

An observational study to promote drug safety of antibiotic therapy among public in post covid era

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Date of Submission: 20-06-2024

Date of Acceptance: 30-06-2024

ABSTRACT: The study was undertaken to investigate the knowledge of the public about drug safety of antibiotic therapy, by conducting a questionnaire-based survey. The objectives of the study include assessment of increased usage of antibiotics in the post COVID era, to promote the ADR reporting due to antibiotics and to provide information regarding proper disposal of antibiotics. The study instrument was a 15 item semi structured questionnaire designed to obtain information on the participant's knowledge about safe and effective use of antibiotics and ADR reporting. The questionnaire consisted of 2 parts; the first included the questions on the demographic variables, such as age, gender, occupation and educational level. The second part consisted of 15 questions which tested the participant's knowledge about safe and effective use of antibiotics. The survey was distributed to 300 individuals, ranging in age from 18 to 70 years, through google forms. 200 responses were obtained, out of which 45 were from respondents in the medical field, thus excluded from the study. Finally, 155 responses were selected. Majority of the respondents take antibiotics with prescription and do complete the course. Antibiotics were prescribed atleast once in the past six months to most of the respondents. A trend of disposing leftover antibiotics within the household trash was exhibited by them. Majority of the respondents have no idea about PvPI and have not yet reported any ADR. Their knowledge on antibiotic usage pattern, its disposal and how ADR, if observed, should be reported are discussed. There is a lack of knowledge about antibiotic resistance and rational use of antibiotics among the general public. The observational study revealed that the majority of respondents adhere to antibiotic prescription guidelines, yet exhibit a tendency to dispose of leftover antibiotics in household trash, lack awareness of PvPI, and have not reported any

adverse drug reactions (ADRs). To improve the knowledge of the public, leaflets on 'Antibiotic Resistance', 'Pharmacovigilance' and poster on 'Proper Disposal of Antibiotics' were prepared and circulated.

KEYWORDS: Antibiotic therapy, Antibiotic resistance, Drug safety, Pharmacovigilance, Adverse drug reactions,

I. INTRODUCTION

The COVID-19 pandemic has underscored the critical importance of effective healthcare interventions and the responsible use of medications. Among these, antibiotics play a pivotal role in treating bacterial infections, saving countless lives. However, the misuse and overuse of antibiotics have led to the emergence of antibiotic resistance, posing a significant threat to global public health. In the aftermath of the pandemic, as healthcare systems reassess and adapt, ensuring the judicious use of antibiotics becomes paramount.

This observational study aims to educate the public about the rational use of antibiotics, reduce the incidence of antibiotic resistance, and promote reporting of adverse drug reactions associated with antibiotic use. With antibiotic resistance presenting a persistent challenge, understanding public knowledge and behaviours regarding antibiotic therapy is crucial. Through the survey, this study will explore public attitudes towards antibiotic usage, awareness of antibiotic resistance, and adherence to prescribed antibiotic regimens. The results of this study are anticipated to provide valuable insights for broader initiatives focused on reducing antimicrobial resistance and maintaining the effectiveness of antibiotics. Through raising awareness and encouraging responsible antibiotic utilization, we can protect public health and support sustainable healthcare

practices in the post COVID era and for years to come.

When bacteria adapt, they become resistant to the effects of antibiotics, making them more difficult to eradicate or suppress. Bacterial infections can become very challenging to cure. Pharmacovigilance, sometimes referred to as drug safety, is the science and practices surrounding the identification, evaluation, comprehension, and avoidance of side effects or any other issue pertaining to medications or vaccines. Before being approved for use, all medications and vaccines are put through extensive clinical trials to ensure their efficacy and safety.

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the cause of the worldwide coronavirus disease 2019 pandemic, commonly referred to as the COVID-19 pandemic or the coronavirus pandemic. The post-COVID-19 period has seen fluctuations in infection rates, largely influenced by various factors including vaccination rates, the emergence of new variants, public health measures, and individual behaviours. Initially, there were concerns about potential surges in infections as restrictions were eased and people began to interact more freely. That said, there have been instances of localized outbreaks and spikes in infections, especially in areas with lower vaccination rates or where new variants have emerged.

II. AIM

To promote safe use of antibiotic by assessing public knowledge about antibiotic resistance.

III. OBJECTIVES

- To conduct survey on antibiotic usage in the post COVID era.
- To promote ADR reporting due to antibiotic by pharmacovigilance programme.
- To provide information regarding proper disposal of antibiotics.
- To sensitize public about antibiotic resistance.

IV. METHODOLOGY

Study Design

The study was conducted among the public over a period of three months from March 2024 to May 2024. This research utilized a cross-sectional, observational survey with questionnaire responses gathered to best reflect the public knowledge. The questionnaire was designed such that all subjects could answer it with relative ease. It was validated by the research guide and experts from the

department of Pharmacy Practice. The questionnaire was first distributed to 20 individuals to run a trial response. Later the questionnaire was distributed to 300 individuals and responses were selected as per the inclusion and exclusion criteria.

Study Instrument and Administration

The study instrument was a 15 item semi structured questionnaire designed to obtain information on the participant's knowledge about safe and effective use of antibiotics and ADR reporting. The questionnaire consisted of 2 parts; the first included the questions on the demographic variables, such as age, gender, occupation and educational level. The second part consisted of 15 questions which tests the participant's knowledge about safe and effective use of antibiotics.

To develop the questionnaire, we first did a thorough literature review, from which we adapted the study instrument and modified it to suit our study context. Questionnaire was distributed through google forms to the public and asked to submit the responses in their free time. Responses recorded later than May 31, 2024 were not considered for the study. Data collected were analysed statistically.

Inclusion/Exclusion Criteria

- Selected individuals from the age group of 18 - 70 years.
- All the answers should be filled in the questionnaire.
- Subjects who studied or working in the medical field are excluded
- Incomplete questionnaires were also excluded.

V. RESULTS AND DISCUSSION

After COVID-19, an increased rate of infection is observed, for which people have been taking antibiotics at an exceptionally higher rate leading to possibilities of ADRs. This may lead to antibiotic resistance in the future. The questionnaire prepared was sent to 300 individuals, and 200 responses were obtained. Out of these 200, 45 were healthcare professionals, thus they were excluded from the study. Finally, 155 responses were selected. The questionnaire was responded by individuals belonging to the age group of 18-62.

Questionnaire Discussion:

1. Post-COVID-19: Encounter with other viral diseases.

Upon analysis 31.2% of respondents were affected by other infections, while 68.8% were not

affected. If a population was encountering fewer viral diseases after the COVID-19 pandemic, it could have been due to an overall decrease in viral diseases, which may have been a result of a combination of factors including public health measures such as mask-wearing, social distancing and hand hygiene during the COVID-19 pandemic. These measures not only reduced the transmission of SARS-CoV-2 but also other respiratory viruses

like influenza and the common cold. Other contributing factors were increased awareness and hygiene practices, vaccination campaigns, reduced travel and social mixing, and immunity development. However, it was essential to continue monitoring and addressing the factors contributing to the prevalence of viral diseases to sustain these positive outcomes over the long term.

2. Consumption of prescribed antibiotics over the past six-months

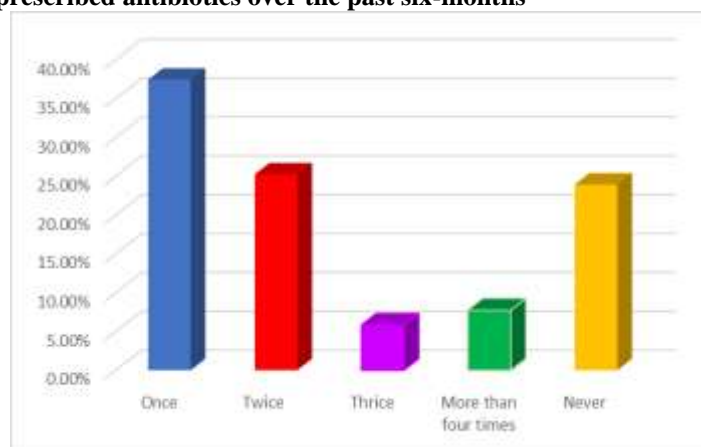


Fig.1

Among the participants, 37.4% (Fig.1) reported to take antibiotics at once in the past six months, indicating limited need for antibiotics during this period. This suggested they had relatively minor infections or health issues that required antibiotic treatment. Limited antibiotic use helped mitigate the risk of developing antibiotic resistance, as overuse and misuse of antibiotics could contribute to the emergence of resistant bacteria, making infections harder to treat.

25.2% of participants took antibiotics twice in that period, suggesting a slightly higher frequency of antibiotic use. This indicated chances of recurrent infections or health issues that required antibiotic treatment on two separate occasions within the past six months. There was a possibility of incomplete treatment, where the initial infection might not have been fully resolved with the first course of antibiotics, leading to a subsequent infection requiring additional treatment. This increased the risk of antibiotic resistance, especially if antibiotics were not used appropriately. 23.9% did not take

antibiotics for any infections, implying good health and limited exposure to infections or they might have undergone other alternative system of medicine. This could be attributed to factors such as good hygiene practices, a healthy lifestyle, or reduced contact with sick individuals. 5.8% took antibiotics three times in the past six months, indicating a relatively high frequency of antibiotic use. Further medical evaluation was needed to address underlying health issues contributing to recurrent infections and ensure appropriate treatment and prevention strategies were in place. 7.7% took antibiotics more than four times in the past six months, suggesting a high frequency of antibiotic use. This could indicate underlying health conditions, weakened immune system, or exposure to difficult-to-treat pathogens. Repeated use can lead to antibiotic resistance. Open communication with healthcare providers was essential to ensure appropriate management of recurrent infections and promote overall health and well-being.

3. Reporting side effects

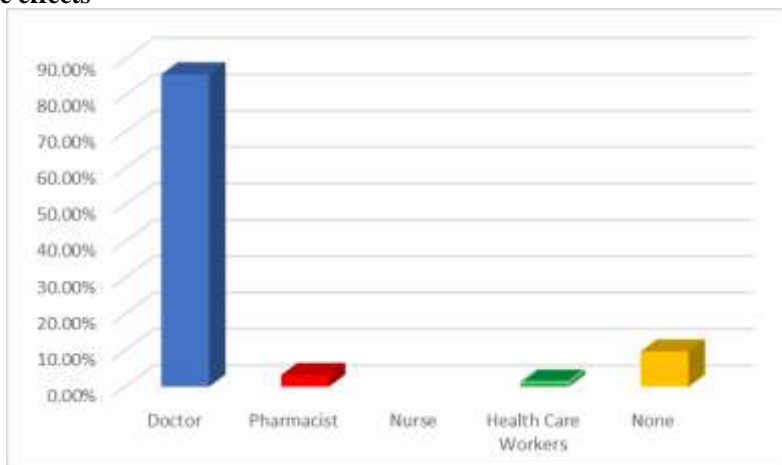


Fig.2

The study showed that 85.8% (Fig.2) of the participants chose to report the side effects of antibiotics to doctors. Most people were aware of adverse drug events and their reporting to doctors, recognizing its importance for patient safety. Participants believed that ADR reporting system will improve drug safety and enhance the overall quality of healthcare and majority consider reporting ADR associated with antibiotics necessary. Reporting ADR to healthcare professionals allowed for the monitoring of drug safety and effectiveness, with doctors documenting and reporting adverse

events to relevant health authorities or pharmacovigilance systems. Some participants, about 9.7%, indicates reporting of ADR associated with antibiotics is unnecessary. This suggested a lack of awareness on reporting of side effects and drug safety, possibly due to communication challenges, normalization of symptoms, or a belief that individual reports would not impact society significantly. The remaining participants, 3.2%, reported side effects to pharmacists, and 1.3% reported them to healthcare workers. None of the subjects reported side effects to nurses.

4. Consumption of antibiotics without prescription

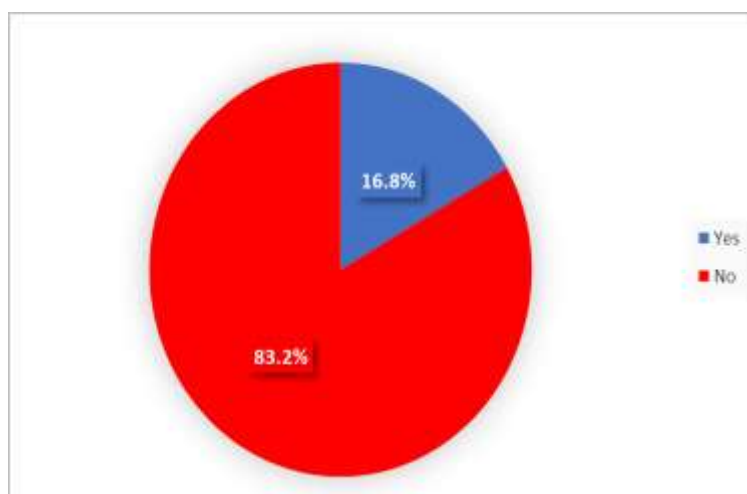


Fig. 3

Taking antibiotics without a prescription can cause serious consequences like antibiotic resistance, adverse reactions, incomplete treatment,

masking of underlying conditions, worsening of infections etc. This section shows that 83.2% (Fig.3) of participants takes antibiotics through proper

consultations and maintained prescriptions till course completion. And 16.8% of the public were self-administered antibiotics without prescription because they might not be aware about the consequences. This may lead to reduced

effectiveness of antibiotics. The global rise in antibiotic resistance poses a significant threat, diminishing the efficacy of common antibiotics against widespread bacterial infections.

5. Disposal of leftover antibiotics

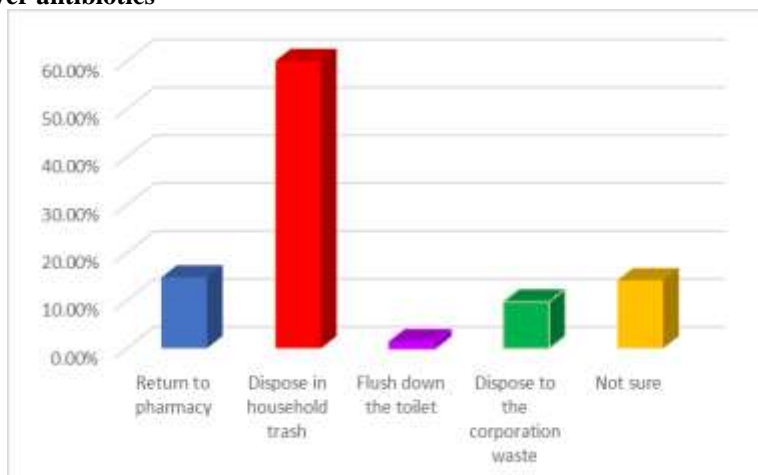


Fig. 4

A large number of participants (60%) (Fig.4) dispose of the leftover antibiotics in household trash. They are not conscious about the impact on social health and wellbeing over antibiotic resistance. The study shows that 14.8% participants return the leftover antibiotics to the pharmacy itself. 14.2% of participants are not aware about how to dispose of leftover antibiotics after completing the prescribed course. A few participants, 9.7% disposes of the leftover antibiotics to corporation waste. Its major consequences are environmental contamination,

antibiotic resistance, public health risk, economic impact etc. A very few percentages, (1.3%) flush down the toilet. It predominantly causes an impact on sewage treatment plants. To mitigate these risks, it's crucial for individuals to dispose of leftover antibiotics properly, following local guidelines and regulations. Generally, antibiotics when prescribed by the physician will not leave any leftover, as is always prescribed in courses. To educate about proper disposal practices, posters were prepared and distributed.

6. Antibiotic Compliance

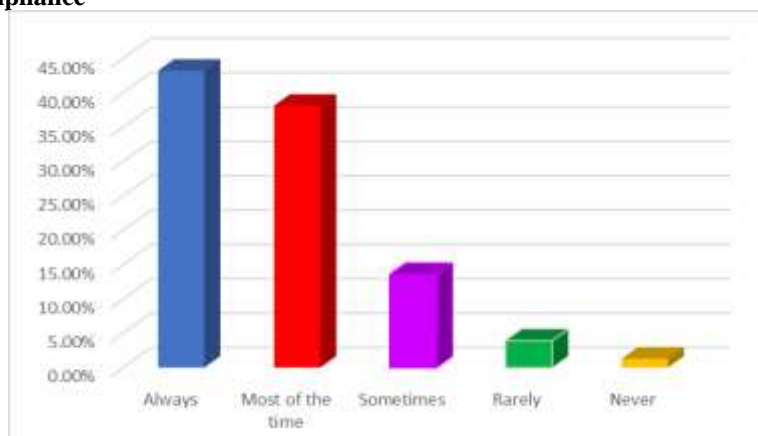


Fig. 5

Completing the full course of antibiotics as prescribed by the healthcare provider is crucial for effectively treating bacterial infections and reducing the risk of antibiotic resistance. From the study, only 43.2% (Fig.5) of participants always complete the full course of prescribed antibiotics, while 38.1%, most of the time completes the prescribed antibiotics. Additionally, 13.5 % sometimes completes the antibiotic course, 3.9% rarely completes it, and 1.3% never completes the antibiotic course. Even if you start feeling better before finishing the prescribed course, it's important to continue taking the antibiotics as directed until the entire course is completed. This helps ensure that all bacteria causing the infection are eradicated, reducing the likelihood of the infection returning or becoming resistant to antibiotics.

7. Knowledge about antibiotic resistance

The study revealed that 74.2% of respondents are knowledgeable about antibiotic resistance, while 25.8% are not familiar with it. "Antibiotic resistance" refers to the ability of bacteria or other microorganisms to withstand the effects of antibiotics, rendering them ineffective in treating infections caused by those bacteria. Over time, bacteria can develop resistance through genetic mutations or by acquiring resistance genes from other bacteria. This phenomenon poses a significant public health threat as it reduces the effectiveness of antibiotics, leading to longer illnesses, increased healthcare costs, and in some cases, life-threatening infections that are difficult or impossible to treat.

8. Significance of Antibiotic Resistance on future generation

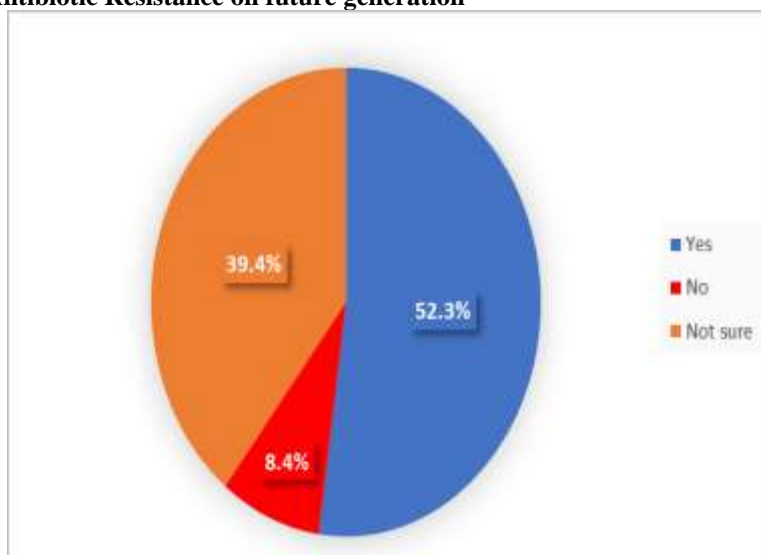


Fig. 6

Antibiotic resistance is a significant issue for future generations. The overuse and misuse of antibiotics have accelerated the development of antibiotic-resistant bacteria, making infections increasingly difficult to treat. If left unchecked, antibiotic resistance could lead to a future where common infections become untreatable, routine medical procedures become riskier, and healthcare

costs rise substantially. From the study, the majority of participants, 52.3% (Fig.6) consider antibiotic resistance a significant issue, while 8.4% do not view it as a major concern. Additionally, 39.4% of participants are uncertain about the significance of antibiotic resistance. This issue can lead to the resurgence of previously controlled infectious diseases, making them harder to treat and control.

9. Knowledge about Adverse drug reactions (ADRs)

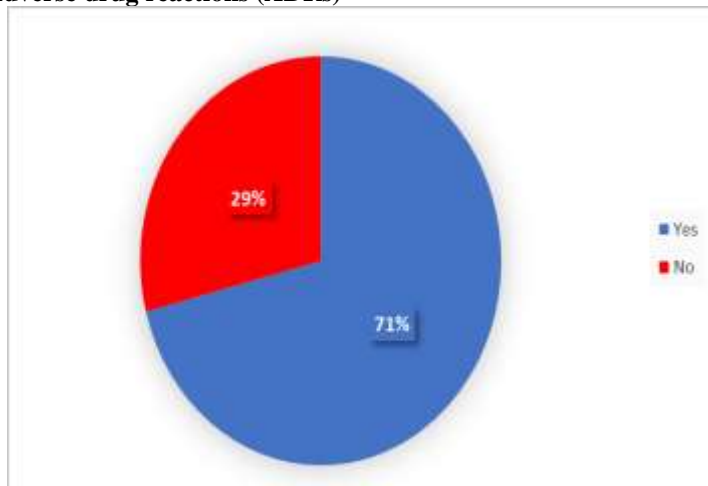


Fig. 7

Adverse Drug Reactions (ADRs) are unintended and harmful reactions caused by the use of medications. These reactions can range from mild to severe and may occur shortly after starting a medication or after prolonged use. The majority of respondents 71% (Fig.7) are knowledgeable about ADRs, while 29% are unaware of them. ADRs can manifest as various symptoms affecting different body systems, even life-threatening allergic reactions or organ damage. The prevalence and severity of ADRs vary depending on factors such as

the individual's health status, genetics, dosage of the medication, duration of use, and interactions with other medications or substances. Healthcare professionals play a crucial role in monitoring for and managing ADRs, including pharmacists who often provide counselling on medication use and potential side effects. Reporting suspected ADRs to regulatory authorities is essential for ongoing pharmacovigilance to ensure the safety of medications for the broader population.

10. History of reporting adverse reactions to antibiotics

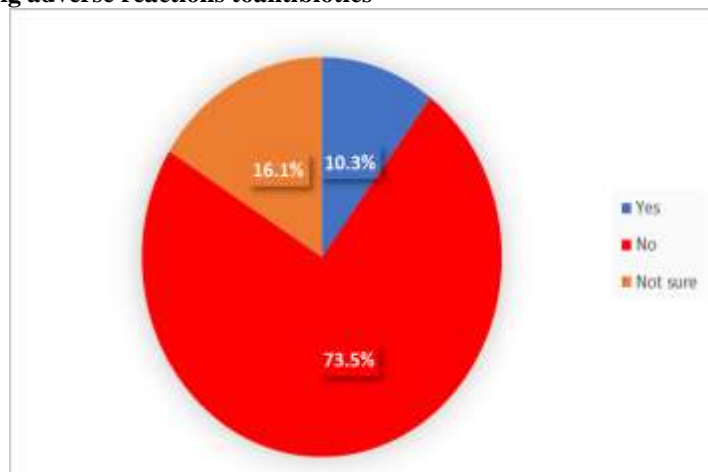


Fig. 8

Reporting of Adverse Drug Reactions (ADRs) refers to the systematic process of documenting and informing relevant authorities about unexpected or harmful effects experienced by individuals following the administration of

medications. As per the obtained result, only 10.3% (Fig.8) of respondents reported and 73.5% of respondents not reported and 16.1% of respondents are not sure about reporting. The closest Adverse Drug Reaction Monitoring Center (AMC) or the

National Coordination Center (NCC) for PvPI can receive a completed Suspected Adverse Drug

Reaction Reporting Form.

11. Need for awareness about antibiotic resistance and ADR monitoring

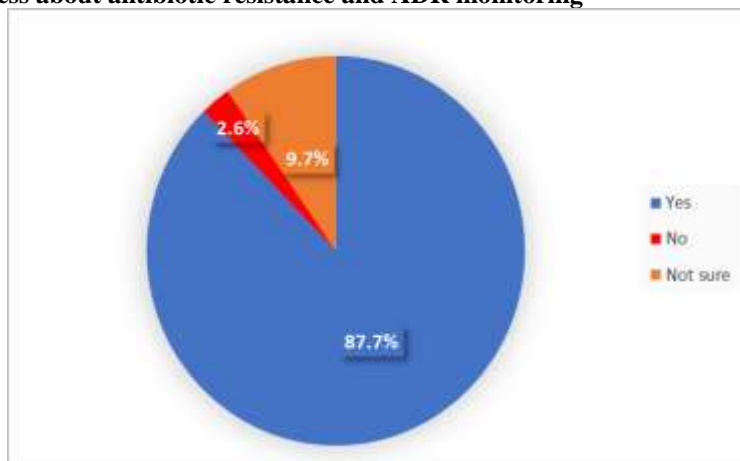


Fig.9

Majority of the participants 87.7% (Fig.9) stand in need for more public awareness campaigns about antibiotic resistance and ADR monitoring. Reporting of adverse drug reactions is crucial for patient safety and it enhances the overall quality of healthcare. But among the participants, 9.7% are not sure if it is necessary or not. Concluding the observation, leaflets on antibiotic resistance and ADR monitoring were distributed to them.

VI. CONCLUSION

The study aimed at promoting drug safety of antibiotic therapy among the public in the post-COVID era underscores the critical need for heightened awareness and education regarding antibiotic usage. Majority of the respondents take antibiotics with prescription and do complete the course. Antibiotics were prescribed at least once in the past six months to most of the respondents. A trend of disposing leftover antibiotics within the household trash was exhibited by them. Majority of the respondents have no idea about PvPI and have not yet reported any ADR.

Generally, antibiotics when prescribed by the physician will not leave any leftover, as is always prescribed in courses. Leftover antibiotics often result from incomplete courses of treatment, whether due to feeling better or experiencing side effects; changes in prescription, when the initial antibiotic is ineffective or dosage adjustments are needed; and improper storage. Use of these leftover antibiotics later contributes to antibiotic resistance.

Therefore, it is crucial not to share antibiotics with others or keep unused antibiotics for future illnesses. Ensuring proper disposal of antibiotics is essential. The results conclude that there is a lack of knowledge about antibiotic resistance and rational use of antibiotics among the general public. Though many of the participants have heard about the term 'Antibiotic Resistance', they are still unaware about the proper practice to prevent the situation. This emphasizes the critical necessity for comprehensive educational campaigns geared towards enriching public knowledge on antibiotic misuse and resistance.

Thus, to provide awareness to the public, leaflets on 'Antibiotic Resistance', 'Pharmacovigilance' and a poster on 'Proper Disposal of Antibiotics' were prepared and circulated. This study highlights the importance of drug safety of antibiotic therapy and minimizing the emergence of antimicrobial resistance, thereby contributing to enhanced public health outcomes and the preservation of antibiotic efficacy.

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