

# Self-Medication with Antibiotics Among Out-Patient Attendants Prior to Medical Consultation at A Tertiary Care Hospital - A Cross-Sectional Study

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## ABSTRACT

**Introduction:** One of the greatest threats to global development and public health is antimicrobial resistance (AMR). The ability of bacteria and other microbes to resist the drugs used to inactivate them is known as AMR. According to estimates, bacterial AMR caused 4.95 million fatalities worldwide in 2019 in addition to directly causing 1.27 million deaths.

**Methodology:** In this cross-sectional descriptive study using convenient sampling method, 422 out patients were recruited from the tertiary care hospital in our district between December 2023 and March 2024. We inquired about sociodemographic characteristics and reasons for self-medicating with antibiotics.

**Results:** 353(83.6%) patients were self-medicating due to previous successful use of antibiotic. 122(28.9%) believed that antibiotics are used to treat all infections. 80 (18.95%) participants in the age group of 36- 44 years were self-medicating with antibiotic ( $\chi^2$ : 39.13;  $P < 0.001$ ). High cost of hospital bills was the reason behind self-medicating with antibiotic in 164(38.88%) participants ( $\chi^2$ : 32.67;  $P < 0.001$ ).

**Conclusion:** 35.5% of the respondents had used antibiotics for self-medication prior to visiting the hospital. There was little knowledge on the usage and adverse effects of antibiotics.

**Keywords:** Self-medication, antibiotics, resistance, OPD attendants

## ARTICLE INFO

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## INTRODUCTION

One of the greatest threats to global development and public health is antimicrobial resistance (AMR). According to estimates, bacterial AMR caused 4.95 million fatalities worldwide in 2019 in addition to directly causing 1.27 million deaths.<sup>1</sup> It is projected that in 2019 alone, antibiotic-resistant diseases lead to the deaths of about 300,000 individuals in India, including tens of lakhs of newborns, and contributed to another one million fatalities.<sup>2</sup> The corona virus pandemic and the improper use of antibiotics to treat a viral illness against which they are completely ineffective a situation that happened both in India and other places-are likely to blame for the problem's exacerbation.

Drug-resistant infections are mostly caused by the abuse and overuse of antibiotics by people.<sup>3</sup> Every country, regardless of location or financial level, is impacted by AMR. Low- and middle-income nations are primarily impacted, and poverty and inequality serve as aggravating factors for both its causes and effects.<sup>4</sup> Many of the advancements in contemporary medicine are jeopardized by AMR. It increases the difficulties of certain medical procedures and treatments, including cancer chemotherapy, caesarean sections, and surgery, and makes infections more difficult to cure.<sup>2</sup>

Antimicrobials are drugs that are used to prevent and cure infectious illnesses in humans. They include antibiotics, antifungals, antivirals, and antiparasitics. When bacteria, viruses, fungi, and parasites stop responding to antimicrobial medications, it's known as antimicrobial resistance (AMR).<sup>5</sup> Antimicrobial drugs, such as antibiotics, become ineffective due to drug resistance, making the treatment of illnesses difficult or impossible. This raises the risk of infection spread, serious illness, disability, and death.<sup>6</sup> Human activity has contributed to its increasing occurrence and spread, especially the overuse and misuse of antibiotics used to treat, prevent, or control human infections.<sup>7</sup>

Some of the major reasons for the use of non-prescribed antibiotics or its incorrect use in developing nations are paucity of knowledge on antibiotics, high cost of healthcare services, easy availability of drugs, lack of health care services and lack of education.<sup>8</sup> The pace at which antibiotics are being prescribed has gradually increased, particularly in these resource-constrained environments, and data indicates that antibiotic resistance is rising in these places where medicines are being used irrationally.<sup>9</sup> Severe drug reactions can arise from the inappropriate use of pharmaceuticals, such as antibiotics, since pharmacies may neglect to inquire about allergies or the concurrent use of other antibiotics.<sup>10</sup> Extensive use of antibiotics can change a disease's natural history and clinical appearance, delaying diagnosis.<sup>11</sup> One factor that has been linked to antibiotic resistance in middle to low income nations is self-

medication.<sup>12</sup> Overcoming self-medication with antibiotic will thereby slow the spread of antibiotic resistance. It is necessary to recognize the prevalent pattern and the patient-related characteristics that motivate the practice of self-medication. Hence, we have planned this study to determine the prevalence of self-medication with antibiotics among attendants of the Out-patient Department (OPD) and to determine the factors associated with self-medication with antibiotics.

## METHODOLOGY

**Study Design:** This was a facility based cross-sectional study.

**Study setting and Study period:** The study was carried out in a tertiary care facility located in the Villianur commune of Puducherry between December 2023 and March 2024.

**Sample size calculation:** The sample size obtained was 384, assuming a 50% prevalence of self-medication with antibiotics with a 95% confidence interval and 5% error. The sample size was determined using the following formula:

$$N = \frac{Z^2 \times p \times [1 - p]}{E^2}$$

Z value for 95% CI = 1.96 for  $\alpha = 0.05$

Expected proportion (p) = 0.5 (50%)

Precision (E) = 0.05 (5%)

A 10% increase was made to this number to account for any non-response or recording problems. The total number of samples was 422.

**Sampling method:** The study participants were chosen from the general OPD using convenient sampling method. Under this consecutive patient were chosen as study participants. Participants aged 18 years and above were included in the study and information was collected from the study participants after obtaining written informed consent.

**Study Tool:** Data was collected from the study participants using pretested predesigned questionnaires. The questionnaire on antibiotic self-medication by WHO<sup>13</sup> was modified and used for obtaining the information. This questionnaire included questions about knowledge, socio demographics and information from people who had self-medicated with antibiotics. The questionnaire was validated. Before the study began, the questionnaire was pre-tested to ensure the tool's repeatability and reliability.

**Ethical Considerations:** The SLIMS Institutional Ethics Committee in Puducherry, India, gave ethical and scientific approval prior to the start of the study.

**Statistical analysis:** The statistical analysis was done using IBM SPSS version 24.0. The mean  $\pm$  standard deviation was used to describe continuous

variables, whereas frequencies were used to characterize categorical variables. The associations were done using chi square test and multiple logistic regression analysis was also done.

218(51.7%) participants were self-medicating due to relative/friend's recommendation. High cost of hospital bills was the reason for self-medicating in 247(58.5%) participants.

## RESULTS

In the present study, out of 422 participants 195 (46.2%) were unemployed. The mean age ( $\pm$  S.D) of study participants was 40.50 ( $\pm$ 14.28) years. Majority of the participants were male 216 (51.2%). 119 (28.2%) participants were high school educated. 150 (35.5%, 95% CI 40.6% to 52.2%) of the 422 respondents said they had self-medicated with antibiotics prior to consulting a doctor. In the present study, out of 422 participants 353(83.6%) were self-medicating due to previous successful use of antibiotic. 224(53.1%) participants were self-medicating due to the long hours spend at a health facility.

**Table 1: Symptoms reported by the participants for self-medicating with antibiotics (n=422)**

Reported Symptoms	Participants (%)
Fever	109 (25.8)
Headache	107 (25.3)
Cough	91 (21.6)
Diarrhoea	41 (9.7)
Cold	37 (8.8)
Sore throat	16 (3.8)
Abdominal pain	8 (1.9)
Menstrual cramps	7 (1.7)
Genito urinary	2 (0.5)
Others	4 (0.9)

**Table 2: Knowledge regarding antibiotic use among the study participants**

Variable	Yes (%)	No (%)	Don't know (%)
Antibiotics are used to treat bacterial infections	110 (26.1)	3 (0.7)	309 (73.2)
Antibiotics are used to treat viral infections	55 (13)	37 (8.8)	330 (78.2)
Antibiotics are used to treat all infections	122 (28.9)	15 (3.6)	285 (67.5)
You stop antibiotics when you feel better during the course	282 (66.8)	18 (4.3)	122 (28.9)
You stop taking antibiotics after you have completed a course as directed	177 (41.9)	80 (19)	165 (39.1)
You can share antibiotics with relatives	119 (28.2)	91 (21.6)	212 (50.2)
You can self-medicate with previously used antibiotics	237 (56.2)	72 (17.1)	113 (26.8)
Side effects of antibiotics	56 (13.3)	99 (23.5)	267 (63.3)
Overuse leads to resistance	30 (7.1)	31 (7.3)	361 (85.5)

**Table 3: Factors associated with sociodemographic characteristics and self-medication with antibiotics (n=422)**

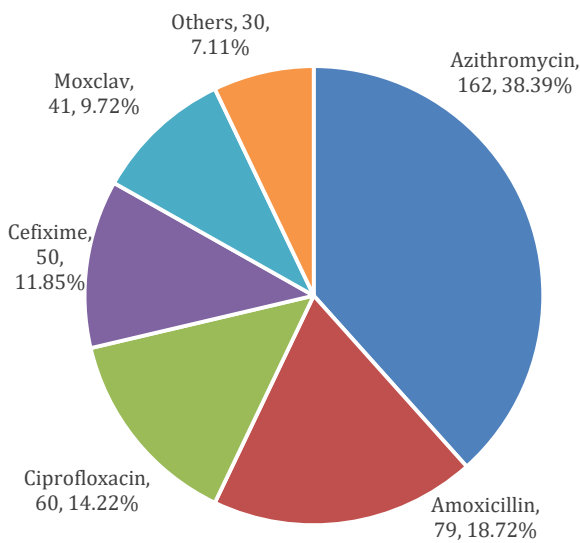
Variable	Self-medication		P value	OR (95% CI)	P value	AOR (95%CI)
	Yes (%)	No (%)				
<b>Age (years)</b>						
18 - 26	25 (5.92)	20 (4.73)		Reference		Reference
27-35	35 (8.29)	102 (23.69)	0.929	1.03 (0.56-1.90)	0.374	1.40 (0.67-2.94)
36-44	80 (18.95)	60 (14.74)	0.001	0.35 (0.24-0.52)	0.742	1.09 (0.64-1.88)
>45	60 (14.21)	40 (9.47)	0.065	1.86 (0.96-3.59)	0.649	1.14 (0.64-2.04)
<b>Gender</b>						
Male	140 (33.17)	122 (28.90)		Reference		Reference
Female	60 (14.21)	100 (23.72)	0.001	1.91 (1.28-2.86)	0.675	1.09 (0.72-1.67)
<b>Educational status</b>						
Graduate	20 (4.73)	48 (11.37)		Reference		
High school	39 (9.24)	80 (18.95)	0.200	0.66 (0.44-0.99)	-	-
Illiterate	19 (4.50)	42 (9.95)	0.800	0.92 (0.36-2.39)	-	-
Primary	23 (5.45)	34 (8.05)	0.900	0.96 (0.44-2.09)	-	-
Diploma or PUC	48 (11.37)	68 (16.39)	0.900	0.99 (0.43-2.28)	-	-
<b>Occupation</b>						
Employed	150 (35.54)	120 (28.43)		Reference		
Unemployed	100 (23.69)	52 (12.34)	0.030	0.65 (0.43-0.98)	-	-
<b>Socio economic status</b>						
Upper middle class	110 (26.06)	65 (15.40)		Reference		Reference
Upper class	7 (1.65)	27 (6.39)	0.900	0.98 (0.37-2.57)	0.107	0.51 (0.23- 1.15)
Middle class	43 (10.18)	35 (8.29)	0.700	1.13 (0.49-2.57)	0.813	0.93 (0.53-1.65)
Lower middle class	19 (4.50)	12 (2.84)	0.700	1.17 (0.49-2.85)	0.988	0.99 (0.44-2.23)
Lower class	73 (17.29)	31 (7.40)	0.001	0.59 (0.38-0.91)	0.028	0.49 (0.26-0.93)

Data shown are frequencies (n) of subjects and proportions (%).  $\chi^2$ : Pearson's chi-square. In the multivariable models, only variables with a significance level of  $p < 0.05$  were included. OR: Odds ratio; AOR: adjusted odds ratio; CI: confidence interval

**Table 4: Factors associated with reasons for self-medicating with antibiotics and self-medication with antibiotics (n=422)**

Variable	Self-medication		P value	OR (95% CI)	P value	AOR (95%CI)
	Yes (%)	No (%)				
<b>Previous successful use</b>						
Yes	124 (29.38)	229 (54.26)		Reference		
No	26 (6.16)	43 (10.20)	0.68	0.9 (0.53-1.93)		
<b>Spending long hours at a health facility</b>						
Yes	80 (18.95)	144 (34.14)		Reference		
No	70 (16.58)	128 (30.33)	0.93	1.02 (0.68-1.51)		
<b>Time spends waiting at a health facility</b>						
<1 hour	76 (18.0)	105 (24.88)		Reference		Reference
1-2 hours	68 (16.15)	103 (24.40)	0.001	0.71 (0.48-1.07)	0.717	0.68 (0.09-5.38)
2-3 hours	5 (1.18)	61 (14.45)	0.75	0.91 (0.50-1.66)	0.167	0.22 (0.03-1.87)
>3 hours	3 (0.71)	1 (0.23)	0.62	0.85 (0.46-1.58)	0.849	0.82 (0.11-6.38)
<b>Relative/friend's recommendation</b>						
Yes	84 (19.92)	134 (31.75)		Reference		
No	66 (15.63)	138 (32.70)	0.18	1.31 (0.88-1.96)		
<b>High cost of hospital bills</b>						
No	67 (15.87)	108 (25.59)		Reference		Reference
Yes	164 (38.88)	83 (19.66)	0.001	3.19 (2.13-4.77)	0.891	0.96 (0.58-1.61)
<b>Busy schedule</b>						
Yes	51 (12.09)	103 (24.40)		Reference		
No	99 (23.45)	169 (40.06)	0.43	0.85 (0.56-1.28)		
<b>Distance to hospital</b>						
No	99 (23.45)	198 (46.93)		Reference		Reference
Yes	74 (17.53)	51 (12.09)	0.001	2.9 (1.89-4.46)	0.644	0.89 (0.56-1.42)

Data shown are frequencies (n) of subjects and proportions (%).  $\chi^2$ : Pearson's chi-square. In the multivariable models, only variables with a significance level of  $p < 0.05$  were included. OR: Odds ratio; AOR: adjusted odds ratio; CI: confidence interval



**Figure 2: Antimicrobial agents used in self-medication during the recent illness (n=422)**

In the present study, out of 422 participants 109(25.8%) gave fever as the reason for self-medication. 107(25.3%) participants were self-medication for headache. 91(21.6%) participants were self-medication for cough. Diarrhoea was the reason for self-medication in 41(9.7%) of the participants shown in Table 1. In the present study, out of 422 participants 162(38.38%) were found to be self-medication with azithromycin. 79(18.76%) participants were self-medication with amoxicillin. 60(14.21%) participants were self-medication with ciprofloxacin as shown in Figure 2.

In the present study, out of 422 participants 122(28.9%) believed that antibiotics are used to treat all infections. 282(66.8%) participants believed that you can stop antibiotics when you feel better during the course of treatment. 119(28.2%) participants believed that you can share antibiotics with relatives. 237(56.2%) participants believed that you can self-medicate with previously used antibiotics as shown in Table 2. In the present study, 80 (18.95%) participants in the age group of 36- 44 years were self-medication with antibiotic ( $\chi^2$ : 39.13;  $P < 0.001$ ). Also, 60(14.21%) females were self-medication with antibiotic ( $\chi^2$ : 10.11;  $P < 0.001$ ). Under socio economic status 73(17.29%) participants belonging to lower class were self-medication with antibiotic ( $\chi^2$ : 27.81;  $P < 0.001$ ) as shown in Table 3. 68 (16.15%) participants self-medication with antibiotic spend 1- 2 hours waiting at a health facility ( $\chi^2$ : 27.34;  $P < 0.001$ ). Also, High cost of hospital bills was the reason for self-medication with antibiotic in 164(38.88%) participants ( $\chi^2$ : 32.67;  $P < 0.001$ ). Distance to hospital was the reason for self-medication with antibiotic in 74(17.53%) participants ( $\chi^2$ : 24.33;  $P < 0.001$ ) as shown in Table 4.

## DISCUSSION

In our study (46.2%) of the study participants were unemployed, this was similar to a study done in Kerala<sup>14</sup> where unemployment among participants was found to be 43.2%. In our study the mean age of the study participants was found to be 40 years this was similar to another study done in Kerala<sup>15</sup> where the



mean age among study participants was 38 years. Majority (51.2%) of our participants were male similar to another study done in China<sup>16</sup> where it was 48.6%. Only (28.2%) of the participants were high school educated, while in a similar study done in Pakistan<sup>17</sup> it was found to be only 19% the reason being maybe due to the decreased literacy rate prevalent in the country. 35.5% of the study participants in our study self-medicated with antibiotics prior to consulting a doctor, similar to another study done in Eritera<sup>18</sup> (37.6%). In our study majority of the participants (83.6%) gave previous successful use as the reason behind self-medication this was similar to another study done in India<sup>19</sup> (79.2%). Patient belief that consuming the same antibiotic that was consumed earlier may lead to curing the disease or relief from symptoms was the reason behind this. (53.1%) self-medicated due to spending long hours at a health facility, this was lower than a similar study done in Ghana<sup>20</sup> where it was found to be 72.1%, maybe due to the lack of health resources in that African country. (58.5%) participants gave high cost of hospital bills as the reason behind self-medication, this was similar to a study done in Ghana<sup>21</sup> (50.7%). (51.7%) participants were self-medicating due to relative/friend's recommendation, similar to another study done in Sri Lanka<sup>22</sup> where it was found to be 48.6%. Fever (25.8%) and headache (25.3%) were the main health conditions for self-medication in our study similar to another study done in Northern Ethiopia<sup>23</sup> (21.85% & 22.6%). 21.6% participants gave cough as a reason for self-medication similar to another study done Egypt<sup>24</sup> (18.9%). Fever, headache and cough being a very highly prevalent common condition. Azithromycin (38.38%) was the most frequently used antibiotic for self-medication, was similar to a study done in North East Ethiopia<sup>25</sup> (34.5%) and Bangladesh<sup>26</sup> (32.1%). Few respondents (28.9%) felt that antibiotics are used to treat all infections, this was higher compared to similar studies done in India<sup>27</sup> (18.7%), China<sup>28</sup> (22.4%) and Malaysia<sup>29</sup> (20.9%). Higher literacy rate of the people and greater awareness in these parts of the country maybe the reason for this. 66.8% of the participants felt that antibiotics can be stopped during the course of treatment once the patient feels better, this was similar to a study done in (62.6%) Western Ethiopia<sup>31</sup>, Saudi Arabia<sup>32</sup> (59.2%) and (58.9%) Bhutan.<sup>33</sup>

Age was found to be significantly associated ( $p < 0.001$ ) with self-medication in our study, similar to a study done Bangladesh<sup>34</sup>, Pakistan<sup>35</sup> and Nepal<sup>36</sup> suggesting self-medication with antibiotics happens across all age groups and is not restricted to few. Socio economic status was found to be significantly associated ( $p < 0.001$ ) with self-medication in our study, while in another study done in China<sup>37</sup> and Haiti<sup>38</sup> it was found not significant. Upper middle class and middle class showing the highest tendency to self-medicate.

In our study time spend waiting at health facility was found to be significantly associated ( $p < 0.001$ ) with

self-medication, similar to a study done in a Malaysia<sup>39</sup> and Peru.<sup>40</sup> Distance to hospital was also found to be significantly associated ( $p < 0.001$ ) with self-medication, similar to a study done in Malaysia<sup>41</sup> and Jordan.<sup>42</sup> Majority patients especially in rural India find it difficult to travel to health care facilities due to lack of health care facilities in nearby places.

## LIMITATIONS

The limitations of this study include the potential for selection bias, as the samples were obtained from the outpatient department (OPD) using convenience sampling. Additionally, since the study is cross-sectional in nature, it is not possible to establish a causal relationship between the variables examined.

## CONCLUSION

In our study, only 35.5% participants had used antibiotics for self-medication prior to visiting the hospital. Majority of the participants did not know whether antibiotics are used to treat bacterial infections or antibiotics are used to treat viral infections, side effects of antibiotics and overuse leads to resistance. 39% participants didn't know whether to stop taking antibiotics after you have completed a course as directed. The socio demographic characteristics and reasons associated with self-medication were age, gender, socio economic status, waiting time at hospital, high cost of hospital bills and distance to hospital. This shows that the awareness about self-medication was less among the study participants.

## RECOMMENDATIONS

To effectively address the issue of antimicrobial resistance (AMR), it is recommended to improve awareness and understanding of AMR among the general public and healthcare professionals. Additionally, measures should be taken to prevent the easy availability of over-the-counter antibiotics, which can contribute to the misuse and overuse of these medications. Strengthening the healthcare infrastructure is also essential to support the appropriate use of antibiotics.

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