)*

4. Patients pressure prescribing antibiotics

Do patients pressure the doctors to add antibiotics to their management plan?

Does this pressure affect the doctors antibiotics prescriptions practices?

5. Doctor patient communication

Is there good communication between doctors and patients about their management plan?

Do you explain to patients why sometimes antibiotics is not needed?

Do you show to patients how antibiotics misuse lead to antibiotics resistant?

Do you advise patients using antibiotics alternatives?

Do you discuss with patients fears with patient?

6. National Action Plan for Antimicrobial Resistance

6.1 Are you committed to the national action plan for antimicrobial resistance?

6.2 Did you receive training about the national action plan for antimicrobial resistance?

Thanks for participation

Annex 4: KII for pharmacists

Key Informant Interview

Study title: Lay people knowledge, attitudes and practices about antibiotics use and resistants in the southern area of the Gaza Strip

1. Antibiotics seeking

1.2 Patients ask for antibiotics by whom:

- *New doctor prescription, Old doctor prescription, old medicine box, pharmacists advice, Any antibiotics, Others*

1.3 What are the most common antibiotics bought?

1.4 Do patients seek broad-spectrum antibiotics (strong antibiotics as they said)?

1.5 factors could affect patient antibiotics selections

- *The price of antibiotics, The frequency of daily dose, Others*

2 Customer characteristics

Factors could affect antibiotics consumption practices

(Patient age, gender, socioeconomic state, educational level, or others.)

3 The safety of antibiotics

3.1 Do you estimate the antibiotics safety when sell it?

3.2 Do you clarify this points to patients when sell antibiotics?

- *Antibiotics side effects, Allergy signs, Food/drug or drug-drug interactions, Time (frequency), storing, Disposal*

4 Pharmacists patient communication

Is there good communication between pharmacists and patients?

Ex. Advice for alternatives

5 Regulations and lows

5.1 Are you committed to the laws of antibiotic prescriptions for the State of Palestine?

5.2 Do you sell antibiotics without a prescription?

Thanks for participation

Annex 5: Table: Distribution of study sample

Hospital	**No. of participants**
Nasser Medical Complex	100
European Gaza Hospital	100
Martyr Mohammed Yousef Al-Najjar Hospital	100
Emirates Crescent Hospital	100
Total	400

Annex 6: Table: Practices domains overall means with weighted means

no.	Items	0. never		1. seldom		2. some-times		3. frequently		4. always		Mean	Weighted Mean %	P direction
		No	%	No	%	No	%	No	%	No	%			
1	I can get antibiotics easily when I want	92	23	50	12.5	53	13.3	68	17	137	ll	1.73	43.25	S(36}
2	I store some antibiotics in my home	109	27.3	55	13.8	67	16.8	84	21	85	21.3	2.05	51.25	F(32)
3	I buy antibiotics from pharmacy as needed by me or any family member	52	13	45	11.3	78	19.5	89	22.3	136	34	1.47	36.75	S(40)
4	I get antibiotics from official UNRWA clinics as described by the physician	44	11	53	13.3	59	14.8	99	24.8	145	36.3	2.62	65.50	F(20)
5	I get antibiotics from the governmental clinics as described by the physician	33	8.3	48	12	68	17	95	23	156	39	2.73	68.25	F(17)
6	I get antibiotics from hospital doctor as described by the treating physician	31	7.8	50	12.5	62	15.5	104	26	153	38.3	2.75	68.75	F(15))
7	I get antibiotics from pharmacy by official prescription.	38	9.5	37	9.3	61	15.3	99	24.8	165	41.3	2.79	69.75	F(10)
8	I pressure the healthcare provider to prescribe antibiotics	142	35.5	58	14.5	74	18.5	60	15	66	16.5	2.37	59.25	F(25)
9	I get antibiotics from my relatives or friends	171	42.8	55	13.8	72	18	58	14.5	44	11	2.63	65.75	F(19)
10	I consume antibiotics once I feel sick	155	38.8	73	18.3	76	19	42	10.5	54	13.5	2.58	64.5	F(21)
11	I consume the same type of antibiotic every time I use it	144	36	73	18.3	84	21	50	12.5	49	12.3	2.53	63.25	F(22)
12	I consume antibiotics when my relatives or friends advise me to do	185	46.3	55	13.8	79	19.8	48	12	33	8.3	2.78	69.5	F(12)
13	I consume drugs exactly as prescribed by doctor	34	8.5	45	11.3	71	17.8	74	18.5	176	44	2.78	69.50	F(12)
14	I use antibiotic consumption is regular exactly by time	24	6	28	7	72	18	78	19.5	198	49.5	3	75.00	A(2)
15	When I forget the pill in the morning, I take twice in the evening	209	52.3	42	10.5	67	16.8	46	11.3	37	9.3	2.85	71.25	F(8)
16	I consult doctor before starting antibiotics	41	10.3	27	6.8	55	13.8	82	20.5	195	48.8	2.91	72.75	F(4)
17	I consult pharmacist or pharmacy outlet before starting antibiotics(R)	48	12	37	9.3	87	21.8	84	21	144	36	1.4	35	S(41)
18	I consult my relatives and friends before starting antibiotic(R)	182	45.5	65	16.3	72	18	54	13.5	27	6.8	2.8	70	F(9)
19	I do not consult any one before starting antibiotics(R)	211	52.8	43	10.8	66	16.5	48	12	32	8	2.88	72	F(7)

20	I share antibiotics with others (ex. family members or friends(R)	211	52.8	53	13.3	62	13	53	13.3	31	7.8	2.9	72.5	F(6)
21	I complete the antibiotics courses	42	10.5	43	10.8	75	18.8	94	23.5	146	36.5	2.65	66.25	F(18)
22	I change antibiotics if I don't feel better (R)	141	35.3	51	12.8	77	19.3	67	16.8	64	16	2.34	58.5	F(27)
23	I change the antibiotics after doctor advice	47	11.8	28	7	51	12.8	58	14.5	216	54	2.92	73.00	F(3)
24	I stop antibiotics if I feel better (R)	115	28.7	55	13	59	14.8	87	21.8	84	21	2.07	51.75	F(31)
25	I save the remaining antibiotics for the next time I get sick (R)	146	36.5	55	13.8	62	15.5	75	18.8	62	15.5	2.37	59.25	F(25)
26	I give leftover antibiotics to others (ex. friends and family members) (R)	201	50.2	54	13.5	46	11.5	56	14	43	10.8	2.78	69.5	F(14)
27	I use herbs as medicine instead of prescribed drug (R)	107	26.8	53	13.3	101	25.3	67	16.8	72	18	2.14	53.5	F(30)
28	I combine herbs with antibiotics (R)	119	29.8	69	17.3	80	20	67	16.8	65	16.3	2.27	56.75	F(28)
29	I use antibiotics for pets management (R)	197	49.3	35	8.8	65	16.3	55	13.8	48	12	2.69	67.25	F(17)
30	I do this use after specialized doctor advice	139	34.8	38	9.5	79	19.8	62	15.5	82	20.5	1.78	44.50	S(35)
31	I use antibiotics for plants (R)	205	51.2	37	9.3	69	17.3	47	11.8	42	10.5	2.79	69.75	F(10)
32	If yes, I do this use after specialist advice	149	37.3	49	12.3	64	16	54	13.5	84	21	1.69	42.25	S(37)
33	I experienced some side effects after consuming antibiotics	126	31.5	43	10.8	75	18.8	68	17	88	22	1.87	46.75	S(33)
34	I check antibiotics side effects before consuming it	38	9.5	42	10.5	69	17.3	91	22.8	160	40	2.73	68.25	F(16)
35	I check antibiotics instructions label before consuming it	29	7.2	38	9.5	77	19.3	79	19.8	177	44.3	2.9	72.50	F(6)
36	I check antibiotics expiry date before consuming it	38	9.5	20	5	60	15	66	16.5	216	54	3.01	75.25	A(29)
37	If I have any concern about my antibiotic course I will consult doctor	41	10.3	26	6.5	60	15	73	18.3	200	50	2.91	72.75	F(4)
38	If I have any concern about my antibiotic course, I will consult pharmacist (R)	36	9	38	9.5	65	16.3	87	21.8	174	43.5	1.19	29.75	S(42)
39	If I have any concern about my antibiotic course I will do internet search about my concern (R)	158	39.5	40	10	77	19.3	69	17.3	56	14	2.44	61	F(24)
40	If I have any concern about my antibiotic course I will consult family members and friends (R)	72	18	46	11.5	102	25.5	96	24	84	21	1.81	45.25	S(34)
41	I check drug-drug interactions before I	43	10.8	36	9	70	17.5	81	20.3	170	42.5	2.75	68.75	F(15)

	consuming antibiotics (ex. from the antibiotic label)													
42	I check drug-food interactions before I consuming antibiotics (ex. from the antibiotic label)	63	15.8	38	9.5	82	20.5	82	20.5	135	33.8	2.47	61.75	F(23)
Overall mean 2.47 overall weighted mean 61.75 **N :never S: seldom, F: frequently, A: always , (R): reverse question**														

Annex 7: List of questionnaire reviewer

1. Prof. Dr. Abdelraof Elmanamaa

   Professor of Microology -Islamic university of Gaza

2. Dr. Mohammed Al-Eila
   Doctor of Engineering, Juzoor Foundation

3. Dr. Mahmoud Al-Shikhali
   Head of Internal Medicine Department – European Hospital of Gaza

4. Dr. Khaled Alsir
   Intern doctor- Surgery department- Nasser Medical Hospital

5. Dr. Mohammed Alsir
   Medical officer- UNRWA primary health care center

6. Dr. Ashraf Madi
   Intern doctor- pediatric department- Martyr Muhammad Youssef Al-Najjar Hospital

Annex 8: Helsinki committee of ethical approval

المجلس الفلسطيني للبحث الصحي

Palestinian Health Research Council

تعزيز النظام الصحي الفلسطيني من خلال مأسسة استخدام المعلومات البحثية في صنع القرار

Developing the Palestinian health system through institutionalizing the use of information in decision making

Helsinki Committee

For Ethical Approval

Date: 06/06/2022 **Number:** PHRC/HC/1140/22

Name: Maha Sadat Alfaqawi الاسم:

We would like to inform you that the committee had discussed the proposal of your study about: نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:

Lay people knowledge, attitudes and practices about antibiotics use in the southern area of the Gaza Strip

The committee has decided to approve the above mentioned research. Approval number PHRC/HC/1140/22 in its meeting on 06/06/2022 و قد قررت الموافقة على البحث المذكور عاليه بالرقم والتاريخ المذكوران عاليه

Signature

Member **Member**

Chairman

Genral Conditions:-

1. Valid for 2 years from the date of approval.
2. It is necessary to notify the committee of any change in the approved study protocol.
3. The committee appreciates receiving a copy of your final research when completed.

Specific Conditions:-

E-Mail:pal.phrc@gmail.com

Gaza - Palestine غزة - فلسطين

شارع النصر - مفترق العيون

معرفة وتوجهات وممارسات عامة الناس حول استخدام المضادات الحيوية ومقاومتها في المنطقة الجنوبية من قطاع غزة.

إعداد: مها سعدات صبحي الفقعاوي

إشراف: أ.د. يحيى عابد

ملخص الدراسة:

المقدمة: تعتبر مقاومة المضادات الحيوية واحدة من أكبر القضايا التي تهدد الصحة العالمية في القرن الحادي والعشرين، حيث تتطور مقاومة المضادات الحيوية عندما تكتسب الكائنات الحية الدقيقة القدرة على مقاومة المضادات الحيوية التي صُمِمت للقضاء عليها. مقاومة المضادات الحيوية تحدث عادةً بشكل طبيعي، ولكن سوء استخدام المضادات الحيوية يسرع هذه العملية الطبيعية. لذلك هدفت هذه الدراسة إلى تقييم معرفة عامة المجتمع ومواقفهم وتوجهاتهم بالإضافة لممارساتهم تجاه المضادات الحيوية ومقاومتها.

الطرق: شارك في هذه الدراسة أربعمائة مشارك من جنوب قطاع غزة (خانيونس ورفح) من خلال تعبئة استبانة، كما تمت مشاركة 20 طبيباً وصيدلانياً في هذه الدراسة من خلال اجراء مقابلات معهم.

النتائج: أظهرت النتائج امتلاك العامة في جنوب قطاع غزة لمستوى جيد من المعرفة والتوجهات والممارسة تجاه المضادات الحيوية، حيث كان متوسط المعرفة لديهم 62.25% و متوسط التوجهات 67.75% ومتوسط السلوك والممارسات 61.75%.

يتمتع المشاركون في منتصف العمر بأعلى مستوى للمعرفة والمواقف الأكثر إيجابية والممارسة الأفضل تجاه المضادات الحيوية ومقاومتها مقارنة بالفئات العمرية الأصغر والأكبر سنًا. تتميز الإناث بمواقف وتوجهات أكثر إيجابية (القيمة الاحتمالية 0.000) وممارسات أفضل (القيمة الاحتمالية 0.021) تجاه المضادات الحيوية ومقاومتها مقارنة بالذكور المشاركين في الدراسة. كما وُجد أن المشاركين الحاصلين على تعليم عالي، لديهم مستوى معرفة أعلى (القيمة الاحتمالية 0.041) . من ناحية أخرى، فإن المشاركين الذين حصلوا على تعليم ابتدائي أو أقل لديهم ممارسة أفضل حول المضادات الحيوية مقارنة بأولئك الذين حصلوا على تعليم عالي (القيمة الاحتمالية 017.). يتمتع المشاركون من الموظفين بأعلى معرفة (القيمة الحتمالية 0.000)، ومواقف أكثر إيجابية (القيمة الاحتمالية 0.000) وممارسات أفضل (القيمة الاحتمالية 0.000) تجاه المضادات الحيوية ومقاومتها. كما وُجد أن المشاركون الذين يعانون من الفقر والفقر المدقع لديهم معرفة أقل (القيمة الاحتمالية 0.022) و مستوى ممارسة أقل (القيمة الاحتمالية 0.045) تجاه المضادات الحيوية ومقاومتها مقارنة بالمشاركين غير الفقراء.

الخاتمة: إن المعرفة العامة للمشاركين ومواقفهم وممارساتهم تجاه المضادات الحيوية جيدة نسبيًا، ولكن يمكن تحسينها إذا تم تنفيذ برامج تعليمية لكل من الجمهور ومقدمي الرعاية الصحية مع تفعيل وتطبيق السياسات واللوائح لتنظيم وصفات المضادات الحيوية وشرائها.