

ORIGINAL ARTICLE

Study on Inappropriate Use of Antibiotics and Its Associated Factors among Adults Residing in Bholakpur, Secunderabad

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ABSTRACT

Background: Antibiotics resistance is a natural phenomenon, but antibiotics abuse accelerates this process. Inappropriate antibiotics use includes non/old prescription purchase, use for incomplete duration or inappropriate indication, and use of left-over antibiotics. Antibiotics resistance leads to increased morbidity and mortality along with catastrophic health expenditure. Study of contributing factors can lead to development of preventive strategies. **Objectives:** The objective of the study was to assess the patterns of inappropriate use of antibiotics and to determine the socio-demographic factors associated with inappropriate use of antibiotics. **Materials and Methods:** A community-based cross-sectional study was conducted in urban field practice area of Gandhi Medical College, Secunderabad during the period of October to December 2019 using semi-structured questionnaire. A sample size of 280 was taken based on prevalence from literature and study subjects were selected by simple random sampling. Statistical analysis was done using Microsoft Excel and SPSS-19. **Results:** The mean age of the study subjects was 37.73 ± 10.9 years. Inappropriate antibiotics use was 71%. Higher age, lower educational status, being unemployed, and lower socioeconomic status were found to be significantly associated with inappropriate use of antibiotics. **Conclusion:** The inappropriate use of antibiotics was high among the study population. Higher age, lower literacy levels and unemployment were found to be strong predictors for inappropriate antibiotics use.

Key words: Antibiotics resistance, inappropriate antibiotics use, non-prescription antibiotics use

INTRODUCTION

Antibiotics resistance is a natural phenomenon, but antibiotics abuse accelerates this process.^[1] There is strong evidence suggestive of uncontrolled and inappropriate use of antibiotics as the major cause for antibiotics resistance.^[2] Inappropriate use includes non/old prescription purchase, use for incomplete duration or inappropriate indication, use of left-over antibiotics. Emergence of antibiotics resistance is a major threat to global health, food security, and development. It leads to increased morbidity and mortality along with catastrophic health expenditure. Inadequate health services, high burden of disease, convenience, minor ailments, time and financial constraints, cheap, and unregulated sales of antibiotics are some of the contributing factors for increase in inappropriate antibiotics use.^[3,4]

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In India, at one end of the spectrum, there are high infection rates with inaccessibility to essential medicines like antibiotics whereas on other end there is inappropriate antibiotics use and emergence of antibiotics resistance. Even with the development of new antibiotics, without behavior change, antibiotic resistance will continue to remain major threat.^[1] Hence, the current study has been undertaken to study the inappropriate use of antibiotics and its associated factors among adults residing in urban field practice of Gandhi Medical College, Secunderabad.

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How to cite: Asma S, Koteswaramma C, Sridhar D, Kumar MV, Aishwariya K, Kumar KJK, Thomas V. Study on Inappropriate Use of Antibiotics and Its Associated Factors among Adults Residing in Bholakpur, Secunderabad. Ann Community Health 2021;9(2):111-115.

MATERIALS AND METHODS

Study Design

This was a cross-sectional study.

Study Area

This study was conducted at Urban Primary Health Centre [UPHC] (Bholakpur), Secunderabad, Telangana.

Study Duration

The study duration was 3 months (from October 2019 to December 2019).

Inclusion Criteria

Adult (>19 years) residents of Bholakpur with history of antibiotics use in the last 1 year were included in the study.

Exclusion Criteria

Those who were not willing to participate in the study were excluded from the study.

Sample Size

A sample size of 280 was taken (based on prevalence of 39%)^[5] and 15% relative error.

$$\begin{aligned} \text{Sample Size} &= 4PQ/L^2 \\ &= 4 \times 39 \times 61 / 34.22 \\ &= 278 \text{ rounded to } 280 \end{aligned}$$

Sampling technique

Simple random sampling.

- Total number of households in Bholakpur was 10,500
- Households selection done by simple random table.

Study Tools

Pre-designed and pre-tested questionnaire was used to collect data after taking informed consent.

Operational Definition of Inappropriate use of Antibiotics

Use of non-prescription antibiotics or antibiotics use for inadequate duration.

Data Analysis

Data were entered into MS Excel sheet and analyzed using SPSS version-19. Data collected were analyzed using descriptive and inferential statistics. Descriptive statistics included frequency, percentage distribution, and mean and

standard deviation. Inferential statistics included Chi-square test and Binary Logistic Regression. $P < 0.05$ was considered to be significant.

RESULTS

It is shown from Table 1 that the mean age of the study subjects was 37.73 ± 10.9 years. Majority were females (77.9%), high school educated (32.5%), unemployed (63.2%), and belonged to the upper lower class (36.8%).

As shown from Figure 1 that majority (70.7%) of the study subjects used antibiotics without prescription, followed by incomplete course of antibiotics (68.9%).

It is observed from Figure 2 that the common reasons cited for inappropriate antibiotics use were time saving (27.8%), quick relief (23.2%), and previous experience with antibiotics (20.2%).

As is observed from Figure 3 that the upper respiratory tract infections (31.8%) were the common indication, followed by gastrointestinal infections (26.3%) for inappropriate antibiotics use.

Table 1: Distribution of study subjects based on socio-demographic characteristics

Socio demographic characteristics	Variable	Mean/ Frequency	Percentage
Age		37.73±10.9 years	
Gender	Male	62	22.1
	Female	218	77.9
Educational status	Illiterate	64	22.9
	Primary School	11	3.9
	Middle School	32	11.4
	High School	91	32.5
	Intermediate	42	15.0
	Degree	39	13.9
	Postgraduate	01	0.4
Occupational status	Unemployed	177	63.2
	Unskilled	07	2.5
	Semiskilled	18	6.4
	Skilled	39	13.9
	Clerical/ Shop-owner/Farmer	13	4.6
	Semi-Professional	26	9.3
	Socio-economic status	Upper class	16
Upper middle class	67	23.9	
Lower middle class	87	31.1	
Upper lower class	103	36.8	
Lower class	07	2.5	

It is shown from Table 2 that the higher age group, lower educational status, unemployment, and lower socioeconomic status were found to be significantly associated with inappropriate antibiotics use.

It is seen from Table 3 that higher age, low literacy levels, and unemployment were found to be strong predictors of

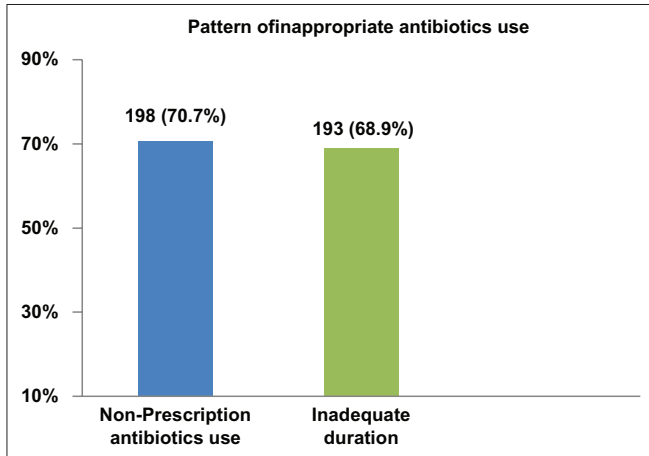


Figure 1: Study subjects according to pattern of inappropriate antibiotics use

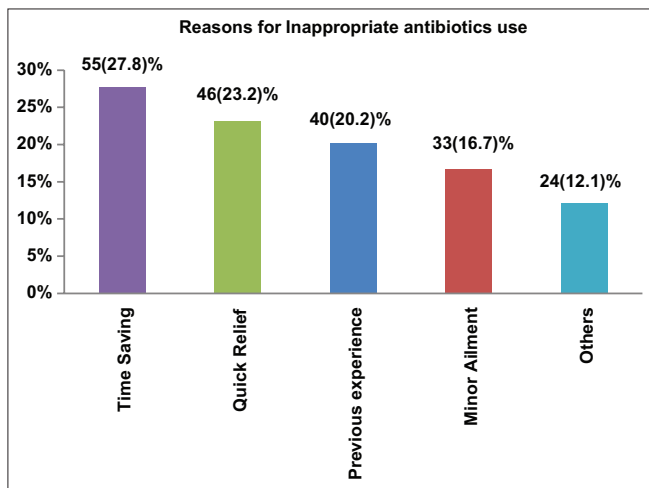


Figure 2: Study subjects according to reasons for inappropriate antibiotics use

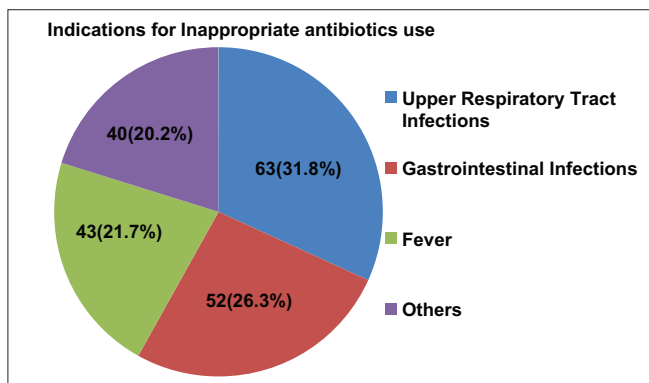


Figure 3: Study subjects according to indications for inappropriate antibiotics use

inappropriate use antibiotics use among the study subjects. The likelihood ratio of inappropriate antibiotics use was 0.049 times higher in subjects from higher age groups and the odds of using antibiotics inappropriately was 1.050 times more in them than in subjects from the lower age groups. The likelihood ratio of inappropriate antibiotics use was 1.028 times higher in subjects whose educational status was less than high school and the odds of using antibiotics inappropriately were 2.796 times more in them than in subjects with more than high school education. Inappropriate antibiotics use in unemployed subjects was 1.408 times higher than employed subjects. Unemployed study subjects showed a risk of inappropriate antibiotics use 4.087 times more than employed subjects.

DISCUSSION

In the present study, it was observed that the mean age of the study subjects was 37.73±10.9 years. Similar findings were reported by Gebeyehu *et al.*,^[6] where the mean age was 34 years. The present study findings were different compared to a study conducted by Erku *et al.*,^[7] where the mean age of the study population was 33.19 ± 10.82 years. Among the study subjects, 77.9% of the study subjects were females, while 22.1% were males. Similarly, in a study by Radhakrishnan *et al.*,^[8] there was female preponderance (female 58% and male 42%). The findings differed with Deepanwita *et al.*^[9] study where males and females were in equal ratio. In the present study, it was observed that the higher proportion of the study subjects, that is, 32.5% were high school educated followed by illiterates (22.9%). The findings were concurrent to the study by Radhakrishnan *et al.*,^[8] where majority (41%) were high school, followed by primary school (35%) study subjects. The findings were different compared to the study by Rajendran *et al.*^[4] and Deepanwita *et al.*,^[9] which reported majority (71.5% and 57.1%) of the subjects were graduates and post graduates, respectively. Among the subjects, majority (63.2%) were unemployed, followed by skilled workers (13.9%). Contrast findings were reported by Deepanwita *et al.*,^[9] where majority (39.7%) were students, followed by salaried (38.9%) subjects.

In our study, it was observed that the higher proportion of the study subjects, that is, 36.8% belonged to the upper lower class followed by lower middle class (31.1%). A study done by Deepanwita *et al.*^[9] reported majority (39%) had annual income between 100,000 and 500,000, followed by 20,000 and 100,000 was (29%). In the present study, non-prescription antibiotics use was found to be 70.7%. This might be due to unregulated sale and easy availability of antibiotics and convenience to people. The present study findings were concurrent with the study by Atif *et al.*,^[10] Chinnasami *et al.*,^[11] Bilal *et al.*,^[12] Nazir and Azim,^[13] and Al-Qahtani *et al.*^[14] where non-prescription antibiotics use was found to be 80.5%, 64.1%, 81.25%, 48.0%, and 40.8%, respectively.

Table 2: Association between socio-demographic factors and inappropriate antibiotics use

Socio demographic factor	Variable	Inappropriate antibiotics use	Appropriate antibiotics use	P-value
Age	<37.73 years	94(59.1%)	65(40.9%)	<0.0001
	>37.73 years	104(86%)	17(14%)	Significant
Gender	Female	148(67.9%)	70(32.1%)	>0.05
	Male	12(19.4%)	50(80.6%)	Not Significant
Educational status	<10 th standard	96(89.7%)	11(10.3%)	<0.0001
	>10 th standard	102(59%)	71(41%)	Significant
Occupational status	Unemployed	142(80.2%)	35(19.8%)	<0.0001
	Employed	56(54.4%)	47(45.6%)	Significant
Socio-economic status*	Upper	44(53%)	39(47%)	<0.0001
	Lower	154(78.2%)	43(21.8%)	Significant

(*According to modified BG Prasad classification 2019)

Table 3: Analysis of highly weighted risk factors among all the risk factors through logistic regression

Socio-demographic factor	β -coefficient	P-value	Odds ratio	95%CI
Age	0.049	0.010	1.050	1.011–1.089
Educational status	1.028	0.016	2.796	1.208–6.470
Occupational status	1.408	<0.0001	4.087	2.072–8.060
Socio-economic status	0.503	0.143	1.654	4–3.244

Dissimilar findings were reported by Radhakrishnan *et al.*,^[8] Emeka *et al.*,^[15] Almeida Santimano *et al.*,^[16] and Rathish and Wickramasinghe,^[17] where non-prescription antibiotics use was only 14.2%, 19.4%, 19%, and 2.6%, respectively. Dua *et al.*^[18] reported repeat use of non-prescription antibiotics.

In our study, inadequate duration of antibiotics use was found to be 68.9%. Disappearance of symptoms and sense of well-being could be the reason for high non-compliance rate. Similarly, studies done by Atif *et al.*,^[10] Nazir and Azim,^[13] Al-Qahtani *et al.*,^[14] Almeida Santimano *et al.*,^[16] Peripi *et al.*,^[19] and Barker *et al.*^[20] found incomplete duration of antibiotics use as 92.3%, 70%, 57.8%, 57%, 70%, and 65%, respectively. Contrast findings were reported by Chinnasami *et al.*,^[11] where 35.8% of the study subjects took antibiotics for incomplete duration. Among the study population, it was observed that time saving (27.8%), quick relief (23.2%), and previous experience (20.2%) were the common reasons for inappropriate antibiotics use. These findings were comparable with Nazir and Azim^[13] and Al-Qahtani *et al.*^[14] study which reported previous experience as the common reason (68% and 67.2%, respectively). In the present study, the upper respiratory tract infection (31.8%) was found to be common indication for inappropriate antibiotics use. Similar findings were reported by Gebeyehu *et al.*^[6] (30.2%) and Nazir and Azim^[13] (53%).

In our study, higher age, low literacy levels, unemployment, and lower socio-economic status were significantly

associated with inappropriate antibiotics use. Among these, age, educational status, and occupation were found to be predictors of inappropriate antibiotics use. Unaffordability of consultation charges, inadequate awareness about antibiotics resistance could be the possible explanation for these findings. Similar results were obtained by Gebeyehu *et al.*^[6] and Erku *et al.*,^[7] which reported young age, low educational, and employment as factors associated with inappropriate antibiotics use. Whereas, Rathish and Wickramasinghe^[17] reported no significant association between age, gender, literacy levels, occupational status, and income.

CONCLUSIONS

More than half of the subjects were <37.73 years, majority were females, one-third were high school educated, two-third were unemployed, and about one-third of the belonged to upper lower socio-economic class. Non-prescription and inappropriate duration of antibiotics usage was found in almost three-fourth of the study subjects. Inappropriate indication for antibiotics use was seen in two-third of them. The epidemiological determinants such as higher age, lower educational status, unemployment, and lower socio-economic status showed statistically significant association with inappropriate antibiotics use. On binary logistic regression analysis, higher age, lower literacy levels, and unemployment were found to be strong predictors of inappropriate antibiotics use.

Recommendations

There is a need for not only improvement on antimicrobial resistance awareness through effective communication but also making general public understands their responsibility toward antimicrobial resistance. Restriction of over the counter sale of antibiotics, regulation of antibiotics sale, and surveillance of antimicrobial resistance. There should be strict enforcement of laws regulating antibiotics sale. Since epidemiological determinants such as education,

socioeconomic status have more impact on antimicrobial resistance emergence, formulating appropriate control measures should be based on them. There is a need for more research related to public health aspects of antimicrobial resistance at community level.

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