



KNOWLEDGE ABOUT AZITHROMYCIN AMONG UNIVERSITY STUDENTS OF NORTH INDIA

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ABSTRACT

Azithromycin, a macrolide antibiotic, has gained popularity as an antibiotic of choice in the recent times. The recent COVID-19 pandemic also saw a large-scale use of this antibiotic for both prophylactic and therapeutic use. A cross sectional study was conducted among university students in two phases, viz. pilot study which was conducted by face-to-face interviews among students of a technical university in Rajasthan and an online web-based survey which was expanded to other universities in North India, to understand the knowledge and use of Azithromycin among them. It was found that nearly one third of the study participants were taking this medicine over the counter, without the prescription of a registered medical practitioner. Variation in dosing and frequency of use was also noted. This raises concern regarding the indiscriminate use of this drug.

KEYWORDS :

INTRODUCTION

Azithromycin, a macrolide antibiotic, was developed towards the end of 20th century in Yugoslavia. It is a broad-spectrum antibiotic, which is mostly used to treat infections of upper and lower respiratory tract, as well as urinary and skin infections. The use of Azithromycin gained traction in India during the recent COVID-19 pandemic, when it was prescribed to prevent and treat secondary bacterial infections.^{1,2} Further, it has been a drug of choice for the clinicians too, because of once-a-day dosing, and shorter treatment regimen, that also reduce the overall cost of treatment.³

India is a country with vast cultural and political diversity. Its per capita income of 2500 USD ranks 142 among all countries and many regions suffer from poor doctor patient ratio.^{4,5} Moreover, the government has implemented stringent laws about over-the-counter sale of antibiotics in India, many antibiotics, including Azithromycin, are available over-the-counter.⁶

Despite evidences suggesting the role of Azithromycin in COVID-19 in adjunct with other medications, it is necessary to reiterate that scientific evidence support the fact that antibiotics play limited role in viral illnesses.⁷ There have been reports of drug resistance due to Azithromycin from parts of India, too.⁸ This has led to indiscriminate use of Azithromycin in the recent times. Moreover, there have been reports of drug resistance due to Azithromycin from parts of India. Published literature from parts of India show that people lack knowledge about antibiotic resistance in India, and globally.^{9,10} Furthermore, Azithromycin was used widely by clinicians in the management of COVID-19, although evidence was on the contrary.¹¹ Hence, this study was planned to gain insight on the knowledge and perception about use of Azithromycin among university students of north India, and their experiences with this drug.

MATERIAL AND METHODS

A cross-sectional survey was conducted among university students studying in various universities across north India in the states of Rajasthan, Haryana, Uttar Pradesh and Delhi. This was conducted in two phases: the first phase being a pilot study done by conducting face-to-face interviews using a semi-structured interview schedule and the second phase being a web-based survey. The pilot study was done in Maharshi Dayanand Saraswati University (MDSU) in Ajmer, Rajasthan. This is a prominent university in the north-western part of India, which was set up in 1987, and offers post-

graduate and diploma, including masters in various streams like science, commerce and arts. All the students enrolled in the university at the time of survey, in the month of November 2022, were eligible to participate in the pilot study. Sample size was calculated using the formula Z^2pq/d^2 , with Z being the standard normal deviate (1.96), and assuming that nearly three-fourth people had no knowledge about the ill-effects of Azithromycin, based on the study conducted by Desai AJ *et al.*⁹ The sample size was calculated to be 450 for the pilot study, assuming the relative error in precision to be approximately 4%. Participants were approached at their duty station during lunch hours and purposive sampling strategy was adopted to enroll the study participants. Written informed consent was taken from them. A self-designed semi structured questionnaire was used for the survey, which was validated for face validity and construct validity. A trained data collector administered the interview schedule. After the interview, study participants were informed about the ill effects of using antibiotics without proper indication, and were also given information on proper dosing and regimen of Azithromycin.

In the second phase of the survey, the questionnaire was further refined based on the interim analysis of the pilot study and circulated using Google Forms through various Whatsapp groups over the third weekend in the month of January, 2023 among various university students of North India. This was done to study the effect of literacy on the knowledge and perception to the use of Azithromycin among university students.

Data collected was entered in Microsoft Excel (version 2019) and was analyzed using SPSS v22. Appropriate statistical tests were used and descriptive data was represented in terms of total number of responses (n) and percentages. Chi square test was used to determine the association of various factors affecting the knowledge of study participants towards use of Azithromycin, and a p value of less than 0.05 was taken as a statistically significant association.

RESULTS

In the pilot study, a total of 450 participants were approached for the survey. However, due to various reasons, like paucity of time (13) and refusal to participate in the study (11), only 426 participants completed the survey. An overall rate of response was 94.6% was obtained in the pilot study. Survey respondents aged 20 to 25 years and had at least passed intermediate. Most of the study participants (78.6%) had heard the name of the drug Azithromycin. In the second phase, a total of 164

responses were obtained from the web-based survey. The survey was filled by university students pursuing various streams of biology, most of whom were pursuing MBBS (57.9%) or BAMS (2.4%) while the rest were doing Bachelor's in various streams of science like microbiology or physiotherapy (7%) and Masters in Science (4.8%), while the rest were pursuing post-graduation. Only three participants to the web survey were from pursuing disciplines which were not related to science.

Results of the pilot study

Less than half of the participants (46.6%) identified Azithromycin as an antibiotic in the pilot study, while others were not sure what was it used for. Majority of the study participants (61.8%) reported that they had consumed this drug in the past. Nearly one third (36.6%) admitted that they had taken this drug without prescription of a registered medical practitioner.

Most of the participants reported that they had taken this medicine for indications such as cold, cough as well as fever and sore throat. A few participants (8%) also reported that they had consumed Azithromycin for body-ache and headache. (Table 1)

Table 1: Self-reported reasons for use of Azithromycin among the participants of the survey

Self-reported reason for use of Azithromycin (N=426)	Pilot Study (N=426) n (%)	Web Survey (N=164) n (%)
Didn't recall	200 (46.9)	0 (0)
Cold	105 (24.6)	43 (26.4)
Fever	42 (9.9)	29 (17.8)
COVID-19	41 (9.6)	18 (11)
Pain in body	17 (4.0)	3 (1.8)
Headache	17 (4.0)	3 (1.8)
Some Infection	4 (0.9)	67 (41.1)

While the majority of the participants reported that they had purchased this medicine from a medical shop, some (15.2%) also reported that they had got the medicines free of cost from a government dispensary. Approximately 40% (170) of the participants reported that the doctor had not explained why this medicine was prescribed to them, whereas 189 (44.3%) reported that they were not instructed clearly on the dosing and frequency of intake.

Further, two participants (0.46%) reported taking the drug twice daily and only one participant (0.23%) reported taking the drug thrice daily among the study population. Most of the participants (80.2%) reported that they had improvements in symptoms after taking Azithromycin.

The participants who had taken Azithromycin after prescription from a registered medical practitioner reported a significantly higher cure rate, with 97.7% participants reporting a better outcome ($p < 0.001$, Pearson $\chi^2 = 16.5$).

Results of the web survey

Among the 164 respondents of the web survey, a majority of them (93.9%) reported that they had heard about the drug Azithromycin. More than half (53.7%) of the survey respondents reported that they had used this drug in the past. Further, 80.4% reported that they had taken this drug on the prescription of a doctor.

Most of the participants of the survey reported that they had procured this drug from a chemist (73.8%) while only 19.8% reported that they had obtained this drug from a government dispensary. Most of the participants reported that they had an improvement in symptoms after taking this drug (91.4%) while only 8.6% reported that they did not have any improvement in symptoms after taking this drug.

Comparison of frequency of dosing for Azithromycin among study participants

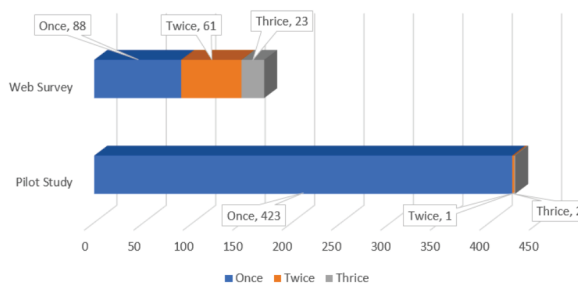


Figure 1: Comparison of frequency of dosing for Azithromycin among study participants

It was found in the pilot study that less than one percent of participants were using Azithromycin more than once daily. However, in the web survey, 35.4% respondents reported using this drug twice daily, and another 13.4% reported using this drug thrice daily. Azithromycin, by virtue of its high half-life and better bioavailability, is used in once daily dosing regimen, in variable duration of time depending upon the indication of use.¹²

DISCUSSION

The present study was conducted to gain insight into the knowledge and perception of people regarding Azithromycin. It was found that in general, university students have less knowledge about the rational use of Azithromycin. This can be highlighted by the fact that this drug is used for indications like cold, body ache and even headache by some participants. Further, the study participants reported that the drug was being used in different dosing schedules which is in contrast to the available guidelines and recommendations of use.

Published evidence suggest that excess use of any antibiotic can lead to anti-microbial resistance.^{13,14} Self-medication and over-the-counter purchase of this drug further complicates this problem.

The findings of this study were similar to other studies where university students reported consuming this drug without a doctor's prescription.^{6,15} Further, it is important to note that Azithromycin is also being used for indications such as cold and cough by the young adults in the study population, which is mostly self-limiting and of viral etiology in majority of cases. This may be because Azithromycin was used widely during COVID-19 pandemic in India. Interventions such as academic detailing for doctors by means of frequent continued medical education (CME) sessions and propagation of guidelines supported by microbiological data. These modalities have been found to decrease irrational use of antibiotics in the past.⁶

Easy availability of Azithromycin is another factor which needs to be taken into consideration. It is available free of cost in most of the government dispensaries in India, as found in the present study, and is also reasonably priced in the private sector. These factors further aggravate the indiscriminate use of this drug. Antimicrobial stewardship strategies¹⁶ may be used to combat this situation. Further, physicians should be motivated to prescribe antibiotics like Azithromycin rationally in the Out-patient department (OPD). A host of factors ranging from physician and patient attitudes, to medical and social practices of the community in general also play a role in physician's antibiotic prescribing process.¹⁷

Despite efforts, the present study had some limitations. A narrow age group of study participants makes the results less generalizable to the other age groups. This was mainly due to

operational issues and time constraints. Further, knowledge about antibiotic use was assessed among university students. Overall literacy of students enrolled in universities may affect the findings of this study. It is imperative to note that all study participants are literate. In fact, it was surprising to find that despite being educated people tend to self-medicate themselves. Furthermore, this means that right kind of awareness towards this dangerous trend is missing. Findings of this study are sufficient to support future large-scale research on knowledge and perception of Azithromycin use among a wider population. Further, it is necessary to highlight that mass awareness campaigns, using electronic and print media, regarding the harms of irrational use of antibiotics is the need-of-the hour. Also, governmental agencies should keep a strict vigil on over-the-counter sale of antibiotics, which further complicates the problem. Lastly, it is necessary to state that if university students pursuing science are using this drug irrationally, then the scenario in the lesser educated masses is a matter of utmost priority for future research.

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