

## Knowledge, attitudes and behaviour towards antibiotic usage and its resistance among the general public of Shimla city: A pilot study

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### Abstract

**Background:** Antibiotic resistance (ABR) or antimicrobial resistance (AMR) is an important growing global health issue which needs urgent addressal. Irrational antibiotics use is a major reason for the spread of AMR. Judicious use of antibiotics is the only solution to curb this problem. **Aim:** This study aimed to assess current knowledge, attitudes and behavior of general public of Shimla city towards antibiotic usage and reasons for resistance development which could serve as baseline data for future studies. **Methodology:** A study involving 200 respondents was conducted using a pre tested, semi-structured close ended questionnaire among general public in Shimla, from January to April 2015. **Results:** The study found that out of 200 respondents, 73% were familiar with antibiotics, 40% of them were familiar with AMR. 46 % of general public knew the side/adverse effects caused by antibiotics. 20% of the respondents correctly identified that antibiotics are indicated for the treatment of bacterial infection. Less than 20% of respondents were aware that AMR is due to irrational use of antibiotic. 72% of them believed that newer and costly antibiotics are more efficient. 13% availed antibiotics as self medication. Incorrect knowledge regarding indication to use antibiotics for cold, diarrhea and fever for one day was 24%, 22% and 36% respectively. **Conclusion:** Educational interventions are needed to promote prudent use of antibiotics among the public to fill the gaps in terms of knowledge, attitude and practice regarding antibiotics use and its association with drug resistance. Enforcing antibiotic regulations at a national level is paramount targeting over the counter sale hence, reducing self-medication.

**Keywords:** Knowledge; Beliefs; Antibiotics usage; Self-medication; Antimicrobial resistance

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## **I**NTRODUCTION

The advent of antibiotics has been recognized as one of the greatest inventions that transformed medical and healthcare, especially the treatment and outcome of infectious diseases.<sup>1</sup> Antimicrobial resistance (AMR) is a worldwide problem preferentially affecting low- and middle income countries.<sup>2</sup> The escalation of AMR poses a significant threat to human healthcare globally.<sup>3</sup> Irrational and overuse of antibiotic is viewed as a key driver for the increase in antibiotic resistance<sup>4,5</sup> and governmental regulations that prohibit selling of antibiotics without a prescription are not fully enforced.<sup>6,7</sup> Moreover, misuse of antibiotics in treating viral infections is common and the prevalence of self-medication is alarmingly high.<sup>8,9</sup> Also it has been associated with inappropriate use including failure to complete treatment, skipping of doses, re-use of leftover medicines, and overuse of antibiotics.<sup>10</sup> Hence, the need to further explore and tackle the vital issue of antibiotics misuse is evident.

The World Health Report 2007 highlighted the issue of antibiotic resistance as one of the major threats to public health security in the 21st century.<sup>11</sup> In 2011 WHO set the theme of world health day as “combat antimicrobial resistance: no action today, no cure tomorrow”.<sup>12</sup> This shows a serious global problem of antimicrobial abuse and there is a growing consensus to urgently develop new strategies for prevention of resistance of bacteria to antibiotics.<sup>13</sup> Antibiotic resistance places a serious burden on the health economy since infections due to resistant bacteria require more specific and expensive antibiotics in order to heal.<sup>14</sup> Most major resistance control strategies recommend education for the general public to promote appropriate antibiotic use.<sup>15,16</sup> Inadequate knowledge of medication use may directly lead to overuse or patient noncompliance with a drug regimen and result in serious outcomes.<sup>17</sup> Like most of the developing countries, in India most of the patients visit a pharmacy to purchase pharmaceutical products much like they would at a supermarket.<sup>18</sup> Having valid prescription is not always enforced for receiving prescription only drugs (POM).<sup>19</sup> The rationale for educating the public is that knowledge about antibiotic treatment and awareness of antibiotic resistance are thought to influence patient and parent demand for antibiotic prescribing.<sup>20</sup> Population-based studies regarding knowledge about antibiotic treatment issues among the general public are rare. Thus aim of this study was to explore the current knowledge

and attitudes towards antibiotic usage among the general public of Shimla city and to identify the gaps in the knowledge and practice of tackling self-medication and the abuse of antibiotics, which could serve as baseline data and provide further insight in planning and developing strategies that would address these problems.

## **MATERIAL AND METHODS**

This was a cross-sectional descriptive study comprised of 200 subjects was conducted among the general public of Shimla city during January and April 2015. Ethical clearance was obtained from the institutional ethical committee. A pre tested, semi structured close ended questionnaire was used to collect the data about the knowledge, attitude and behaviour of antibiotic usage and its resistance among the respondents for the past six month after taking informed consent. They were also asked to provide further information regarding the source and reason for taking antibiotics if they had taken antibiotics within this period, its indication, safety, dangers of antibiotics (antibiotic resistance, allergic reaction and side effects), and completion of treatment course. In order to achieve generalizability, interview was conducted among adults at different sites (e.g. places of prominent public gathering like shopping malls, University campus, cafeteria's, restaurants etc.). Level of Knowledge was calculated using seven statements dealing with the use, indication, efficacy, resistance and safety.

## **RESULT**

The study included 200 adults and out of which 56% were male and 44 % were females. The present study found that majority of the participants 73% knew the name “antibiotics”. Among them 29% were aware that antibiotics are used against bacterial infection. 17% of them were aware of the fact that antibiotics are used against all infections .i.e. bacterial, parasitic, viral etc. 10% of the respondents reported antibiotics as pain killers and 16% of them called it as immunity booster (table 1).

It was observed that 36% of participants agreed that these antibiotics were indicated for fever of one day duration while 24% and 22% of them believed that antibiotics were indicated for common cold and diarrhoea respectively. Only 18% of them believed that these antibiotics are indicated in ear discharge. It was revealed in the study that nearly half of the study participants 46% were aware about antibiotic safety (risk to health/side effect/allergic reaction). It was also observed that majority of participants 72% opined

that if the antibiotics are newer and more costly, they have better efficacy. It was found that majority of respondents 60% didn't know about antibiotic resistance and when asked about the reasons for resistance, nearly 13% were of the view that this is due to not completing the full course of it while 6% of them were of the view that it is due to self-medication. Table 2 shows attitude and behaviour towards antibiotic use among the study population. The study observed that majority of participants i.e. 71% took antibiotics from a qualified medical practitioner and 13% of them availed these as self-medication without prescription. It was also observed that only 14% and 2% of the respondents took them directly from the retail pharmacies and on advice from a friend respectively. It was revealed that 8% of the participants were of the view that saving money and time was the rationale for purchase of antibiotic directly from pharmacies without prescription followed by 3% as getting detailed information by pharmacy and 1% as availability of pharmacy shop at doorsteps. It was also found in the study that majority of respondents 64% took the complete course of antibiotics when prescribed to them while inconsistency in use of antibiotics was also noticed in 36% of respondents. Most of the participants 31% reported that improvement in the symptoms was the main reason for not taking full course of antibiotics while adverse effects, no improvements in symptoms and high cost of antibiotics were the reasons cited by 2%, 2% and 1% of respondents respectively. It was found that 38% of them reused the left over antibiotic and (18%) of the respondent were of the opinion that due to having enough knowledgeable they reused them. Saving money and time as reasons for reusing antibiotics were cited by 14% and 2% of respondents respectively. 64% of the respondents reported that the doctor didn't tell them regarding full dosages/schedule/side effect/dietary advice regarding antibiotics. 16% of the respondents had admitted to request antibiotic prescription from their physician. It was also observed that 76% of respondents did not bring all previous medication/prescription they have been taking to their physician (table 3). Table 4 shows public perception about antibiotic abuse and resistance. Most of the study participants i.e. 86% were of the view that abuse of antibiotic and antibiotic resistance affects them and their family health. Furthermore almost all 98% of them believed that more education about antibiotics is need of the hour. The study also revealed that 51% of the respondents agreed that proper detailed

information should be given by medical professionals/health workers to promote the rationale use of antibiotics while about one third of them 31% were of the view that large scale multimedia campaign by government agencies (TV/radio/press) is necessary to promote rational use of these antibiotics. It was found that 11% and 17% of the participants were of the opinion that well defined course on rationale use of antibiotics in universities/school/college and involvement of non government organization would be a better way to promote rationale use of antibiotics respectively.

## DISCUSSION

Poor knowledge about antibiotics may determine attitude to its use and eventual practice of use of antibiotics. The present study demonstrated that there are widespread problems in knowledge, attitudes, beliefs, and behaviors among general public, which influence their antibiotic usage. Various authors conducted similar studies and reported variations regarding general awareness about antibiotics.<sup>21,22,23</sup> About three fourth of our respondents were familiar with antibiotics whereas around one third of them could describe them correctly. Similar results were found in study conducted by Esther O et al.<sup>1</sup> There is need for people to be educated on the difference between viral and bacterial infections; and advising them not to take an antibiotic for viral illness. The present data found important misconceptions that members of the general public have about the effectiveness of, and the appropriate indications for using, antibiotics which is similar to study conducted by Cals JWL.<sup>4</sup> Overall results of this study show that most participants had moderate to adequate knowledge regarding antibiotic use. The subjects were aware with the risks of antibiotic use; for example, regarding antimicrobial resistance, allergic and possible side effects similar to others.<sup>25</sup> Although people may have inappropriate understanding regarding the meaning of resistance, these findings; somehow, indicate their awareness regarding the risks of antibiotic use. The antibiotics used by respondents were prescribed by a doctor in about three fourth of our respondents. Similarly Mazinska B et al also found similar response.<sup>26</sup> Quarter of the respondent took antibiotic without prescription either through local

**Table 1: Knowledge about antibiotics, its usage, indication, safety, efficacy, resistance and reasons for resistance**

| <b>1</b> | <b>Knows what antibiotics are?(n=200)</b>   | No. | %     |
|----------|---|-----|-------|
| A        | Yes   | 146 | 73%   |
| B        | No  | 54  | 27%   |
| <b>2</b> | <b>Role of antibiotic?(n=146)</b>   |     |       |
| A        | Pain killer   | 21  | 10.5% |
| B        | Bacterial infection   | 58  | 29%   |
| C        | Immunity booster  | 32  | 16%   |
| D        | All bacterial, parasitic and viral infection  | 35  | 17.5% |
| <b>3</b> | <b>Condition in which antibiotic prescribed/indicated? (n=200)</b>                          |     |       |
| A        | Fever of one day duration   | 72  | 36%   |
| B        | Common cold   | 48  | 24%   |
| C        | Loose motion without fever and bleeding   | 44  | 22%   |
| D        | Ear discharge   | 36  | 18%   |
| <b>4</b> | <b>Aware about antibiotic safety (risk to health/side effect/allergic reaction)?(n=200)</b> |     |       |
| A        | Yes   | 92  | 46%   |
| B        | No  | 108 | 54%   |
| <b>5</b> | <b>Is the efficacy better if the antibiotics are newer and more costly?(n=200)</b>          |     |       |
| A        | Yes   | 144 | 72%   |
| B        | No  | 56  | 28%   |
| <b>6</b> | <b>Knows about antibiotic resistance?(n=200)</b>  |     |       |
| A        | Yes   | 80  | 40%   |
| B        | No  | 120 | 60%   |
| <b>7</b> | <b>Antibiotic resistance is due to?(n=80)</b>   |     |       |
| A        | Using antibiotics without prescription(self-medication)                                     | 13  | 6.5%  |
| B        | Using without indication  | 04  | 2%    |
| C        | Not completing the full course  | 26  | 13%   |
| D        | Using same antibiotic repeatedly/frequently   | 05  | 2.5%  |
| E        | All of the above  | 32  | 16%   |

pharmacy or self-medication which is similar to results found by A Ling OH et al.<sup>27</sup>The fact that an appreciable proportion of respondents of present study sometimes buy and use antibiotics as self-medication and even prescribe antibiotics to others portrays some element of self-medication. This constitutes potential threat to rational use of antibiotics and occurrence of antibiotic resistance. So it is the duty of the community pharmacist to

enlighten the clients on correct dose and time of taking these drugs especially when clients do not bring prescription before buying the antibiotics. Majority of the respondents i.e. 64% claimed they completed their full course of antibiotics. Reasons for non-completion of full course were that the ailment subsided and they got better. This shows that the general public might not truly understand the reason and importance of the need to comply

with the full treatment course of the antibiotic regimen Kim SS et al conducted a similar study in South Korea and found that three quarter subjects stopped continuing course of antibiotics when they felt better.<sup>28</sup> Several studies have revealed that the

patient's expectation is an important determinant of antibiotic prescription. Inaccurate and over-estimation of patient expectations do occur which result in unnecessary prescribing.<sup>27</sup> Furthermore, the decision to prescribe is also

**Table 2:Attitude And Behavior Towards Antibiotic Use**

|          |  |     |     |
|----------|--|-----|-----|
| <b>1</b> | <b>Source of advice for taking antibiotic( when required)(n=200)</b>                               |     |     |
| A        | Self-medication with prescription  | 26  | 13% |
| B        | Local pharmacy store   | 28  | 14% |
| c        | Advice from friend/relative  | 04  | 02% |
| D        | Qualified medical officer  | 142 | 71% |
| <b>2</b> | <b>Rationale for purchase antibiotic direct from pharmacies without prescription/access?(n=28)</b> |     |     |
| A        | Located nearby   | 02  | 1%  |
| B        | Knows you personally   | 04  | 2.% |
| C        | Saves time and money   | 16  | 8.% |
| D        | Give you detailed information /satisfy your queries  | 06  | 3%  |
| <b>3</b> | <b>Did you take full dosage/course of antibiotic as prescribed?(n=200)</b>                         |     |     |
| A        | Yes  | 128 | 64% |
| B        | No   | 72  | 36% |
| <b>4</b> | <b>Reason for not taking full course of antibiotics?(n=72)</b>                                     |     |     |
| A        | Symptom improved fully   | 62  | 31% |
| B        | Experienced some side/adverse effect   | 04  | 2%  |
| C        | There was no improvement   | 04  | 2%  |
| D        | Antibiotics are too costly   | 02  | 1%  |
| <b>5</b> | <b>Did you Use leftover medicine for later use in case of future need?(n=200)</b>                  |     |     |
|          | Yes  | 76  | 38% |
|          | No   | 124 | 62% |
| <b>6</b> | <b>Rationale for using left over antibiotic?(n=76)</b>   |     |     |
| A        | Save time  | 04  | 2%  |
| B        | Save money   | 28  | 14% |
| C        | Knowledgeable enough to use antibiotic on their own  | 36  | 18% |
| D        | Doctor/chemist would prescribe same antibiotic every time  | 08  | 4%  |

**Table 3:Patient Doctor Relationship**

|          |   |     |           |
|----------|---|-----|-----------|
| <b>1</b> | <b>Did the doctor advice you regarding full dosages/schedule/side effect/dietary advice regarding antibiotics?(n=200)</b> | No. | Percentge |
| A        | Yes   | 72  | 36%       |
| B        | No  | 128 | 64%       |
| <b>2</b> | <b>Did you ever request antibiotic prescription to your physician?(n=200)</b>   |     |           |
| A        | Yes   | 32  | 16%       |
| B        | No  | 168 | 84%       |
| <b>3</b> | <b>When you visit your physician will you bring all medication/prescription you are taking?(n=200)</b>                    |     |           |
| A        | Yes   | 48  | 34%       |
| B        | No  | 152 | 76%       |

**Table 4: Public Education**

| 1 | Abuse of antibiotic and antibiotic resistance affect you and your family health?(n=200)                 | No. | Percentage |
|---|---|-----|------------|
| A | Yes   | 172 | 86%        |
| B | No  | 28  | 14%        |
| 2 | Is it necessary to get more education about antibiotics?(n=200)   |     |            |
| A | Yes   | 196 | 98%        |
| B | No  | 04  | 2%         |
| 3 | What measures according to you should be undertaken to promote the rationale use of antibiotics?(n=200) |     |            |
| A | Large scale multimedia campaign by government agencies (tv/radio/press)                                 | 62  | 31%        |
| B | Establish course on rationale use of antibiotics in universities/school/college                         | 22  | 11%        |
| C | Proper detailed information should be given by medical professionals/health workers                     | 102 | 51%        |
| D | Non govt organization would to do a better job  | 14  | 07%        |

greatly influenced by the doctor-patient relationship, in which the doctor wants to meet the patients satisfaction even though the prescriber feels antibiotics are unnecessary but in contrast in this study most of the participants did not ever request antibiotic prescription to their physician. The electronic media and health workers were the leading sources of information about antibiotics among the study subjects. It is an expected positive development because an average household have access to TV and internet in their homes. Thus, the fact which comes out in this study is that educational interventions are needed to promote prudent use of antibiotics among the public. The need for continuous health education campaign by the government on judicious use of antibiotics and other antimicrobial is important. The limitation of the present study is that the population involved is of an urban area of Shimla, results of this study would apply more to urban people who are mostly literate, are able to easily get access to the mass media, and possibly have received more information about antibiotics than those in rural areas.

### CONCLUSION

Our study provides an important insight regarding the knowledge, attitudes, perceptions and practices

regarding antibiotic resistance and usage among the residents of Shimla city. Various factors constituting irrational use of antibiotics were prominent. We recommend organized, continuous, and sustained health education campaign programs on antibiotics' use to bridge this knowledge gap and target stakeholders including prescribers and consumers to promote prudent use of antibiotics among the public. Furthermore, strict policies must be enforced to regulate procurement of antibiotics and prohibit their purchase without a prescription. Moreover, successful implementation of antibiotic regulations can involve urging pharmacists to dispense antibiotics on unit-dose basis rather than selling a whole drug pack. Finally, consultation strategies and guidelines which make patient expectations explicit without damaging clinician-patient relationship should be followed.

### RECOMMENDATION

Based on the findings of this present study, further studies are suggested. A similar study needs to be conducted in rural areas of Shimla, as this present study represents the urban people. A better understanding is needed on the extent to which beliefs can influence people using antibiotics in inappropriate ways; for example using antibiotics without medical consultation. It is imperative to

develop a sustainable intervention program to reduce misconceptions of antibiotic use and to increase public's awareness about the risks of inappropriate use of antibiotics. Therefore, a larger-scale study is needed where more heterogeneous population mix would define further the scope of antibiotic use and misuse among participants.

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