International Standard Serial Number (ISSN): 2249-6807

International Journal of Institutional Pharmacy and Life Sciences 16(2): March-April 2026

INTERNATIONAL JOURNAL OF INSTITUTIONAL PHARMACY AND LIFE SCIENCES

Pharmaceutical Science

Research Article……!!!

Received: 27-01-2026; Revised: 27-03-2026; Accepted: 27-04-2026

ASSESSMENT OF THE KNOWLEDGE, ATTITUDE AND PRACTICES RELATED TO ANTIBIOTICS AMONG THE GENERAL PUBLIC FROM SELECTED DISTRICTS OF MAHARASHTRA, INDIA

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Keywords:

Antibiotics, Antibiotic Resistance, Awareness, KAP Study, Self-medication, Public Health, Adverse Drug Reactions, Rational Drug Use

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ABSTRACT

Antibiotics are among the most commonly prescribed medications for the treatment of infectious diseases; however, their irrational use has contributed significantly to the global rise in antibiotic resistance. The present study was conducted to assess the knowledge, attitude, and practices (KAP) regarding antibiotic use and antibiotic resistance among the general population. A structured questionnaire-based survey was carried out involving respondents from different age groups and districts.

The study evaluated participants' understanding of antibiotics, their effectiveness against bacterial and viral infections, awareness about adverse drug reactions (ADRs), and practices such as completion of prescribed antibiotic courses and self-medication. The results indicated that while a considerable proportion of respondents were aware of antibiotics and their role in treating bacterial infections, misconceptions still exist regarding their use in viral infections such as cold and flu. Additionally, inappropriate practices such as over-the-counter purchase of antibiotics and discontinuation of therapy before completion were observed.

The findings highlight a moderate level of awareness but also reveal critical gaps in knowledge and behavior that may contribute to antibiotic resistance. The study emphasizes the need for public health education, stricter regulations on antibiotic dispensing, and active involvement of healthcare professionals to promote rational use of antibiotics.

INTRODUCTION

"Antibiotics are the substances produced by microorganism, which selectively suppress the growth or kill the microorganisms at very low concentration."

The word "antibiotic" is derived from the Greek words Anti means against and Bios means Life and it is commonly refers to chemical substances which are produced by microorganisms that inhibit or destroy the other harmful microorganisms and stop their growth. Since, the first antibiotic "Penicillin" was discovered by Sir Alexander Fleming in1928.

In 21st century antibiotic resistance is one of the most critical public health challenges intimidating the better protection about bacterial infection and their treatment. The term antibiotic resistance means "The ability of microorganisms, particularly bacteria to survive proliferate in the presence of antimicrobial agents that were once effective against them."

Resistance is a serious problem leading to serious difficulty in treating bacterial infection.

Antimicrobial resistance (AMR) commonly occurs through genetic level mutations in bacteria. (Jain K. et al.2021) Therefore, this process of AMR is increased due to over use and misuse of antibiotics in humans, animals and agriculture as growth enhancers and has put every nation at risk. (Anna Susan Abraham et al. 2025)

Antibiotic resistance is a major threat to public health and safety globally. To stop antibiotic resistance, the WHO has set the theme: "No Action Today, No Cure Tomorrow"

Inappropriate and irrational use of antibiotics leads to the growth of antimicrobial resistance which possess a serious danger to global public health. It possess a major global public health challenge with economic, social, and political consequences worldwide. (Michaelidou M.et.al.2020)

The activity of the antibiotic is most perfectly as long as they used, if not work properly, there should problem leads to the antibiotic resistance. According to WHO, "Antibiotic resistance occurs when bacteria change in response to the use of these medicines."

Antibiotic resistance is a global public health concern because it adversely affects treatment results, prolongs morbidity, increases hospital stay, elevates the risk of mortality, and escalates medical costs. (Zafar Akbar et al.2021)

There are several factors that affect the antibiotic resistance –

Unnecessary and misuse of the antibiotic can lead the resistance. In hospitals or the primary care, clinics, improper hygiene, poor sterilization, can spread the resistant bacteria.

Stop the use of antibiotic early in the sufficient period of time lead to the antibiotic resistance.

OTC availability and self–medication can also lead the problem.

Improper disposal of pharmaceutical waste and untreated sewage containing antibiotics lead to environmental contamination, promoting resistant bacteria.

Bacteria can mutate or exchange resistance genes through plasmids, bacteriophages, making resistance spread rapidly.

Antibiotics used as growth enhancers or disease preventives in live stock

Contribute to the development of resistant bacteria that can transfer to humans through food chains.

Nowadays, people are researching on the internet and follow the self medication without consulting the physician or the doctor and this lead to the inappropriate consumption of the antibiotic use and that's the major problem to improving the resistance. (Patil S.S & Agarwal S.2019)

Health professionals play a key role in the fight against antibiotic resistance because they play apart in prescribing antibiotics during routine clinical practice as well as in promoting health education, particularly by encouraging patients to adhere to therapies and avoid self medication.

The misuse of antibiotics is linked not only to a lack of knowledge but also to insufficient public awareness and the easy access to over–the–

counter medications. Our society faces a serious threat from the growing problem of antibiotic resistance in both rural and urban populations. (Chingri S., Das S. & Gupta S. 2024)

Antibiotic resistance stands among the most serious global threats of the 21st century, comparable to challenges such as terrorism and climate change.

The misuse of drug during self medication is a wide spread issue. Common improper practices include taking antibiotics for a short duration, using incorrect doses, sharing medicines with others, and stopping treatment once symptoms improve. Research indicates the large number of people use leftover antibiotics from the previous prescription without doctor consultation these behavior are harmful as they disrupt the body's natural bacterial balance and contribute to antibiotic resistance. (Higuita-Gutierrez L.F. 2020)

Also many people stop the full course of antibiotic, once they feel better. This allows surviving bacteria to multiply again, leading to recurrent infection and resistance problems.

Moreover, some infections display symptoms similar to other illness. If patients fail to describe their symptoms accurately, doctors may prescribe broad–spectrum antibiotics unnecessarily, which further grows the antibiotic resistance. Also, the studies state that many people wrongly believe antibiotics can treat viral infections such as cold and flu, adding to the misuse. (Kumar et al. 2021).

These misconceptions often cause fear and confusion regarding antibiotic use, leading to either overuse or complete avoidance. Such behavior can increase infection rates and contribute to the worsening of antibiotic resistance.

Therefore, proper antibiotic practices must be followed, and public awareness should be promoted. Simple hygiene measures, such as washing hands with plain soap, remain one of the most effective ways to prevent infections.

The general public plays vital role in minimizing the improper and excessive use of antibiotics. It is important to assess their knowledge, attitudes and practice towards antibiotic use to identify any educational gaps. This can be achieved by conducting a survey that considers all these aspects.

According to the World Health Organization (WHO), antimicrobial resistance (AMR) causes approximately 1.27 million deaths annually worldwide 290000 in India. (Jain K. et al.2021). It increases the financial pressure among the local people because of the longer stays in hospital, and more critical care.

The goal of this study is to analyze the public's knowledge, attitude, and practice about antibiotic use and resistance in general public of the selected districts of Maharashtra, with the purpose of informing future awareness to promoting more effective antibiotic management.

DISCUSSION

A total of 204 responses were received through selected districts of the Maharashtra, participated in the Study after providing informed consent. A total of 68 (45.3%) males and 82(54.7%) females participated in the study.

Additionally 204 respondents were below the age of 18, 6 belonged to the age group of 18-25,169 were between 26 & 40, 20 between 41-50, 12 between 51-60 and 2 were more than 60 years old .

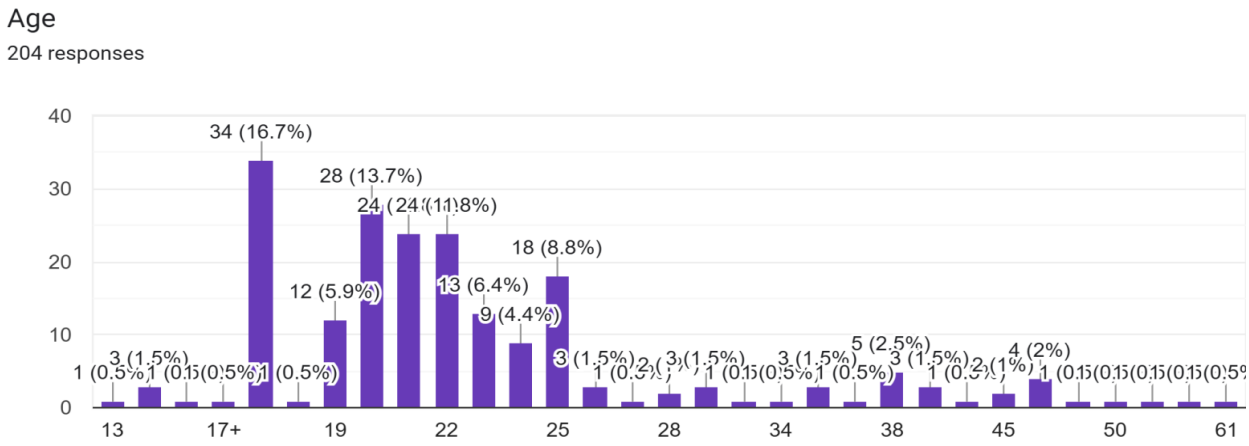

Fig.01. Age of Respondents

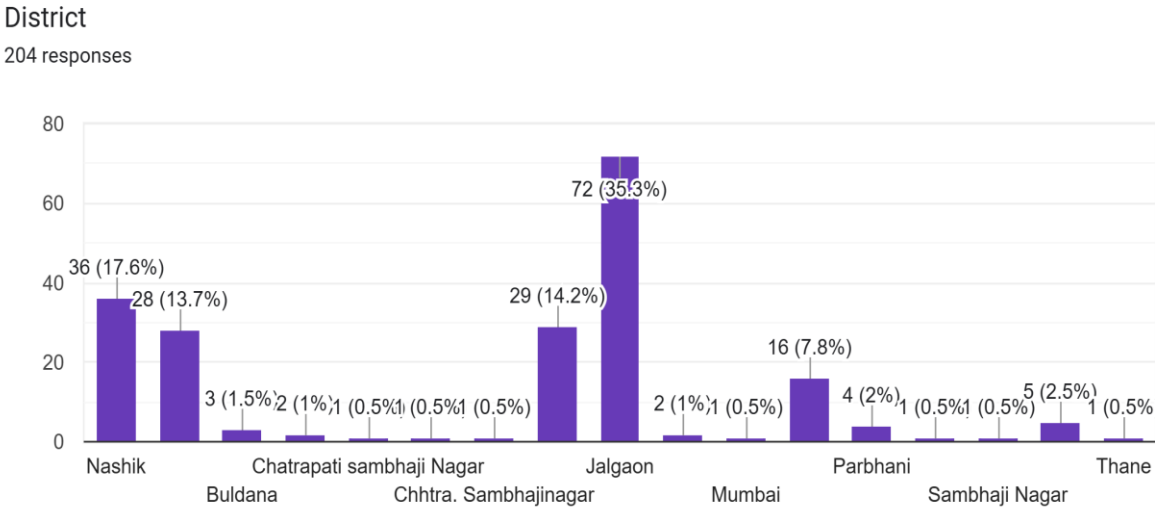

Fig.02. District of Respondents

Above figure represents the geographical distribution of the 204 survey respondent across various districts of Maharashtra. The bar graph shows both the numbers of participants and their corresponding percentage share from each district.

The analysis indicates that the majority of respondent belong to Jalgaon district, contributing the 74 participant (36.2%) , making in the highest represent district in the survey.

Other districts with moderate representation include.

Nashik = 36 Respondents (17.6%)

Pune = 29 Respondents (14.2%)

Dhule = 29 Respondents (14.2%)

Nanded = 16 Respondents (7.8%)

Chhatrapati Sambhaji Nagar = 11 Respondents (5.3%)

Districts with minimal contributions includes

Buldhana = 05 Respondents (2.4%)

Parbhani = 04 Respondents (1.9%)
Thane = 01 Respondents (0.4%)
Mumbai = 01 Respondents (0.4%)
Overall, the graph demonstrates that the survey sample is predominantly concentrated in Jalgaon, Nashik, Pune, Dhule, Nanded, Chhatrapati Sambhaji Nagar, Buldhana, Parbhani, Thane, Mumbai while the remaining districts show significantly lower participation. This distribution pattern reflects the primary regions where the survey was actively conducted and where maximum public participation was achieved.

SECTION A
KNOWLEDGE ON THE ROLE OF ANTIBIOTICS

Q.1 What are the antibiotics?

Most of the respondents (192 out of 204) gives the right answer that "Medicines that kill bacteria or prevent their growth".

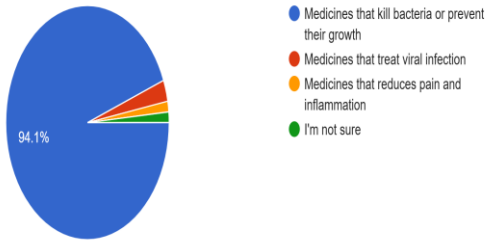

Fig.03 Response about Antibiotics

Q.2 Do Antibiotics have side effect or adverse reaction?

Respondent`s knowledge about antibiotics have side effects or adverse reaction was surveyed in fig. no. 04. We learnt that 68.1% (n = 139) had selected the correct option 'Yes'

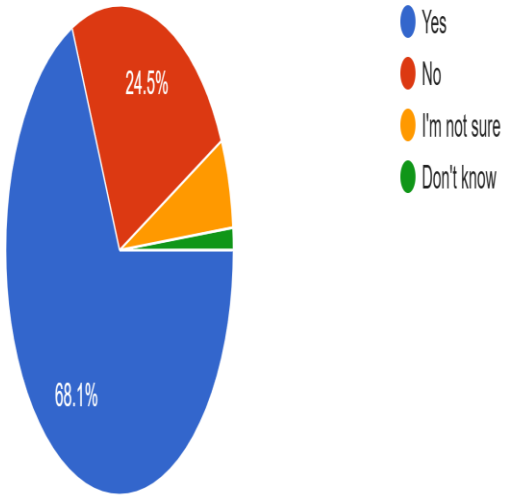

Fig.04. Responses about ADRs

Q.3 What do antibiotics target?

Respondents gives the correct answer about the knowledge antibiotics target that is, "Bacteria"

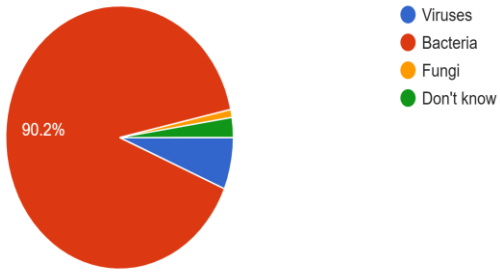

Fig.05. Responses on Targets of Antibiotics

Q.4 Antibiotics are often needed for cold and flu illness?

As we observe in fig. 06 68.6% (n = 140) of people selected the correct option that is, 'No' because cold and flu illness are caused by viral infection and antibiotics are only affect against the bacteria.

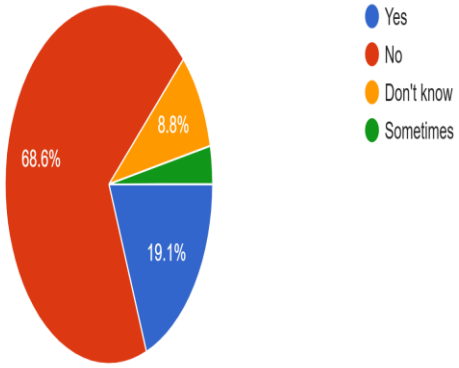

Fig.06. About Cold and Flu Treatment

Q.5 Antibiotics can kill 'Good bacteria' present in our bodies?

Fig 07 indicates that the 55.9% (n = 114) of people chose the correct answer that is 'Yes' but, 34.8 % (n = 71) of people don't know that antibiotics does not kill the good bacteria in our body so they chose the option 'No'

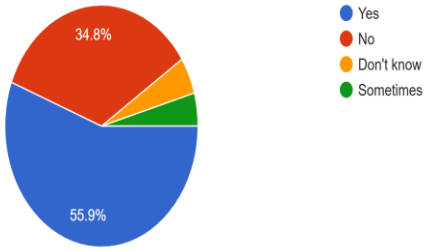

Fig.07. About Good Bacterias

Q.6 Antibiotics can cause allergic reaction?

About 54.4% (n = 111) of respondent's from all age groups chose the option 'Yes' and they all are right.

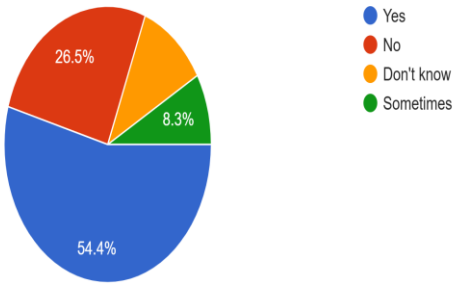

Fig.08. About Allergic reactions

Q.7 Misuse of antibiotics can lead to antibiotic resistance?

As we observe in fig. 9 most of the respondents (140 out of 204) 68.6% gives the right answer that 'Yes' but 17.6% (n = 36) people don't know the misuse of antibiotics lead to antibiotic resistance.

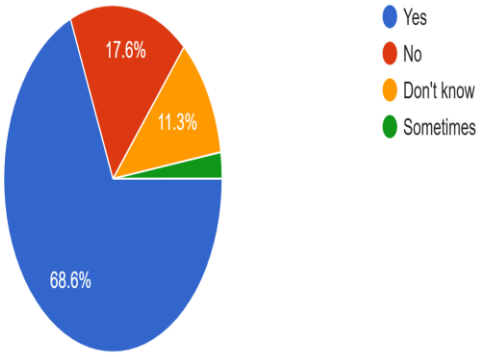

Fig.09. About Resistance towards Antibiotics

SECTION-B

ATTITUDES TOWARDS ANTIBIOTICS

Q.1 When I have cold, I should take antibiotics to prevent getting a more?

Colds are caused by viruses, and antibiotics only work against bacteria. So, the 46.1% (n = 94) of people gives the correct answer 'No' but, 37.7% (n = 77) people have no idea about the colds are caused viruses.

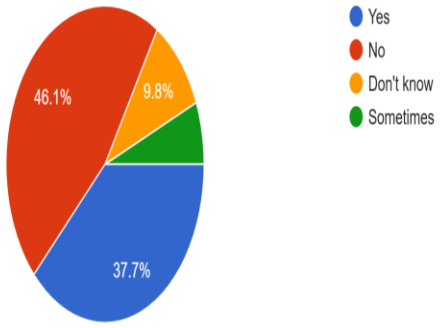

Fig.10. Information on Antibiotics to treat cold

Q.2 When I have fever, antibiotics helps me get batter?

Fever is not always caused by bacteria it is often due to viral infections (like cold, flu, dengue etc.) Antibiotics only work against bacterial infection, not viral ones. So, taking antibiotics for any fever without a doctor's prescription is wrong and it can lead to antibiotic resistance.

So , the 28.9 % (n = 59) of people gives the correct answer ' No ' .

but 34.3% (n = 70) peoples are unknowledgeable about it.

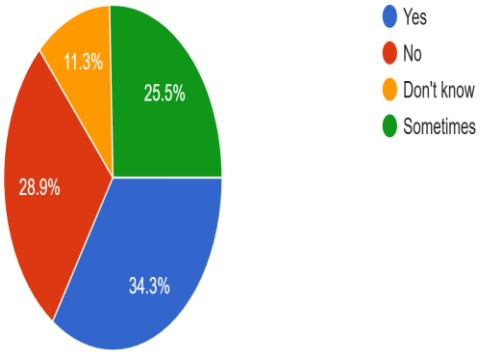

Fig.11. Information on Antibiotics in Fever

Q.3 Whenever, I take an antibiotics, I contribute to the development of antibiotics resistance?

As we observe in fig – 12, 62.7% (n = 128) respondents selected the correct answer 'Yes' because, every time we used antibiotics, especially when they are misused or observed some bacteria can survive and become resistant to the medicine .So, even though antibiotics help treat infection, each use contributes a little to the overall problem of antibiotics resistance.

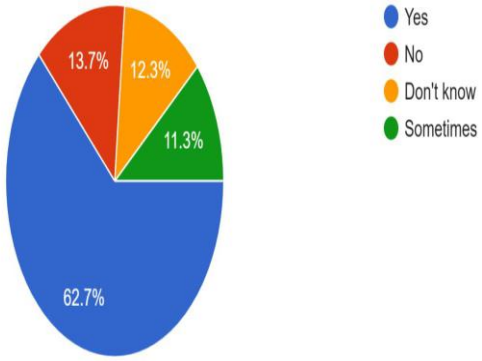

Fig.12. About Antibiotics Resistance

Q. 4 Antibiotics are safe to take without a doctor's prescription?

Fig.13 indicates that 65.2% (n = 133) of people chose the correct answer i.e. 'No'. Antibiotics should only be taken when prescribed by a qualified doctor. Because taking antibiotics without medical advice can lead to wrong dosage or wrong medicine.

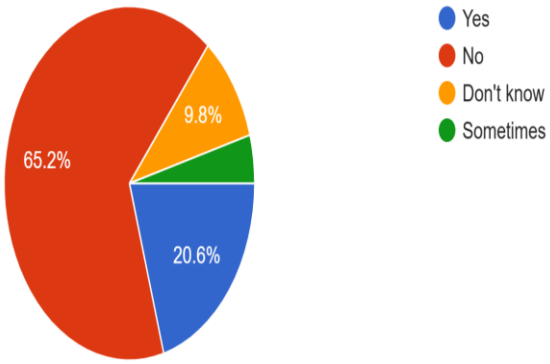

Fig.13. Safety of Antibiotics

Q. 5 Antibiotics are effective against viral infection?

Antibiotics kill or stop the growth of bacteria, not viruses. So, the antibiotics are not effective against viral infection.

60.3% (n = 123) of people select the correct answer 'No'.

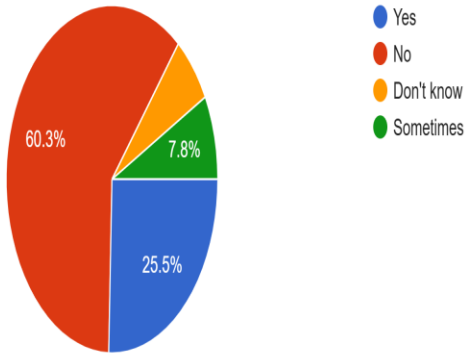

Fig.14. Effectiveness of Antibiotics towards viral infections

Q.6 I believe antibiotics are effective against most infections?

Antibiotics are effective only against bacterial infection, not most infections in general.

But, many people 37.7% (n = 77) selected the option 'Yes' and less people 37.3 % (n = 76) selected option 'No'.

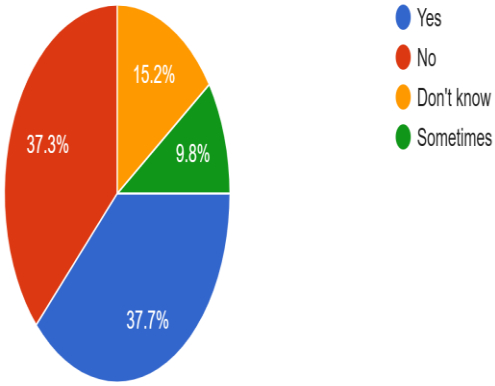

Fig.15. Antibiotics for All

Q.7 I Believe antibiotic resistance is a significant public health concern?

Yes, Antibiotic resistance is a serious and growing public health concern worldwide. The World Health Organization (WHO) considers antibiotic resistance one of the biggest global public health threats.

63.2% (n = 129) respondents gives the correct answer 'Yes'

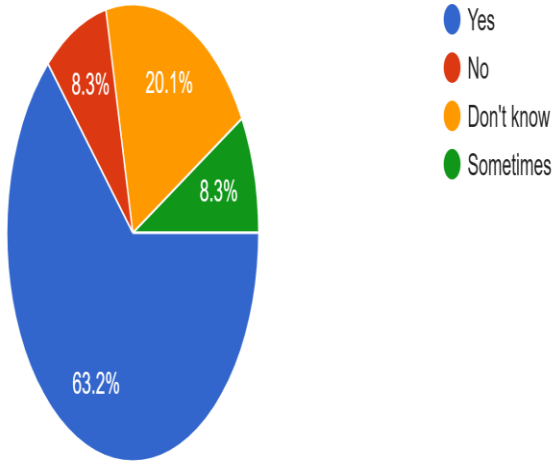

Fig.16. Antibiotic Resistance as a Public Health Concern

SECTION - C

ANTIBIOTIC USE PRACTICE

Q.1 Do you ask your doctor about the potential side effects of antibiotics?

69.1 % (n = 141) of people aware about always discuss possible side effects and precautions with your doctor before taking antibiotics . So, they selected the option 'Yes'.

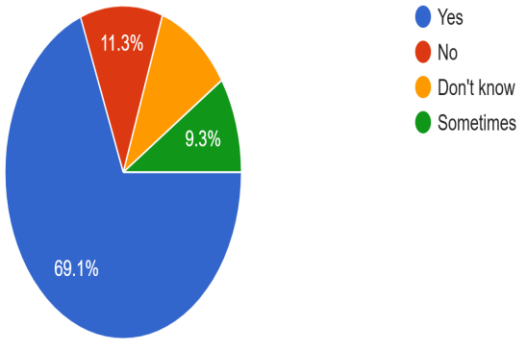

Fig.17. Doctor's Opinion on Side Effects of Antibiotics

Q.2 If you feel better, after taking 2 – 3 doses of antibiotics, do you still complete the full course of treatment?

Always take the full course of antibiotics as prescribed by your doctor, even if your symptoms improve. Because the remaining bacteria can grow back and cause the infection to return.

So, the 64.7% (n = 132) of people aware about it that complete the full course of treatment if feeling better.

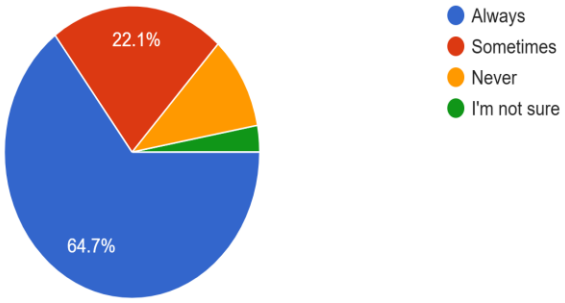

Fig.18. Responses on Full Dose of Antibiotics

Q.3 Do you prefer to obtain antibiotics from the pharmacy rather than doctor / health worker if you have an illness?

The given fig indicates that 49.5% (n= 101) of people gives the correct answer 'Never'.

Always consult a doctor or qualified health worker before taking an antibiotics. Because , self – medicating or buying antibiotics without prescription can lead to wrong treatment, side effect and antibiotic resistance.

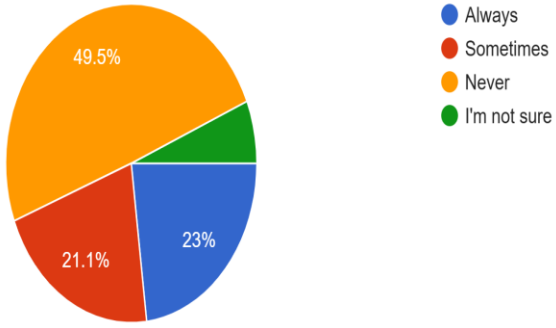

Figure 19 Over the Counter - Antibiotics

Q. 4 Do you prefer to take an antibiotic, when you have cough and sore throat?

Most coughs & sore throats are caused by viruses, not bacteria. So, only take antibiotics for cough or sore throat if your doctor confirms it's caused by bacterial infection 41.7% (n = 85) of people chose the option 'Never'.

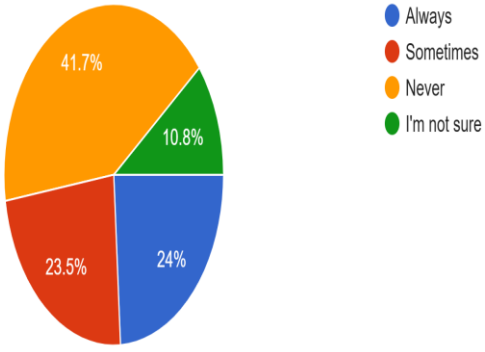

Figure 20 Antibiotics for Cough and Sore Throat

Q.5 Do you consult a doctor before starting an antibiotic?

Most of the respondents 81.9 % (167 out of 204) gives the correct answer 'Always'.

So, always consult a qualified doctor before taking any antibiotic. A doctor can confirm if your infection is bacterial and actually needs antibiotics.

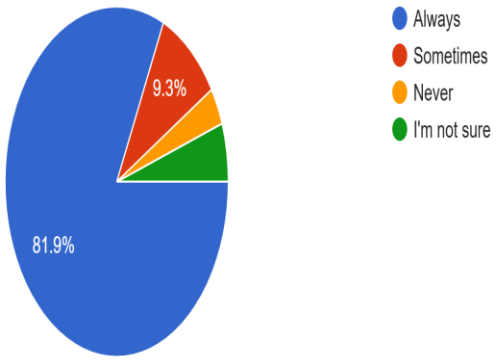

Figure 21 Consultations from Doctors

Q.6 Do you check the expiry date of the antibiotic before using it?

As we observe in above fig 90.7% (n = 185) of people selected the correct option 'Always'. So, always check the expiry date and avoid using expired antibiotics. Because expired antibiotics may lose their effectiveness & fail to treat infections properly. Some expired medicines can become harmful or toxic. So, checking the expiry date helps ensure safe and effective treatment.

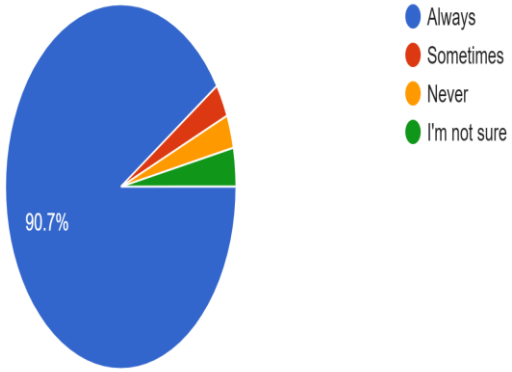

Figure 22 About Awareness on Expiry Dates

DISCUSSION

Antibiotic resistance has emerged as a serious health concern in India, primarily because of the high prevalence of infectious diseases, uncontrolled antibiotic Sales, profit-driven prescriptions by healthcare professionals, growing patient demands, increased income levels, inadequate public heath infrastructure.

Doctors are not sufficiently trained on the careful use of antibiotics in their studies as a result, many, prescribe antibiotics more often than needed because of money related benefits & patient demands.

Using antibiotics without a doctor's prescription is a major issue contributing to antibiotic resistance. Therefore, proper & responsible antibiotic use is crucial to control its spread. Many resistance control programs suggest that public awareness & education are important for promoting correct antibiotic practices. In our research, a google survey form was shared with 250 individuals and 204 agreed to participate.

The survey targeted people from all background regardless of age, gender. Its purpose was to evaluate public understanding of antibiotic use & the measures needed to prevent antibiotic resistance. The collected responses were analyzed according to demographic factors such as age or gender.

Numerous misunderstandings about antibiotic use were observed among the general public. For instance, some individual, believe that consuming antibiotics can weaken their bodies. A Considerable proportion of respondents also assumed that antibiotics eliminate all bacteria present in the human body.

In our study, participants aged 18 –25 years comprised the largest group n=169 (82%) with a majority being female 56.9% (n=116).

We tried knowing the usage pattern of antibiotic respondents by asking them certain questions such as they discontinue the course once they feel better, we learnt that n = 132 out of n = 204 agreed to this incorrect practice.

Also, in our study, we found that n=192 out of n=204 people knows the correct knowledge about the antibiotics which is "medicines that kill bacteria or prevent their growth". or target of antibiotics is ' bacteria'.

While questions regarding its role, like "antibiotics are often needed for Cold & flu illness", were answered is correct by a majority 68.6% (n=140).

Also 34.3% (n=70) of people unaware about the antibiotics are not used to treat fever.

Also 34.3% (n=70) of people unaware about the antibiotics are not used to treat fever. Also 24%. (n=49) of people believed that prefer to take an antibiotic when suffering Cough & sore throat, which is incorrect practice.

62.7% (n=128) people had the correct attitude towards the whenever we take an antibiotics, we contribute to the development of antibiotic resistance.

65.2% (n=133) people are aware about antibiotics are not safe to take without a doctor's prescription.

Also, 55.9% (n=114) people knows the antibiotics does not kill the good bacteria in our bodies. Also 68.1%. (n=139) people knows that antibiotics have side effect or adverse reaction or 54.4% (n=111) people knows that also cause allergic reactions.

In our study, we learnt that 68.6% (n=140) knows the correct Knowledge about misuse of antibiotics Can lead to antibiotic resistance. Also, 46.1% (n=94) had the correct attitude towards antibiotics are not prevent getting a more when Suffering from cold. Although, 60.3% (n=12) respondents knows antibiotics are effective only against the bacterial infection not a viral infection. 81.9% (n=167) People also had the Correct practice about always consult a doctor before starting an antibiotic. And we also knows from the Study that 90.7% (n=185) of people check the expiry date of the antibiotic before using it which is correct practice.

Good awareness was seen, but many practiced self-medication & incomplete Courses. This shows the need for more awareness & stricter control on antibiotic sales.

CONCLUSION.

The study concludes that though public possesses good knowledge about antibiotics, there is a gaps in understanding and inappropriate practices precisely in incomplete course and use for viral illnesses still exist which significantly contributes to rising antibiotic resistance in India and studied districts of Maharashtra. Better education, regulating antibiotic sales and promoting responsible prescribing practices are essential to minimizes the misuse and protect the effectiveness of antibiotics.

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HOW TO CITE THIS ARTICLE

Vaibhav B. Mahajan, Tejas A. Pawar, Rohini V. Patil, Samiksha D. Patil, Pranjal S. Gholap, Samiksha P. Warke: Assessment of the knowledge, attitude and practices related to antibiotics among the general public from selected districts of Maharashtra, India. International Journal of Institutional Pharmacy and Life Sciences, Vol 16[2] March-April 2026 : 31-43.