Original Article

Knowledge, Attitude, and Practice Related to Antibiotic Use among Adult Population in Urban Slums of Burdwan Municipality, Purba Bardhaman District of West Bengal: A Cross-sectional Study

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Abstract

Introduction: Antibiotic resistance (ABR) poses a considerable challenge to global public health. Appropriate antibiotic usage plays a pivotal role toward preventing emerging ABR. The objectives of this study were to assess the knowledge, attitude, and practice (KAP) regarding antibiotic use among the adult population (≥18 years) in urban slums of Burdwan Municipality and to find out the associations, if any, between sociodemographic characteristics and level of KAP. **Materials and Methods:** A descriptive, cross-sectional study was done on 270 adults residing in slums of Burdwan Municipality during September–October 2023. Subjects were selected by simple random sampling. Data were collected by interviewing the respondents using a predesigned, pretested, semi-structured schedule. Data were analyzed using descriptive statistics and Chi-square tests. **Results:** The mean age of participants was 38.16 (±13) years. The majority (63.7%) of them were females, 25.6% were educated up to middle school, and 41.1% were homemakers or retired persons. It was found that only 35.9% population had better knowledge, 47.8% had a positive attitude, and 48.5% of the population had an appropriate practice of antibiotics. Almost a quarter (23.70%) of the population was unaware of the term antibiotics. The Chi-square test revealed gender, occupation, and education to be significantly associated with knowledge, attitude, and practice of antibiotic usage among respondents. **Conclusion:** The findings underscore the importance of targeted educational interventions to improve the knowledge about antibiotics and promote rational antibiotic use among urban slum dwellers. Efforts to combat ABR must prioritize addressing KAP gaps in diverse community settings to mitigate the threat of antimicrobial resistance.

Keywords: Adult, antibiotic resistance, antibiotic use, attitude, knowledge, practices

Introduction

Antibiotics have played a historic role in the control and management of infectious diseases by saving the lives of innumerable patients and escalating patient care.[1] A preliminary survey on antibiotic use was conducted by the WHO Southeast Asia Regional Office, New Delhi, that revealed around 25% ceased medication before course completion. Nearly half (47%) agreed to visit another doctor if the first doctor did not prescribe an antibiotic for the common cold.[2] Thus, misuse and overuse of it have led to the emergence and spread of resistant organisms. Infections due to resistant microbes have been linked with an increased stay in hospital, prolonged duration of therapy, usage of additional drugs, and laboratory investigations that elevate the healthcare cost and raise mortality.[3]

Antibiotic resistance (ABR) constitutes one of the greatest threats of the 21st century ranking along with terrorism and climate change.[3,4] The knowledge, attitude, and practices

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(KAPs) of the community regarding the appropriate usage of antibiotics is what really drives the majority of antibiotic consumption leading to ABR. Several studies conducted in India and abroad have shown poor knowledge and inappropriate practices of antibiotic usage. A study in Bhutan has shown that unsatisfactory knowledge and inappropriate practices prevail among 52.8% and 47% of the population, respectively.[5] Similarly, other studies done on separate study populations revealed varied responses on KAP of antibiotic use.[6-8] The inappropriate use of antibiotics is not only associated with poor knowledge, but also inadequate public awareness, and easy availability of over-the-counter drugs. Our society is at stake regarding the upcoming ABR among both rural and urban populations.

Nearly, a quarter of the world's urban population resides in slums,[9] with overcrowding, poor sanitation, and unhealthy lifestyle, thereby escalating the spread of infectious diseases and increasing demand for antibiotics and their inappropriate use.[10] Limited data are available on their knowledge and practice of antibiotic use.

In the above context, the present study was conducted with the objective to assess the KAP regarding antibiotic use among the adult population (≥18 years) in urban slums of Burdwan Municipality and to find out the associations, if any, between sociodemographic characteristics and level of KAP.

Materials and Methods

Study design, setting, and subjects

A community-based descriptive type of cross-sectional study was conducted in the urban slums under the jurisdiction of Burdwan Municipality, Purba Bardhaman District, West Bengal, during September and October 2023. Adults (≥18 years) residing in the abovementioned study area for at least 6 months were considered the study population. Those seriously ill and unwilling to participate were excluded.

Sample size and sampling technique

Considering the prevalence of adequate knowledge regarding antibiotic use to be 18.5%,[8] with 95% level of confidence and an absolute precision of 5%, the minimum required sample size was found to be 236. Taking a further nonresponse rate of 10%, the sample size was 260. Finally, 270 study subjects participated in the study.

Out of the 144 registered slums under Burdwan Municipality, 10% of the total slums, ~ 15 slums were chosen by simple random sampling. Thereafter (260/15 ≈ 18), 18 eligible study subjects were selected from each slum giving a total sample size of 270. For this, sampling frame for each slum was prepared separately enlisting all adults residing there, by their names and addresses. From this frame, 18 subjects were selected from each slum by simple random sampling.

Tools and techniques of data collection

A semi-structured questionnaire was developed based on the literature review of similar studies.[11,12] It was pretested for content, design, readability, and comprehension among 20 respondents, and corrections were made thereafter. Some of the respondents were unaware of the term "antibiotic" and hence minor changes were made and they were asked if they ever heard about certain commonly used antibiotics such as metronidazole or azithromycin. The schedule was prepared in English and then translated into Bengali, the local language, and again backtranslated into English keeping semantic equivalence. Finally, the Bengali version was used for data collection.

The schedule was divided into four sections. The first section consisted of sociodemographic characteristics of the participants. The second section included 10 questions on their knowledge of antibiotic usage. This section was further divided into four domains: "Identification of antibiotics," "Knowledge on the role of antibiotic," "Side effects of antibiotics," and "Antibiotic resistance." The third section had seven questions for assessing their attitude toward antibiotic use. It had three domains: "Preference for use of antibiotics," "Antibiotic resistance and safety," and "Attitude toward doctor's prescribing of antibiotics" and the fourth section included six questions to know about the practices of antibiotic use among the study population.

All the responses for the knowledge and attitude sections were graded on a five-point Likert scale, i.e. "Strongly agree," "Agree," "Neutral," "Disagree," and "Strongly disagree" which were later combined into three groups, "yes," "no," and "do not know," respectively. The responses for the practice section were "never," "seldom," "sometimes," and "almost always."

Scoring:[11,12] The responses to knowledge and attitude questions which were grouped into three groups: "yes," "no," and "do not know," respectively, were given a score of "1" for correct response and "0" for incorrect or uncertain response. Responses to the questions related to the practice section were assessed using 4-point Likert scale: "never," "seldom," "sometimes," and "almost always". The responses were scored ranging from 3 for most appropriate response and 0 for least appropriate response or no response and then summed up. The median score for all three sections, i.e. KAP, were taken as the cutoff value to dichotomize the continuous variables into dependent variables. Participants scoring more than the median were considered to have "better knowledge," "positive/appropriate attitude," and "appropriate practices" toward antibiotic use.

Data were collected by interviewing the study subjects using the predesigned and pretested semi-structured schedule. The study participants were explained about the purpose of the study and the importance of their response following which written consent to participate in the study was taken. Confidentiality and anonymity were assured.

Data analysis

The collected data was checked for completeness and consistency and entered in Microsoft Excel 2016 (Microsoft, Redwoods, WA, USA) datasheet. It was thereby analyzed using Statistical Package for Social Sciences Inc., (IBM SPSS Statistics 20.0, Windows, 2012, Chicago, IL, USA) software. Data were organized and presented by applying the principles of descriptive statistics in the form of tables and figures. The outcome variable was KAP regarding antibiotic use which was dichotomized as explained earlier. A Chi-square test was performed to identify the sociodemographic factors which were significantly associated with KAP scores. P <0.05 was considered statistically significant.

Ethical considerations

Ethical Clearance was obtained from the Institutional Ethics Committee of Burdwan Medical College and Hospital, West Bengal, vide memo no: BMC/I. E.C./321. Before data collection, informed written consent of study participants was taken with assurance that the confidentiality of the given information will be maintained.

Results

The present study was conducted among 270 adults (>18 years), and the mean age of the study population was 38.16 (±13) years. Seventy-nine (29.3%) of the study subjects belonged to the age group 28–37 years followed by 18–27 years 65 (24.1%). 172 (63.7%) of the study subjects were females (63.7%). 266 (98.5%) of them were Hindus. 69 (25.6%) of the study subjects were educated up to middle school and 65 (24.1%) were illiterate. Among the 270 study subjects, 111 (41.1%) were "stay at home" which included homemakers and retired persons, 104 (38.5%) were unskilled workers, and only 13 (4.8%) were unemployed. Most of them 152 (56.3%), lived in joint families having >4 family members. The socioeconomic class (as per the modified B.G. Prasad scale January 2022) revealed that 167 (61.9%) of them belonged to the upper class followed by the upper middle class 83 (30.7%) and the remaining were middle class, lower middle class, and lower class.

Knowledge, attitude, and practice of antibiotic use

The maximum attainable scores in knowledge, attitude, and practice domains were 10, 7, and 18, respectively. Only 2 (0.7%), 6 (2.2%), and 26 (9.6%) of the study population attained the maximum score in each of the domains, respectively. The minimum attainable score was 0 which was attained by 23.7% of the study population in the knowledge and practice domain and almost the same 24.4% in the attitude domain [Table 1].

Regarding the "knowledge of antibiotic use," out of 270 study subjects, 23.70% were unaware of the term antibiotics and hence gave neutral response. Nearly, a third (38.5%) of the population believed that paracetamol is an antibiotic, although 47.4% agreed antacids are not antibiotics. Forty-three percent knew that antibiotics are useful for killing germs; however, almost 57% still thought that antibiotics are often required for recovery from coughs and colds. Around 47.8% did not know that antibiotics could destroy "good bacteria" within the body, and 50.7% agreed that antibiotics could cause secondary infections after killing these "good bacteria." Only 27.41% knew antibiotics could cause allergies. Questions regarding knowledge of ABR mostly received positive responses. About 61.1% of the study population believed misuse of antibiotics can lead to its resistance and 55.9% were aware that a bulk of infections are becoming resistant to treatment with antibiotics [Figure 1].

Table 1: Distribution of study population according to their score in domains of knowledge, attitude, and practice of antibiotic use (n=270)

Domains	n (%)
Knowledge* maximum attainable score=10, minimum attainable score=0, maximum attained score, n (%)=2 (0.7)	
Better knowledge (>6)	97 (35.9)
Poor knowledge (≤6)	173 (64.1)
Attitude# maximum attainable score=7, minimum attainable score=0, maximum attained score, n (%)=6 (2.2)	
Positive/appropriate attitude (>3)	129 (47.8)
Inappropriate attitude (≤3)	141 (52.2)
Practice$ maximum attainable score=18, minimum attainable score=0, maximum attained score, n (%)=26 (9.6)	
Appropriate practice (>12)	131 (48.5)
Inappropriate practice (≤12)	139 (51.5)

*Median total knowledge score=6, #Median total attitude score=3, $Median total practice score=12

Regarding "attitude toward the use of antibiotics," out of 270 study subjects, 23.7% were unaware of the term antibiotics and hence gave neutral responses. About 60.4% of the study population preferred to take antibiotics every time they had a cold. Likewise, 70.7% believed that antibiotics cured them more quickly whenever they had a fever. Only 37.04% agreed skipping doses could lead to the development of ABR. Regarding ABR and safety, 36.3% believed that antibiotics are not safe and hence not used commonly. Only 14% were less satisfied with a doctor's visit if they did not receive an antibiotic after expecting one, and 10% stated that if they were not prescribed an antibiotic when they expected one, they would visit another doctor [Figure 2].

Lastly, regarding "practice of antibiotic use," only 32.2% almost always consulted a doctor before starting an antibiotic and 24% preferred obtaining an antibiotic from a pharmacy rather than a doctor. Almost 19.3% never completed the full course of antibiotics after feeling better with 2–3 doses. The majority of the study population checked the expiry date before using it (59.6%) and 73.7% used antibiotics prophylactically [Figure 3].

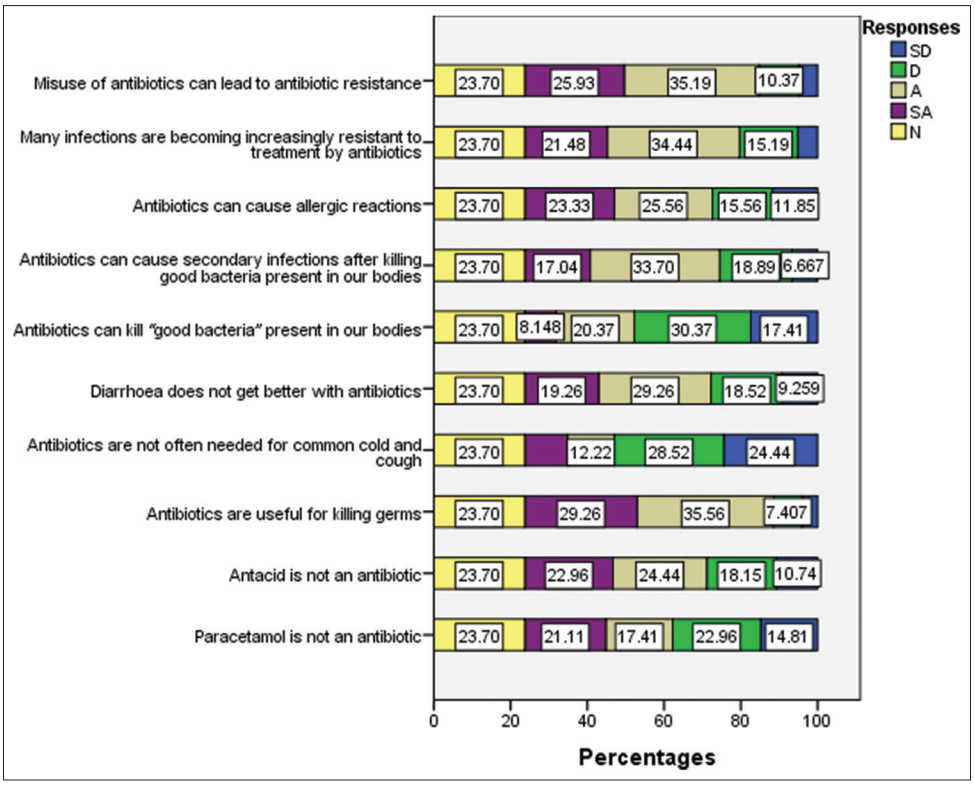

Figure 1: Segmented bar graph of the responses to questions on knowledge regarding antibiotic use among the study population (n = 270. *SD = Strongly disagree, D = Disagree, A = Agree, SA = Strongly agree, N = Neutral

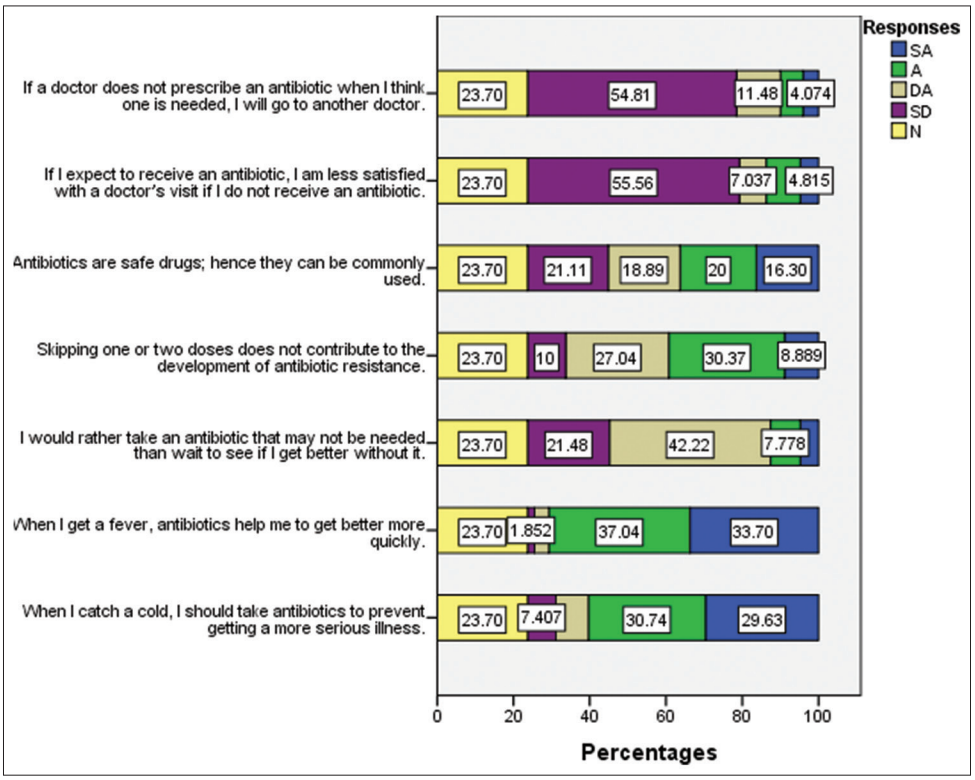

Figure 2: Segmented bar graph of the responses to questions on attitudes toward antibiotic use among the study population (n = 270). *SD = Strongly disagree, D = Disagree, A = Agree, SA = Strongly agree, N = Neutral

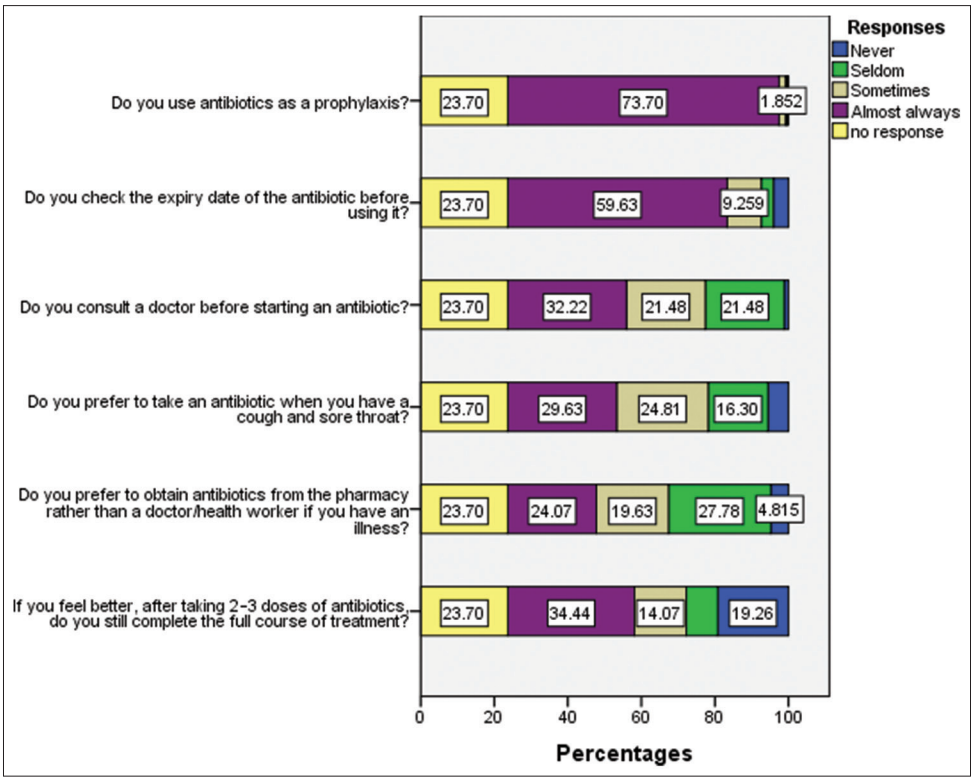

Figure 3: Segmented bar graph of the responses to questions on the practice of antibiotics among the study population (n = 270)

Association between level of knowledge, attitude, and practice and sociodemographic profile

The association between sociodemographic characteristics and the level of KAP regarding antibiotic usage revealed that males had significantly higher levels of knowledge about antibiotic use as compared to females (P = 0.000). Similarly, the study subjects who were workers (P = 0.008) and were educated (P = 0.000) had significantly better knowledge than their counterparts.

The attitude toward antibiotic use was significantly associated with gender (P = 0.001), occupation (P = 0.00), and educational qualification (0.000). Female respondents, workers, and those having education up to middle school had a positive attitude toward antibiotic use than that of their counterparts.

Regarding practice, it was found that gender, occupation, and education were significantly associated with the practice of antibiotics. Contrary to their counterparts, female respondents, workers, and those having education up to secondary had appropriate practice. In all these cases, the $P < 0.05$ and hence, statistically significant [Table 2].

Discussion

This study was conducted in the slums of Purba Bardhaman district of West Bengal among 270 adults where KAP related to antibiotic use was studied.

From this study, it was found that 35.9% population had better knowledge regarding antibiotic use. On the contrary, in a study conducted in rural Mangaluru, 18.5% of the participants had adequate knowledge.[8] Only 3% of the population attending the mass gathering of Kumbh Mela in Ujjain City had good knowledge.[13] Almost 53% of participants had higher knowledge regarding the use, action, and resistance of antibiotics in a study among the public in Kuwait.[6] These variations could be explained by the difference in study setup having an effect of mass gathering for subject selection.

In the present study, 23.70% were unaware of the term antibiotics whereas a study conducted among rural communities of Odisha revealed 55.53% had not heard about antimicrobial medicines.[14] Almost 93% of the population defined antibiotics incorrectly in a study conducted by Nguyen *et al*. at a mass gathering in Central India.[13] As far as knowledge regarding the identification of antibiotics is concerned, nearly a third (38.5%) of the population believed that paracetamol was an antibiotic. Comparably, in a study conducted in the Rupandehi district of Nepal,[11] 28.5% identified paracetamol as an antibiotic which was similar to that of a Lebanese study (21.6%).[15] In this study, 43% knew that antibiotics are useful for killing germs while 57% still believed that antibiotics are required for recovering from coughs and colds. Similarly, 60.8% of participants thought that antibiotics hastened the recovery from cough and cold in a study conducted in Mangaluru, India, whereas around 30.8% thought that antibiotics killed all germs.[8] A study conducted in Northern India revealed the most common reason for using antibiotics was the common cold.[16] About 45.8% of the population believed that antibiotics are needed for the common cold and cough in a study by

Table 2: Association of knowledge, attitude, and practice score regarding antibiotic usage with the sociodemographic characteristics among the study population (*n*=270)

Variables (*n*)	Knowledge score		χ^2 (df), *P*	Attitude score		χ^2 (df), *P*	Practice score		χ^2 (df), *P*
	≤6 (*n*=173), *n* (%)	>6 (*n*=97), *n* (%)		≤3 (*n*=141), *n* (%)	>3 (*n*=129), *n* (%)		≤12 (*n*=139), *n* (%)	>12 (*n*=131), *n* (%)	
Age (years)									
≤50 (221)	145 (65.6)	76 (34.4)	1.249 (1), 0.323	113 (51.1)	108 (48.9)	0.581 (1), 0.528	120 (54.3)	101 (45.7)	3.869 (1), 0.041
>50 (49)	28 (57.01)	21 (42.9)		28 (57.1)	21 (42.9)		19 (38.8)	30 (61.2)	
Gender									
Male (98)	47 (48.0)	51 (52.0)	17.355 (1), 0.000	38 (38.8)	60 (61.2)	11.148 (1), 0.001	36 (36.7)	62 (63.3)	13.394 (1), 0.000
Female (172)	126 (73.3)	46 (26.7)		103 (59.9)	69 (40.1)		103 (59.9)	69 (40.1)	
Religion									
Hindu (266)	169 (63.5)	97 (36.5)	2.277 (1), 0.300	140 (52.6)	126 (47.4)	1.206 (1), 0.351	137 (51.5)	129 (48.5)	0.004 (1), 1.000
Muslim (4)	4 (100)	0		1 (25.0)	3 (75.0)		2 (50.0)	2 (50.0)	
Occupation									
Skilled* (42)	20 (47.6)	22 (52.4)	11.807 (3), 0.008	10 (23.8)	32 (76.2)	21.494 (3), 0.000	12 (28.6)	30 (71.4)	14.134 (3), 0.003
Unskilled** (104)	68 (65.4)	36 (34.6)		57 (54.8)	47 (45.2)		52 (50.0)	52 (50.0)	
At home# (111)	80 (72.1)	31 (27.9)		70 (63.1)	41 (36.9)		69 (62.2)	42 (37.8)	
Unemployed (13)	5 (38.5)	8 (61.5)		4 (30.8)	9 (69.2)		6 (46.2)	7 (53.8)	
Education									
Illiterate/just literate (65)	57 (87.7)	8 (12.3)	32.608 (5), 0.000	50 (76.9)	15 (23.1)	27.325 (5), 0.000	51 (78.5)	14 (21.5)	39.252 (5), 0.000
Primary school (41)	27 (65.9)	14 (34.1)		22 (53.7)	19 (46.3)		23 (56.1)	18 (43.9)	
Middle school (69)	44 (63.8)	25 (36.2)		34 (49.3)	35 (50.7)		37 (53.6)	32 (46.4)	
Secondary (53)	30 (56.6)	23 (43.4)		23 (43.4)	30 (56.6)		13 (24.5)	40 (75.5)	
Higher secondary (30)	12 (40.0)	18 (60.0)		9 (30.0)	21 (70.0)		10 (33.3)	20 (66.7)	
Graduation and above (12)	3 (25.0)	9 (75.0)		3 (25.0)	9 (75.0)		5 (41.7)	7 (58.3)	
Socioeconomic status (Modified B.G. Prasad Scale January 2022)									
Upper (167)	100 (59.9)	67 (40.1)	6.285 (4), 0.179	82 (49.1)	85 (50.9)	3.572 (4), 0.467	78 (46.7)	89 (53.3)	5.537 (4), 0.237
Upper middle (83)	61 (73.5)	22 (26.5)		49 (59.0)	34 (41.0)		49 (59.0)	34 (41.0)	
Middle (16)	10 (62.5)	6 (37.5)		8 (50.0)	8 (50.0)		10 (62.5)	6 (37.5)	
Lower middle (3)	1 (33.3)	2 (66.7)		1 (33.3)	2 (66.7)		1 (33.3)	2 (66.7)	
Lower (1)	1 (100)	0		1 (100.0)	0		1 (100)	0	

*Skilled-Driver, Businessman, Tailor, Carpenter, Healthcare worker, **Unskilled-Laborer, Sweeper, Shopkeeper, Home maid, #At home- retired or homemaker

Chatterjee *et al*. in India.[17] A majority (94.1% and 84.1%, respectively) replied correctly that antibiotics are beneficial for destroying germs and that antibiotics are not usually required for colds and flu, in a study among community members of the Rupandehi District in Nepal.[11] These variations in the findings reflect the developing country's commitment toward antibiotic stewardship policy. Concerning the knowledge of the side effects of antibiotics, in the present study, only 27.41% knew antibiotics could cause allergies. On the contrary, 68.24% and 52.8% believed that antibiotics could cause allergic reactions and have adverse effects, in a study conducted in Boyolali, Indonesia,[18] and Northern India,[16] respectively. About 61.1% of the population of the present study believed misuse of antibiotics can lead to resistance which is similar to a study conducted in Indonesia, where 67.71% population believed the same.[18] A study conducted in Mangalore revealed that only 16.2% thought ABR was a global issue.[8]

Coming to attitude toward the use of antibiotics, 47.8% had a positive attitude toward antibiotic use in the present study, in tandem to the study conducted in Central India, where 40% had an appropriate attitude toward antibiotic usage.[13] The current study revealed that 60.4% preferred taking antibiotics whenever they had a cold and 70.7% believed antibiotics cured them more quickly whenever they had a fever. In the study conducted in Mangalore, 52.3% preferred to take an antibiotic when they had a fever or sore throat,[8] similar to this study's findings. However, in a study conducted in Indonesia, over 45% of participants thought antibiotics could hasten recovery from a cold.[18] In this study, 14% were less satisfied with a doctor's visit if they did not receive an antibiotic after expecting one, and 10% stated that if they were not prescribed an antibiotic when they expected one, they would visit another doctor. Similarly, in a study conducted in Ujjain, 7% population considered visiting another doctor if the previous doctor had not prescribed one.[13] A study conducted in Davanegere revealed that 74.4% population expected antibiotics from their doctor whenever they were ill.[19] In a study conducted in Boyolali, Indonesia, 29% reported that they were not satisfied if the doctor did not prescribe an antibiotic.[18] The antibiotic prescription largely depends upon the geographical variation of infectious diseases.

Last but not least, as regards to practice of antibiotic use was concerned, 48.5% of the population had an appropriate practice of antibiotics. On the contrary, only 20% and 33.75% population had an appropriate practice of using antibiotics in the study conducted in Ujjain[13] and South Karnataka,[20] respectively.

Our study revealed that 32.2% population almost always consulted a doctor before starting an antibiotic and 24% preferred obtaining an antibiotic from a pharmacy rather than a doctor. Although there are strict regulations that restrict the sale of antibiotics, a study conducted in Indonesia revealed that 35% considered buying antibiotics without a doctor's prescription.[18] In the study conducted in Odisha, 20.14% ceased taking antibiotics before course completion which is similar to our study.[14] 87% and 80.2% stated that they stopped taking antibiotics as soon as symptoms subsided in the studies conducted in Ujjain[13] and Davanegere,[19] respectively. In the present study, 59.6% of the population checked the expiry date before using it and 73.7% used antibiotics prophylactically. In a study done in Nepal, 85.8% checked the expiry date before using antibiotics, and 31.8% used antibiotics as a prophylaxis.[11] This observed poor practice can be reflected by the significant knowledge gap found in the studies.

In this study, the association between sociodemographic characteristics and knowledge regarding antibiotic usage revealed males, workers, and educated had significantly higher levels of knowledge as compared to their counterparts. This could be possible because men and workers are more exposed to public media and spend much time outdoors. In addition, those who were workers, educated, and female had a positive attitude and appropriate practice than that of their counterparts. The study conducted in Central India revealed gender, education, occupation, and age were the crucial factors associated with the KAP which is similar to our study.[13] In a study conducted in Indonesia, it was found that factors such as gender, educational level, area of residence, and monthly income were significantly associated with KAP ($P < 0.05$).[18]

Limitations

The results of the study should be deciphered, keeping in mind, the limited generalizability of the study as the study was conducted in only 15 slums under the Burdwan Municipality, out of 144 slums. Furthermore, considering the feasibility of the researcher, many additional factors related to KAP regarding antibiotic use could not be explored.

Conclusion

The study highlights the low level of knowledge and a relatively moderate level of attitude and practice on antibiotic usage. There were several malpractices such as not completing the course of antibiotics, purchasing antibiotics without consulting a doctor, and preferring the usage of antibiotics to treat cough and sore throat. This reflects the need for educational campaigns to promote correct knowledge and attitude about the suitable usage of antibiotics, discourage inappropriate practices, and awareness regarding the threat of ABR. Public health programs should be introduced for the people living in slums to create cautiousness about self-medication, discourage harmful practices, and check the expiry dates before using any medicine. Another important strategy to lower over-the-counter sales and, thus, lower antibiotic self-prescription should be the nationwide enforcement of antibiotic regulations.

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Conflicts of interest

There are no conflicts of interest.

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