Effect Of Indian Demographic on Self Medication in Term of Antibiotics Resistance

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***Abstract*—Antibiotic medicines are not recommended for OTC (Over the Counter) use; however, self-medication practice is commonly observed in the Indian population. Self-medication with antibiotics may cause adverse effects and increase the risk of side effects. Many people purchase antibiotics as OTC drugs and do not complete the full course of treatment, which leads to the development of antibiotic resistance. In rural areas, people are often unaware of antibiotic resistance and its consequences. Taking antibiotic in doses that are higher or lower than the prescribed amount or, for a duration shorter or longer than the standard recommended period, can cause adverse effects such as nausea, vomiting and diarrhea. In India, self-medication with antibiotics remains wide spread, driven by factors like their easy over the counter access, economic limitations, hectic lifestyles, and dependance on advice from pharmacist, relatives, or previous prescriptions. Patients with chronic condition (e.g.: COPD, diabetes, hypertension) are prone to antibiotic self-medication and misuse due to frequent infections, symptoms confusion, prior exposure, polypharmacy confidence, weakened immunity, health care costs and incomplete courses- all accelerating bacterial resistance. It may also lead to serious health compliance. The prevalence is in Male (35.48%) and female (15.56) used self-medication due to lack of time, (32.26%) male and (26.67%) female used self-medication who were not consulted with physician. (24.44%) female and (3.3%) male believe in Ayurvedic.**

***Index Terms*—Self-medication, Antibiotic resistance, antimicrobial resistance (AMR), Demographic factors, Indian population, Antibiotic misuse.**

I. INTRODUCTION

Self-medication refers to the practice of individuals using medicines to treat self-diagnosed illnesses or symptoms without consulting a qualified healthcare professional. This practice often includes the use of antibiotics obtained without a prescription, leftover medicines from previous treatments, or recommendations from family, friends, or pharmacists. While self-medication may appear convenient and cost-effective, the inappropriate use of antibiotics has become a major public health concern worldwide.[5]

Antibiotics are drugs designed to treat infections caused by bacteria. However, when these medications are used incorrectly-such as taking them for viral infections, using the wrong antibiotic, taking incorrect doses, or stopping treatment early-bacteria can adapt and develop resistance. This phenomenon is known as antibiotic resistance, where bacteria evolve mechanisms that make antibiotics less effective or completely ineffective.

Self-medication significantly contributes to the development and spread of antibiotic resistance. Easy access to antibiotics without proper medical supervision encourages misuse and overuse. As resistant bacteria spread within communities and healthcare settings, common infections become harder to treat, leading to longer illness durations, increased healthcare costs, and higher mortality rates.[5]

The growing threat of antibiotic resistance has been recognized globally by organizations such as the World Health Organization, which warns that misuse of antibiotics could lead to a “post-antibiotic era” where minor infections or injuries could once again become life-threatening.[5]

Therefore, understanding the relationship between self-medication and antibiotic resistance is essential. Promoting responsible antibiotic use, strengthening regulations on antibiotic sales, and increasing public awareness are crucial steps in controlling the rise of antibiotic-resistant bacteria.

II. REVIEW

Antibiotics: Antibiotics are chemical substance which are obtained from various species of microorganism that kills or inhibits the growth of another microorganism in low concentration. The antibiotics shows their therapeutic effects by killing or inhibiting growth of microorganism by various mechanisms such as; inhibition of biosynthesis of bacterial cell wall, inhibition of functioning of cytoplasmic membrane, inhibition of protein synthesis, inhibition of nucleic acid biosynthesis [3].

Antibiotics are the one of the most frequently or habitually acquired OTC medication in Indian demography [5].

Antibiotic Resistance: Antibiotic medicines are not recommended for OTC (Over the Counter) use; however, self-medication practice is commonly observed in the Indian population. Self -medication with antibiotics may cause adverse effects and increase the risk of side effects. Many people purchase antibiotics as OTC drugs and do not complete the full course of treatment, which leads to the development of antibiotic resistance. In rural areas, people are often unaware of antibiotic resistance and its consequences. Taking antibiotic in doses that are higher or lower than the prescribed amount or, for a duration shorter or longer than the standard recommended period, can cause adverse effects such as nausea, vomiting and diarrhea. It may also lead to serious health compliance [3].

Broad spectrum antibiotics are mostly used to treat bacterial infection but occurring unneeded use in health care system due to late diagnosis of pathogenic bacteria and it will create antimicrobial sensitivity in patients which leads to many various infections or disease [3]. More use of antibiotic may cause ADR in drug selection and dose of these antibiotics in which we use classification of antibacterial drug and it is used in the treatment [3].

Public health services lead to challenge in the global market to providing strategy in case to prevent and they provide the emergency antibiotic resistance.

Epidemiology Of Antibiotic Resistance:

The many countries are including Brazil, China, South Africa these countries found the antibiotic resistance in health care system which leads due to the modern medicine are used [3]. Antibiotic resistance can cause various risk such as therapy are false, more chance of bacterial infection, bacterial growth and biological population are also increased [3].

Researcher of India found that the medical expert's team, self-medication are mostly used to treat non-serious health condition.

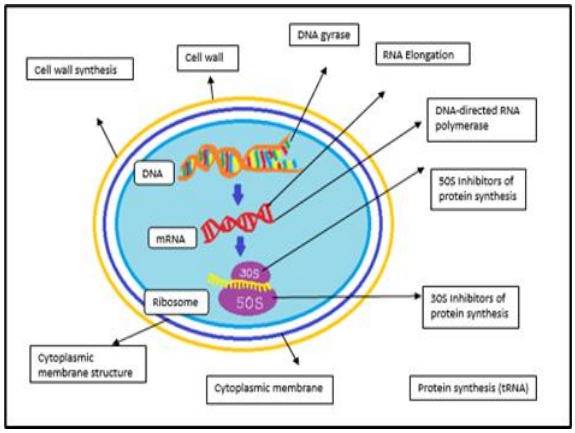

Figure 1: Diagram of Mechanism of Antibiotic.

Sr. No.	Mechanism of Action	Antibiotic Drugs
1.	Cell wall synthesis	Glycopeptides Beta Lactams
2.	DNA gyrase	Quinolones
3.	RNA Elongation	Actinomycin
4.	DNA-directed RNA polymerase	Rifampin
5.	50S Inhibitors of protein synthesis	Streptomycin Amphenicol Macrolides Lincosamides Oxazolidinones
6.	30S Inhibitors of protein synthesis	Aminocyclines Tetracyclines
7.	Protein synthesis (tRNA)	Aminoglycosides Spectinomycins
8.	Cytoplasmic membrane structure	Polymyxins Daptomycin

Table 1: Classification of antibiotic based on their mechanism of action

III. EFFECT OF INDIAN LIFESTYLE

In India, self-medication with antibiotics remains wide spread, driven by factors like their easy over the counter access, economic limitations, hectic lifestyles,

and dependance on advice from pharmacist, relatives, or previous prescriptions. People frequently take them for trivial or viral conditions and stop courses prematurely, stemming from limited health literacy and weak compliance. Compounding this are challenges like dense populations, inadequate sanitation, and antibiotic exposure via food and farming, which fuel overuse. Such misuse generates intense evolutionary pressure on bacteria, accelerating antimicrobial resistance across the country.

Case Study:
Patients' information:

- Name: Undisclosable
- Location: Maharashtra
- Age: 21 years

Case description:
the patients reported a history of severe throat infection. During this condition, the patient self-medicated with an antibiotic, specifically azithromycin, based on the suggestion of a family member.
The medication was purchased directly from a retail medical store without a prescription (i.e., over -the-counter, OTC use).

Drug details:
Drug name: Azithromycin
Dosage: 1 tablet per day
Duration: 3 days (total 3 tablet)
Adverse drug reaction:
During the course of treatment, the patient experienced the following side effect:

- ✓ Diarrhea
- ✓ Vomiting
- ✓ Dry mouth
- ✓ Bitter taste

Conclusion:
The case highlights inappropriate self-medication with antibiotics, which lead adverse drug reactions (ADR). It emphasizes importance of using antibiotics only under proper medical supervision.

Comorbidity:
Having multiple health condition in a single individual heightens the chances of antibiotic self-medication, which fuels bacterial resistance. Patients with chronic condition (e.g.: COPD, diabetes, hypertension) are prone to antibiotic self-medication and misuse due to frequent infections, symptoms confusion, prior exposure, polypharmacy confidence, weakened immunity, health care costs and incomplete courses-all accelerating bacterial resistance.

IV. GROWTH OF OTC DRUG SALE

In India, we seen that the sale and purchase of antibiotic drugs are greatly observed. In these drugs includes like analgesics (Paracetamol, Dolo 650, Crocin), pain-relief drugs, antibiotics (Azithromycin, Amoxicillin, Cefixime) used for relief from cold, infections. The sale of these antibiotics is given by the OTC drugs in which they are available in pharmacy by shop and even at the petrol pump mostly antibiotic preferred self-medication and they produce various side effects [8].

V. ANTIBIOTICS USED IN THE SELF-MEDICATION WHICH CREATE THE ANTIBIOTIC RESISTANCE

In India the most commonly used antibiotic drugs are the penicillin, cephalosporin, macrolide, amoxicillin and metronidazole cure illness or disease or any type of infection [5]. And observed that generally many peoples taking azithromycin in cold. In the bacterial infection we see that the most people are using antibiotics such as ampicillin, cloxacillin are used as antibacterial drug due to over use of antibiotic drug chances of sever adverse effects [5,6].

Sr. No.	Category	Drugs
1.	Cough and cold	D-cold total Corex Benadryl Glycodin
2.	Analgesics	Saridon Disprin Nise Diclofenac Nimesulide
3.	Antipyretics	Paracetamol Ibuprofen Calpol

		Crocin
4.	Antiseptic	Dettol Boroplus
5.	Antibiotics	Ciprofloxacin Norfloxacin Amoxicillin Cefadroxil
6.	Others	Dabur Chyawanprash Hajmola

Table 2: Antibiotics used in self-medication.

Prevalence Of Self-Medication

Male (35.48%) and female (15.56) used self-medication due to lack of time, (32.26%) male and (26.67%) female used self-medication who were not consulted with physician. (24.44%) female and (3.3%) male believe in Ayurvedic [8].

The prevalence of self-medication in developing countries widely varies between 12.7% and 95% [9]. Therefore, some of female (6.67%) in which no family support to take self-medication and about (55%) of self-medication profile found in Meghalaya [8,6]. The study in Uttarpradesh shows their prevalence about 69.6% with one year and prevalence of self-medication was about 73.6% within last three months. In South India the prevalence of self-medication is about 92%.

The observed self-medication prevalence in Brazil (86.4%), China (50%), Sri Lanka (33.9%) and (35.9%) in urban population.

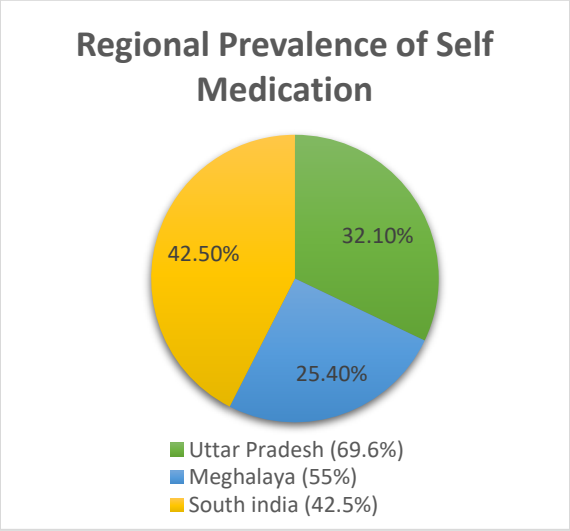

Figure 2: Regional Prevalence of Self Medication.

Causes of Self-Medication:

The patients are mostly preferred the self-medication to the health care system and they have capability to treat chronic infection and the bacterial infection [6].

For example: They were use antifungal agents, antibiotics, oral contraceptive drugs, topical corticosteroid and histamine H_2 receptor blocking agent [6].

Reasons for self-medication with antibiotics:

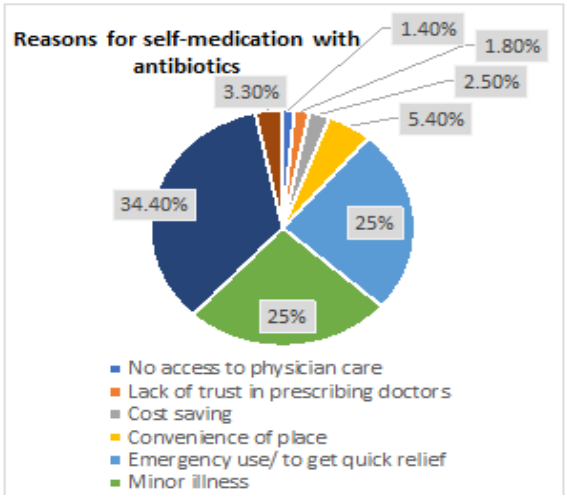

Figure 3: Reasons for self-medication with antibiotics

VI. DUTIES OF PHARMACIST

Pharmacist play most important role in educating the patients/ customers about proper use of medicines. He has big responsibility to educate the patients about the safety and efficacy of the drug and make their use appropriate, effective and economical for all medications he should guide the patients about the effect of the drug and prevent the problems related to medicine so patient get the best result and quality of medicines. Pharmacist should give advice to patient/ customers to consult a doctor before taking medicines on their own [7].

Role of Pharmacist is as follows:

- Communicator/ Counselling -
- Pharmacist should council the patients about their disease condition or past medication history. Pharmacist must ask appropriate question to patients about their illness or disease.

- Pharmacist should guide the patients about the medication, dose, efficacy of drug, possible side effects and adverse drug reactions.
- Pharmacist must keep confidentiality of documents regards patients.
- Supply of quality drug –
- The responsibility of pharmacist to provide good quality medication.
- Pharmacist must make sure that they purchasing medication from reputed and trusted company and safe, better-quality medications.

VII. CONCLUSION

Self-medication with antibiotics is a serious public health issue in India and plays a major role in driving antibiotic resistance. Factors such as easy over-the-counter access to antibiotics, limited public knowledge, financial constraints, hectic schedules, and reliance on pharmacists or past prescriptions contribute to their inappropriate use. Choosing the wrong dose, stopping treatment early, or using antibiotics unnecessarily can cause adverse reactions and diminish their effectiveness. The findings underscore the importance of enforcing stricter controls on antibiotics sales, ensuring pharmacists provide accurate counselling, and raising public awareness about appropriate antibiotic use. Antibiotics should be taken only under the supervision of healthcare professionals to curb resistance and preserve future treatment options.

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