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Original Research Article

What do we know and how do we act: knowledge, attitude and practices around antimicrobial resistance

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ABSTRACT

Background: The overuse and misuse of antibiotics has influenced a rise in antimicrobial resistance (AMR) thereby posing a significant threat to global health. Information on AMR has been available to the public; however, a gap exists in relay of information due to lack of effective interventions. This study focuses on exploring the knowledge, attitudes and practices (KAP) among rural, semi-urban and urban populations from Delhi NCR, India.
Methods: This study was a cross-sectional questionnaire based online survey conducted across rural, semi-urban and urban areas of Delhi NCR for one month (June-July 2024). The questionnaire comprising 28 close-ended questions was administered in English and Hindi languages to participants aged 15-80 years. The questionnaire focused on knowledge, awareness and practices of antibiotics and antimicrobial resistance.
Results: A total of 500 participants attempted the survey out of which 435 (87%) were aware about antibiotics. About 479 (95.8%) participants had earlier consumed antibiotics out of which 336/497 (70.1%) participants consumed antibiotics prescribed by doctors. Among 479 participants, 253 (52.8%) completed the course however 311 (69.1%) of the participants kept the antibiotics for reuse. Nearly 191/479 (39.9%) participants practiced antibiotics misuse by consumption of antibiotics when having similar symptoms as previously observed. The assessment of participants revealed that only 216/500 (43.2%) participants were knowledgeable about AMR. The participants aware of AMR agreed that the antibiotic practices of reuse (n=69/216, 31.9%), poor quality (n=87/216, 40.3%), lower dosage (n=81/216, 37.5%) and not completion of course (n=77/216, 35.6%) can result in AMR.
Conclusions: The study highlights that despite the participants being informed about antibiotics and followed medical advice their practice of reusing antibiotics raises the need for tailored interventions to promote awareness about AMR and appropriate use of antibiotics.

Keywords: Antibiotics, Antimicrobial resistance, Antibiotic awareness, Antibiotic misuse, Knowledge attitude practices studies

INTRODUCTION

The World Health Organisation (WHO) recognizes antimicrobial resistance (AMR) as a major threat to public health. According to the National Health Service (NHS) England, "AMR occurs when the microorganisms which cause disease (including bacteria, viruses, fungi and parasites) are no longer affected by antimicrobial medicines such as antibiotics, antivirals, antifungals and antiparasitic that we use to kill them, prevent and treat the disease".[1] Consequently, due to this drug resistance, antibiotics lose their effectiveness in treating infections which increases the risk of severe illness, spread of disease, disability and death.[2] Approximately seven hundred thousand deaths due to drug-resistant infections

have been reported annually and it is predicted that this number will rise up to ten million people dead each year until 2050, highlighting the need for urgent action.[2] Antibiotics were celebrated in the 20th century as one of the greatest medical advances in modern history and have been a primary weapon in the fight against infectious diseases in humans and animals.[3] In the 21st century, however, antibiotics have become a major public health issue – one with social and economic implications across the globe.[4,5]

Bacteria naturally become resistant to antibiotics over time due to Darwinian evolution involving genetic mechanisms.[6] However, in the past two decades the healthcare sector has seen a plateau in the discovery of new antibacterial drugs, accompanied by a rapid surge in AMR, with wide-spread consequences for health systems worldwide.[7] Meanwhile, the overuse and misuse of antibiotics continue to fuel the problem, creating a serious threat to the global health system.[1]

In low- and middle-income countries (LMICs) like India, AMR has become particularly alarming due to the high burden of infectious diseases, over-the-counter availability of antibiotics and inadequate regulatory enforcement.[8,9] There is still a relatively poor awareness and appreciation of AMR in many LMICs in spite of this being a very pressing problem. The development and spread of antimicrobial resistance are accelerated by factors such as overuse and misuse of antibiotics, lack of awareness, poor infection control, agricultural use of antibiotics and gaps in knowledge.[10,11] As a consequence, in India in 2019, 297,000 deaths were attributable to AMR and 1,042,500 deaths associated with AMR.[12]

Additionally, the issue has direct consequences such as decreased efficacy of available antimicrobial drugs, increased costs for the healthcare and decreased recovery rate and quality of life (QoL) of affected patients.[13] As a result, the WHO emphasizes the need for grassroot level understanding in LMICs regarding AMR in its research priority setting document.[14] Hence, conducting a thorough investigation into local knowledge, attitudes and practices (KAP) related to antibiotic use is essential for developing effective interventions. This study aims to investigate the understanding of the general population regarding antibiotic use and AMR.

METHODS

Study design

A cross-sectional questionnaire based online survey was conducted in semi-urban, urban slums and rural areas across Delhi NCR, India between June 2024 to July 2024.

The study was conducted after obtaining ethical clearance from Gene Bandhu Independent Ethics Committee (ECG023/2024). The participants were informed about the study's purpose, their role and rights as research subjects. The participants agreeing to undertake the survey provided an online consent which was in accordance with ethical standards.

Sample size

The sample size of 500 has been calculated based on the assumption about knowledge and awareness on AMR among population being 70.0% along with desired precision (d) as±4.0% and 95% confidence interval (Zα) i.e. 1.96.[15]

Population

The study participants were between the age of 15 to 80 years.

Intervention

The online anonymous structured questionnaire was developed using Google form in two languages namely English and Hindi (Figure 2). The questionnaire consisted of twenty-eight close-ended questions. The questionnaire development was a three-phase process. This included reviewing existing literature on antibiotic use and AMR to generate relevant questions followed by a group discussion with subject matter experts from various fields such as infectious diseases, pharmacology and public health for refining the questionnaire. The questionnaire was pre-tested in ten individuals from different socio demographic backgrounds and ages to assess the clarity, validity and reliability of the questionnaire.

The questionnaire focused on Knowledge and awareness about antibiotics, Practice and use of antibiotics and Knowledge and awareness about antimicrobial resistance.

Outcomes

This study will give an understanding about the knowledge, awareness and perception among the general population towards use of antibiotics and antibiotic resistance.

Statistical analysis

The demographic characteristics such as age, gender, education and knowledge about the healthcare sector were represented as frequency and percentage. The responses received for the questionnaire were presented as frequency and percentage. The data analysis and graphical presentation were done using Microsoft Excel 2016.

RESULTS

Demographic characteristics of survey participants

Table 1 provides an overview of the demographical characteristics of the participants who participated in the study. A total of five hundred participants completed the

survey. The median age of the participants was 38 years (range 15-88 years). The highest participation was observed among the age group below 30 years (193/500, 38.6%) followed by those in the age group of 30-50 years (173/500, 34.6%). Among the participants, 288/500 (57.60%) were male and 212/500 (42.40%) were female. A high participation was seen among graduates (174/500, 34.80%) and post graduates (170/500, 34.00%).

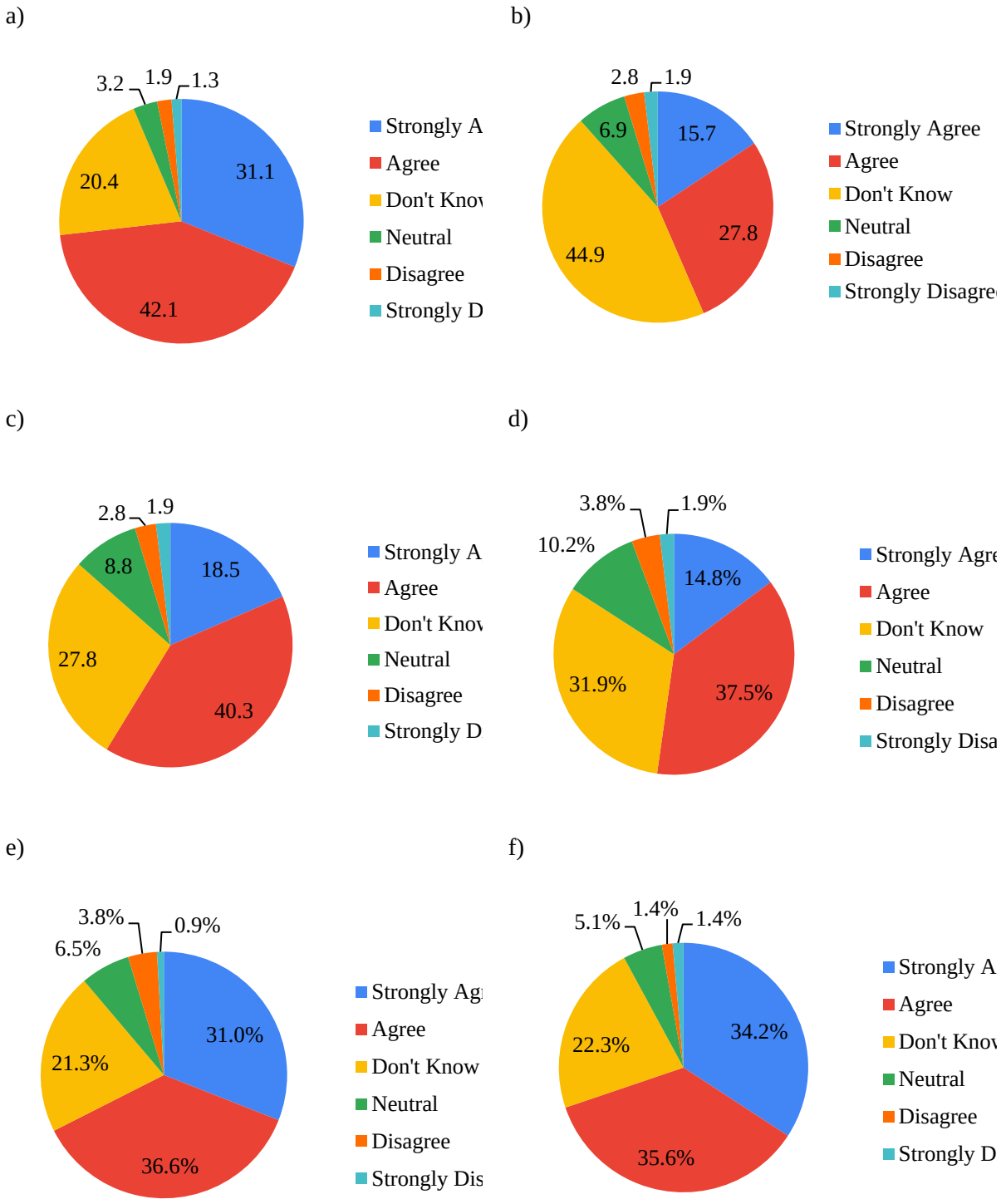

Figure 1: a) Ineffectiveness of antibiotics in treating disease due to overuse; b) Antibiotics resistance due to use of antibiotics in animal farming; c) Availability of poor-quality antibiotics; d) Administration of lower antibiotic dosage; e) Self-medication of antibiotics; f) Antibiotic course is not completed.

Knowledge and awareness about antibiotics

The data on knowledge and awareness regarding antibiotics among participants has been tabulated in Table 2. Participants when asked if they knew about antibiotics, 435/500 (87.0%) of the participants were aware about antibiotics. Participants when asked to select the correct names of antibiotics in a multiple-choice question, 317/500 (63.4%) and 243/500 (48.6%) correctly opined for penicillin and ceplox respectively.

Few participants incorrectly identified paracetamol (123/500, 24.6%), allegra (68/500, 13.6%), Pan D (55/500, 11.0%), Amlong (63/500, 12.6%), Metformin (101/500, 20.2%), Crocin/dolo (118/500, 23.6%), cough syrup (78/500, 15.6%) and tetanus injection (115/500, 23.0%) as antibiotics.

Table 1: Baseline characteristics of participants.

Characteristics	Number of participants (n=500)	(%)
Gender		
Male	288	57.6
Female	212	42.4
Education		
Up to middle	30	6.0
Senior secondary	115	23.0
Graduate	174	34.8
Post graduate	170	34.0
Others	11	2.2
Formal education in health		
Yes	64	12.8
No	436	87.2
Family member working in health sector		
Yes	120	24.0
No	380	76.0

Table 2: Knowledge and awareness about antibiotics among participants.

	Number of participants (n=500)	(%)
Do you know what is an antibiotic?		
Yes	435	87.00
No	65	13.00
Which of these is an antibiotic? *Multiple response		
Paracetamol	123	24.60
Allegra	68	13.60
Cough syrup	78	15.60
Pan D	55	11.00
Ceplox	243	48.60
Amlong	63	12.60
Metformin	101	20.20
Crocin/DOLO	118	23.60
Penicillin	317	63.40
Tetanus injection	115	23.00
Antibiotics are used for? *Multiple response		
Bacterial infections	331	66.20
Viral infections	246	49.20
Parasitic infections	181	36.20
Healing of wound	191	38.20
Fungal infection	142	28.40
Headache	75	15.00
Stomach-ache	88	17.60
None	28	5.60

Table 3: Practice and use of antibiotics among participants.

	Number of participants (n=500)	(%)
Have you ever taken an antibiotic?		
Yes	479	95.8
No	21	4.2
	Number of participants (n=479)	**(%)**
If yes, how often have you used antibiotics within the past 3 months?		
1 time	185	38.6
2-3 times	95	19.8
4-5 times	15	3.1
More than 5 times	10	2.1
None	174	36.4
Was the antibiotic prescribed by the doctor?		
Yes	336	70.1
No	143	29.9
If not prescribed by a doctor, who gave the antibiotic to you?		
Myself	63	13.2
Family member	33	6.9
Friend	11	2.3
Pharmacist	28	5.8
Nurse	11	2.3
Other health workers	12	2.5
Others	52	10.9
If a doctor gives you antibiotics, do you complete the full course?		
Always	253	52.8
More Often	149	31.1
Sometimes	59	12.3
Never	7	1.5
Rarely	11	2.3
Did you stop using antibiotics when you felt better?		
Yes	256	53.4
No	223	46.6
What do you do with leftover antibiotics?	***Multiple response**	
Kept for reuse	311	69.1
Discard as general Waste	162	33.8
Given to others	114	23.8
Have you ever used leftover antibiotics without consulting a doctor?		
Yes	277	57.8
No	202	42.2
Main reason for reuse	***Multiple response**	
Doctor is not needed for these issues	69	14.4
Similar symptoms as last time	191	39.9
Saves money of the doctors' fees	113	23.6
Pharmacist/ nurse/ healthcare worker told me you can use	78	16.3
Saves time	98	20.5
Any health issues with reuse?	***Multiple response**	
None	271	56.6
Allergy	47	9.8
Gastrointestinal issues	36	7.5
Antibiotic are no longer effective	15	3.1
New Infection	9	1.9
Worsening of original Symptoms	6	1.3
Delay in start of new treatment	18	3.8
Others	31	6.5

Continued.

	Number of participants (n=500)	(%)
Who is the health worker who spoke about completing the entire course of medication?		
Doctor	246	51.4
Nurse	62	12.9
Pharmacist	29	6.1
Others	11	2.3

Table 4: Knowledge and awareness about AMR among participants.

	Number of Participants (n=500)	(%)
Do you understand the meaning of AMR?		
Yes, I have good understanding	58	11.6
Yes, I have basic understanding	105	21.0
I have heard of AMR	53	10.6
I do not understand AMR	289	57.8
	Number of participants (n=216)	**(%)**
Source of information about AMR.	*** Multiple response**	
Health worker	124	57.4
Internet	115	53.2
Social media	26	12.0
TV, Radio	9	4.2
Magazine newspaper	30	13.9
Family and friends	40	18.5
Do you believe that reusing antibiotics can cause AMR?		
Yes	69	31.9
No	15	6.9
Sometimes	45	20.8
I don’t know	82	38.0

With regards to knowledge and awareness about antibiotics, participants were lastly asked what are antibiotics used for treating and 331/500 (66.2%) rightly identified use of antibiotics in treatment of bacterial infections while 246/500 (49.2%) had the misconception that viral infections can also be treated using antibiotics.

Practices and use of antibiotics

Table 3 summarizes the participant responses on the practices and use of antibiotics. Participants were asked if they have ever consumed antibiotics out of which 479/500 (95.8%) participants had taken antibiotics before while 21/500 (4.2%) did not consume antibiotics. Participants who had answered to have consumed antibiotics before, were informed to attempt detailed questions regarding use of antibiotics. The participants who did not consume antibiotics were informed to attempt the ‘Knowledge regarding AMR’ section of the questionnaire.

Participants who responded to having consumed antibiotics earlier when asked how frequently they had taken antibiotics in the past three months. Among 479 participants, 185/479 (38.6%) of them had consumed antibiotics one time, 95/479 (19.8%) of participants had antibiotics two to three times, 15/479 (3.1%) of the participants consumed antibiotics four to five times and lastly, 10/479 (2.1%) had the antibiotics more than five times. About 174/479 (36.4%) of the participants had claimed to have not consumed any antibiotics in the past three months. The participants were then asked if the antibiotic they consumed was prescribed by the doctor.

Out of the 479 participants, 336/497 (70.1%) consulted the doctor for antibiotics while 143/497 (29.9%) did not consult a doctor for their antibiotic prescription. Among the 143 participants who did not refer to a doctor for an antibiotics course, 63/479 (13.2%) of them were self-medicating themselves. Furthermore, the participants were asked whether they completed the full course for antibiotics when prescribed by a doctor.

Majority of the participants, 253/479 (52.8%) responded that they always complete the course while only 11/479 (2.3%) responded that they never complete the antibiotic course. Next, participants were asked whether they stop using antibiotics when they felt better and 256/479 (53.4%) of the participants stopped using antibiotics upon feeling better while 223/479 (46.6%) did not. In addition to that, participants when asked regarding their practices involving leftover antibiotic medication and 311/479 (69.1%) of participants responded they kept medicines for reuse purposes followed by 162/479 (33.8%) discarding the medicine as general waste and the rest giving the medicine to others.

Participants were then asked regarding their practice involving leftover antibiotics and out of 479 participants, 277/479 (57.8%) participants responded positively stating that they do reuse leftover antibiotics without consulting a doctor.

Based on the information participants were asked about the main reason for reuse for which multiple reasons could be provided, 191/479 (39.9%) of the participants reported reusing antibiotics since they had similar symptoms as last time followed by 113/479 (23.6%) reusing medication to save money and lastly 98/479(20.5%) did the same to save time as provided in table 3. The respondents were further asked if they have experienced any health issues after reusing antibiotics and 271/479 (56.6%) of the participants did not face any issues. Some participants out of 479, 208/479 (43.4%) gave a list of negative outcomes experienced after reusing antibiotics. This includes 47/479 (9.8%) participants having an allergy and mainly the occurrence of gastric problems in 36/479 (7.5%) of the participants.

Furthermore, to gain insights about the role of healthcare workers in the right dissemination of knowledge, participants were asked about which health worker has spoken about completing the entire course of medication and the dangers of leftover antibiotics and 246/479 (51.4%) participants mentioned that doctors most often warn them followed by 62/479 (12.9%) participants receiving usage guidelines from nurses.

Knowledge and awareness about AMR

Under the theme 'knowledge and awareness about AMR' participants when asked if they knew the term 'antimicrobial resistance', 216/500 (43.2%) responded to have known about AMR. Among the 216 participants, 124/216 (57.4%) relied on healthcare workers while 115/216 (53.2%) relied on internet content for information on antibiotics use and AMR. Among these the 216 participants, 69/216 (31.9%) agreed that reusing antibiotics can cause AMR (Table 4).

Perspectives on factors that contribute to AMR

Among 216 participants who responded that they understand AMR were further questioned about their perspectives on factors contributing for AMR. Firstly, 91/216 (42.1%) of the participants agreed that ineffectiveness of antibiotics in treating disease due to overuse is the main contributor to AMR (Figure 1a). With regards to the antibiotic resistance being caused due to use of antibiotics in animal farming, 97/216 (44.9%) of the participants responded that they did not know about it (Figure 1b).

As for the availability of poor-quality antibiotics being a contributor, 87/216 (40.3%) of the participants agreed (Figure 1c). Furthermore, 81/216 (37.5%) of the participants agreed that administration of lower antibiotic dosages can contribute to antimicrobial resistance (Figure 1d). In addition, 79/216 (36.6%) of the participants agreed that self-medication of antibiotics can lead to AMR (Figure 1e). Lastly, 77/216 (35.6%) of the participants agreed that if the antibiotic course is not completed it can also result in AMR (Figure 1f).

DISCUSSION

This study focuses on the knowledge, attitudes and practices about antibiotic use and antimicrobial resistance. In our study, we observed that participants were aware about antibiotics (n=435/500, 87.0%) however few of them incorrectly identified paracetamol (n=123/500, 24.6%), allegra (n=68/500, 13.6%), Pan D (n=55/500, 11.0%), Amlong (n=63/500, 12.6%), Metformin (n=101/500, 20.2%), Crocin/dolo (n=118/500, 23.6%), cough syrup (n=78/500, 15.6%) and tetanus injection (n=115/500, 23.0%) as antibiotics. The study participants revealed to have practiced good antibiotics use approaches such as intake of antibiotics prescribed by doctors/clinicians (n=336/497, 70.1%) and completing the antibiotics course (n=253/479, 52.8%), but nearly 311/497 (69.1%) participants kept medicines for reuse. Although 216/500 (43.2%) participants knew about AMR, the participants showed low awareness for factors contributing towards AMR.

Knowledge and awareness about antibiotics

The awareness about antibiotics among our study participants was 435/500 (87.0%) which was consistent with the findings reported by a study conducted in Ethiopia where 419/504 (83.13%) of the participants had an understanding about antibiotics.[16] Furthermore, 331/500 (66.2%) of our study participants correctly answered that antibiotics can be used for treating bacterial infections. Our findings showed improvement in comparison to the study conducted in the Romanian population where 22.23% participants correctly agreed to the use of antibiotics to kill bacteria.[17] Another study from India, conducted in the state of Karnataka reported that only 45% of the participants rightly identified use of antibiotics to treat bacterial infections.[18] Nevertheless, a gap still exists in the participants' understanding about use of antibiotics in treating infections as 246/500 (49.2%) of them responded that antibiotics can be used to treat viral infections.

Correspondingly, 49% participants in the awareness survey conducted in Karnataka wrongly identified the use of antibiotics in viral infections.[18] In our study, the majority of the participants (n=317/500, 63.4%) were rightly able to identify penicillin as an antibiotic from a list of medicines. These findings were consistent with the reports from a study conducted in Malaysia where 61.8% of the participants were able to correctly identify penicillin as an antibiotic.[19]

Practices and use of antibiotics

In our study, 479/500 (95.8%) participants have reported consuming antibiotics previously which was consistent with a study conducted in Ethiopia where 99.8% of the participants had used antibiotics at some point in their life.[16] Our study highlighted that nearly 25/479 (5.2%) participants had consumed antibiotics more than 4 times over a period of 3 months which is relatively higher as proposed to a median global level of 8.54 defined daily doses per capita per year.[20] Subsequently, our study participants who had consumed antibiotics previously when asked if the regimen was prescribed by the doctor, about 336/497 (70.1%) of them had agreed to have consulted a doctor.

These findings show an improvement in responses when compared with the study conducted in Karnataka with 67% of the respondents obtaining doctor prescribed antibiotics.[18] Our findings were consistent with the Romanian population where 78.86% of the participants consumed antibiotics only based on the doctor's prescription.[17] Our study also revealed a relatively low number of participants (n=63/479, 13.2%) opting for self-medication which was reasonably higher than that of 3.2% participants in a study conducted in Bangladesh.[21] In our study, 253/479 (52.8%) of the participants responded to having completed the required course for the antibiotic treatment. These findings were similar to those reported in the Romanian population where 57.35% of the respondents were aware that antibiotic treatment should be completed regardless of the presence and absence of symptoms.[17] Additionally, a study conducted in Malaysia revealed that 54.4% of the participants completed the antibiotics course.[19]

Regardless of the fact that 246/479 (51.4%) of the participants have been given guidelines on correct antibiotic usage by doctors in our study, participants still continued to neglect the guidelines and misuse the antibiotics intake. This was evident in our study wherein 311/497 (69.1%) of the participants kept leftover medicine for reuse purposes. These results were comparable to the findings in an Ethiopian study where 60.9% of the participants had saved leftover antibiotics for future use.[16] Survey conducted in Uganda revealed that 52% participants reported reusing antibiotics due to the recurrence of symptoms resembling those from the previous infection.[22] Similarly, several knowledge, attitudes and practices studies conducted in China reported that people keeping leftover antibiotics tend to use them when encountered with similar symptoms.[23]

However, our study revealed that only 191/479 (39.9%) participants reportedly reused antibiotics due to the recurrence of symptoms resembling those from the previous infection showing variation in the practices of the participants. Misuse of antibiotics may negatively impact health causing disruption of the gut microbiome (diarrhoea), increased side effects associated with antibiotics (abdominal pain or nausea) and emergence of drug resistance bacteria.[24,25] In our study nearly 208/479 (43.4%) participants reported to have experienced negative outcomes after reusing antibiotics.

Knowledge and awareness about AMR

Our study revealed that less than half of the participants (n=216/500, 43.2%) acknowledged to know about AMR which corroborates with the findings reported in the Ethiopian study where 47.6% of the participants were able to correctly identify the definition of AMR.[16] Additionally, our study showed that more than half of the participants (n=124/216, 57.4%) relied on health care workers for correct information about antibiotic use and AMR while others relied on internet content for information. These results were similar to the findings reported in a study conducted in Bangladesh where exposure to media positively influenced the spread of knowledge among the population through newspapers and social media.[21] Additionally, another study conducted in Europe reported similar findings where 78% of the participants considered doctors for information regarding antibiotics.[26] In our study, 69/216 (31.9%) agreed that reusing antibiotics can cause AMR. The awareness was comparably lower to that reported in a study conducted in Bangladesh where 381/656 (58.08%) agreed that misuse of antibiotics can develop antibiotic resistance.[21]

Perspectives on factors that contribute to AMR

Our study revealed participant's perspectives on the factors that contribute to AMR varied widely, reflecting a combination of accurate insights and common misconceptions about the misuse and overuse of antibiotics and self-medication practices. They identified factors such as overuse of antibiotics, self-medication, incomplete courses of treatment and use of antibiotics in animal husbandry.

Our study reflected that participants had a relatively lower understanding of contributors of AMR where only 81/216 (37.5%) of the participants agreed that administration of lower antibiotic dosages can contribute to antimicrobial resistance. These findings were comparatively lower to 115/120 (95.83%) participants correctly identifying underuse of antimicrobials as a cause of AMR in a study conducted in Ethiopia.[27] Additionally, in our study, 91/216 (42.1%) of the participants correctly agreed that overuse of antibiotics leads to ineffectiveness of the medication in treating disease and hence as a contributor to AMR. These results are consistent with the findings in the Ethiopian study where 295/504 (58.5%) responded correctly to excessive antibiotic use as a contributor to AMR.[16]

Our study revealed that participants demonstrated a lack of awareness where 97/216 (44.9%) of the respondents did not know whether the use of antibiotics in animal farming or animal husbandry contributed to AMR. Similarly, a study conducted in Romania indicated 47.95% of the

participants were unsure whether animal products containing antibiotic residues can increase the occurrence of AMR.[17] On the other hand, in a study conducted in Ethiopian participants showed a much higher rate of awareness where 105/120 (87.5%) participants agreed that the excessive use of antibiotics in livestock and food production is a contributor to AMR.[27]

The inappropriate use of antibiotics by self-medication for self-limiting diseases like common cold, flu-like symptoms, etc. have been a major concern for increase in AMR.[28] In our study, 79/216 (36.6%) participants agreed that self-medication of antibiotics can lead to AMR. The misuse of antibiotics, including taking incomplete doses, has contributed to the growing problem of antibiotic resistance, which health officials are increasingly alarmed about.[25] In our study, 77/216 (35.6%) participants agreed that if the antibiotic course is not completed it may lead to AMR. Likewise, 81/216 (40.3%) of the participants agreed that the availability of poor-quality antibiotics is a contributor for AMR. Poor-quality medicines can lead to treatment failure, mistakenly attributed to resistant infections even when standard treatment guidelines are followed, especially in low- and middle-income countries with limited access to susceptibility testing. The failure to incorporate antimicrobial drug quality surveillance into plans against antimicrobial resistance could undermine their effectiveness by overlooking a potential driver of resistance.[29]

The study being of cross-sectional design provided information about knowledge, attitudes and practices for antibiotics and AMR at a single point in time. It would be necessary to perform longitudinal studies to track changes over time and evaluate the effectiveness of interventions. The study relied on self-reported data, which may be subjected to recall bias and social desirability bias. The study introduces regional bias thus limiting its generalizability to other regions and populations in India. The study did not collect detailed information on participants' socioeconomic status, which could influence their access to healthcare, knowledge and practices regarding antibiotic use.

CONCLUSION

The survey conducted across Delhi NCR within the semi-urban, urban slums and rural areas revealed that while there is a general awareness about antibiotics and AMR within the population. Nevertheless, there were still misconceptions and gaps in knowledge that contributed to wrong practices of antibiotics use. The findings of the study highlight the need for developing and implementing tailored interventions and national policies for spreading awareness about AMR.

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