Original Article

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Public awareness regarding the use and resistance of antibiotics: A cross-sectional study among Nepalese adults in Kathmandu valley

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Abstract

Background: Antibiotics are considered to be among the most commonly sold drug classes globally. Antibiotic resistance is a recognized public health issue at the local, national and global levels.
Objectives: The aim of this study was to identify awareness of general public regarding the use and resistance of antibiotics.
Methodology: A descriptive cross-sectional study was conducted in Kathmandu in November 2016 using a quantitative questionnaire among 120 adult people aged 20–60 years. Convenience sampling method was used and information on use of antibiotics and resistance was obtained using semi-structured questionnaire through interview method. Descriptive statistics was done to describe the respondent's level of awareness regarding use of antibiotics and resistance.
Results: Among the total respondents, majority had incorrect awareness as regards to action, reasons for using antibiotics, possible side effects of the antibiotic. Seventy one percent of the respondents had not heard about antibiotic resistance. The study finding showed that about 66.7% of the participants had inadequate awareness towards use and resistance of antibiotics.
Conclusion: The findings demonstrate that the overall awareness on antibiotic use and resistance is poorly understood among our respondents. This information can be utilized in future educational and antibiotic resistance awareness raising campaigns.

Key words: Antibiotic, Awareness, Resistance

INTRODUCTION

Antibiotics are considered to be among the most commonly sold drug classes globally. Resistance to antibiotics has increased for reasons relating to the use and misuse of antibiotics[1]. Antibiotic resistance is occurring everywhere in the world, compromising the treatment of infectious diseases and undermining many other advances in health and medicine. It represents one of the biggest threats to global health today, and can affect any one, of any age, in any country[2].

The availability of effective antimicrobial drugs is estimated to add 20 years to life expectancy.

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Antimicrobial resistance (AMR) threatens the effective prevention and treatment of an ever-increasing range of infections caused by bacteria, parasites, viruses and fungi[3]. The emergence of AMR therefore poses a serious threat to public health resulting in prolonged illness and greater risk of death[4]. In addition, It leads to longer hospital stays, higher medical costs, delayed recuperation, and long-term disability[2,5,6].

Without effective antimicrobials for prevention and treatment of infections, medical procedures such as organ transplantation, cancer chemotherapy, diabetes management and major surgery (for example, caesarean sections or hip replacements) become very high risk. Antimicrobial resistance increases the cost of health care with lengthier stays in hospitals and more intensive care required. Antimicrobial resistance is putting the gains of the Millennium Development Goals at risk and endangers achievement of the Sustainable Development Goal[7]. Furthermore, systematic reviews of the scientific

evidence show that AMR has a negative impact on outcomes for patients and health-care expenditures[3]. At the community level, irrational antibiotic usage including misinformed notions on antibiotics, incomplete courses of medicine, and self-medication are major factors contributing to global AMR[8].

Low-quality medicines, wrong prescriptions and poor infection prevention and control also encourage the development and spread of drug resistance. Lack of government commitment to address these issues, poor surveillance and a diminishing arsenal of tools to diagnose, treat and prevent also hinder the control of antimicrobial drug resistance[7].

Community sensitization in form of antibiotic awareness and education may contribute toward controlling the rapid rise of AMR as highlighted by several studies[3,9]. Furthermore, WHO is coordinating a global campaign to raise awareness of antibiotic resistance and encourage best practices among the public, policy makers, health and agriculture professionals to avoid further emergence and spread of antibiotic resistance[2].The strategies for managing community-based antibiotic resistance are to promote behavior modification besides providing relevant information on proper antibiotic use[10]. Therefore, it is important to understand each target group's belief and perception about antibiotic use and resistance before undertaking any intervention[8]. At present, relatively little is known about the general public's knowledge of antibiotic resistance at a global level[2]. Against this background, the present study was conducted to assess current public awareness regarding the use and resistance of antibiotics.

METHODOLOGY

A descriptive, cross-sectional research design was used. The study was conducted at four different location of the Kathmandu Metropolitancity namely Tribhuvan University Teaching Hospital, Om Hospital and Research Centre and four different supermarket of Bhatbhateni situated in Maharajgunj, Kalanki, Balaju and Chhuchepati. The study was conducted among the 120 adult people aged 20–60 years to find out theawareness regarding the use and resistanceof antibiotics.Convenience sampling method was usedand information on use and resistance of antibiotics was obtained using semi-structured questionnaire through interview method. The questionnaire contained three sections; covering questions about (1) socio-demographics and information about previous antibiotic use, (2) awareness on areas of antibiotic use and resistance. Ethical clearance was obtained from the Institutional Review Board (IRB) of Tribhuvan University, Institute of Medicine (TU, IOM). All the participants were explained the objective of the study, requested for voluntary participation, and obtained the informed consent before collecting data. Descriptive statistics was done to describe the respondent's level of awareness regarding use and resistance of antibiotics. Inadequate and adequate awareness were defined as a total awareness score of 0-10 and 11-21 of 21 questions, respectively.

RESULTS

One hundred and twenty participants were included in this study. The mean age of the respondents was 31.53 years. More than half of them (59.2%) were males.In terms of education, one third of the respondents (34.2%) had education level up to bachelor and 85% of them had taken non-health related type of education. Regarding the use of antibiotic within last one year, nearly half (44.2%) had not remembered using any, while 25.8% had taken one within last one year.

Regarding the awareness on the use of antibiotic,most of them (82.5%) replied that antibiotic should be taken after mealand least (11.9%) of them said no preferences of taking antibiotic. Similarly, almost all (98.3%)told that antibiotic should be taken with water. Regarding storage, majority (85.0%) mentioned that antibiotics should be storedon table. As regards to action of the antibiotic, half of the respondents (50.0%) said that it killsvirus, 24.2% said that bacteria are killed and very few were unaware. 94.1%, 90.7%, 83.1% replied fever, sore throat and cough respectively as reasons for using antibiotics. 93.3%, 90.0% respondents told leftover antibiotics and friends respectively as a major source of antibiotics whereas only 25.8% mentioned pharmacy.

Awareness about possible side effects of antibiotics was obviously low as more than half (51.4%) of the respondents were unaware of it. Among heard, 26.2% of the respondents had mentioned nausea vomiting as a major side effect. 70.8% of the respondents had not heard about antibiotic resistance. Among heard, half of them (51.4%) had correct knowledge of the meaning of antibiotic resistance and 28.6% had incorrectly replied that antibiotics resistance is a condition when pain is not successfully controlled. Majority (88.6%) in each replied not completing the full course of therapy and taking antibiotic with another drug as the reasons of the antibiotic resistance. Moreover, 48.6% mentioned to visit doctor more or be treated in hospital for managing the resistance lasting longer. Our study finding showed that about 66.7% of the participants had inadequate awareness towards use and resistance of antibiotics.

Table 1: Socio-demographics (Age, Gender, Education, Type of Education,and Use of Antibiotics)

Variables	Frequency	Percent
Age (in years)		
20-30	57	47.5
31-40	42	35.0
41-50	21	17.5
Gender		
Male	71	59.2
Female	49	40.8
Educational Status		
Illiterate	2	1.7
Primary	6	5.0
Secondary	18	15.0
Higher secondary	36	30.0
Bachelor	41	34.2
Masters	17	14.2
Type of Education		
Health related	18	15.0
Non-health related	102	85.0
Use of Antibiotics		
Can't remember	53	44.2
In the last month	17	14.2
In the last 6 month	19	15.8
In the last 1 year	31	25.8
When to take		
Before meal	4	3.3
With meal	3	2.5
After meal	99	82.5
No preference	14	11.7
How to take		
With water	118	98.3
With milk	2	1.7
Storage of antibiotic		
On table	102	85.0
Kitchenshelf	12	10.0
In a medicine cabinet	6	5.0

DISCUSSION

This study sought to identify the awareness of the Nepalese general population regarding use and resistance of antibiotics. The results of the study on antibiotic use on how frequently antibiotics are taken, 44.2% of the respondents reported of not remembering the use of antibiotics whereas 25.8% had taken within last one year. Unlike these findings, the survey report by WHO[2] reported that 65%of the respondents across the 12 countries reported having taken antibiotics within the past six months. Furthermore, study findings of Namibia[11] reported that 80.36% had used antibiotics in the past 12 months.

Regarding knowledge on ingestion of antibiotics, majority of respondents (82.5%) replied that antibiotic should be taken after meal. Similar finding was reported in study done by Shehadehet al.[12] where 72.1% of respondents reported that they would take antibiotics after a meal. Majority (98.3%) of respondents said that

Table 2: Awareness regarding use and resistance of antibiotics and respondent's level of awareness

Variables	Frequency	Percent
Meaning of Antibiotic		
Viruses	60	50.0
Bacteria	29	24.2
Both	24	20.0
Don't know	7	5.8
Indication of Antibiotic#		
Flu	56	47.5
Fever	111	94.1
Cough	98	83.1
Sore throat	107	90.7
Sources of Antibiotic#		
Leftover drug	112	93.3
Friend	108	90.0
Pharmacy	31	25.8
Side Effects of Antibiotics#		
Nausea and vomiting	28	26.2
Diarrhea	17	15.9
Abdominalorstomachpain	15	14.0
Rash	7	6.5
Don't know	55	51.4
Heard about antibiotic resistance		
Yes	35	29.2
No	85	70.8
Meaning of antibiotic resistance (n=35)		
Drug can't treat the particular infection	18	15.0
Unsuccessful treatment of pain	10	8.3
Don't know	7	5.8
Causes of antibiotic resistance#		
Using antibiotics when they not necessary	23	65.7
Not completing the full course of antibiotic	31	88.6
Self medication	10	28.6
Taking antibiotic with another drug	31	88.6
Using the same antibiotic with a different brand	3	8.6
Excessive use of antibiotic	1	2.9
Effects of antibiotic resistance#		
Sick for longer	12	34.3
Frequent visit to doctor or treated in hospital	17	48.6
Need of expensive medicine causing side effects	3	8.6
All of above	10	28.6
Knowledge Score		
Inadequate knowledge	80	66.7
Adequate knowledge	40	33.3

Multiple responses

antibiotic should be taken with water. Concerning storage, 85.0% of the respondents said that antibiotic should be stored in table. Extremely low percentage (5%) mentioned table for the storage. These findings are in line with the study done in Jordan which revealed that majority (94.0%) reported taking antibiotic with water. Moreover, 48.3% did not store antibiotics in a medicine cabinet[12].

In this study, 76.7% of respondentsthought that antibiotics kill virus. Similar finding was reported by Kandelaki, Lundborg & Marrone[13]which reported that 55 % believed that antibiotics are beneficial against viruses. Moreover, as per the study findings of Carter, Sun & Jump[14], 30% of respondents agreed that antibiotics can kill viruses. Our study showed that most of the respondents (94.1%) replied fever as the main reason for using antibiotics. Similar with this study, is the findings of Carter, Sun & Jump[14] which stated that over 40% of respondents indicated that antibiotics were the best choice to treat a fever or a runny nose and sore throat. Also notable is the fact that 93.0% stated leftover antibiotics as a major source of using antibiotics whereas only 25.8% mentioned pharmacy. Whereas, contrast with these findings is the study report done by Pereko, Lubbe& Essack[11] which reported that 82% of respondents mentioned the pharmacy as source of having antibiotics.

Awareness about possible side effects of antibiotics was obviously low as more than half (51.4%) of the respondents were unaware of the side effects of antibiotics. Among heard, 26.2% of the respondents had mentioned nausea vomiting as a major side effects. Similar with this study, is the finding of Jordan[12], which revealed low level of awareness about antibiotics possible adverse effects of antibiotics.

Regarding the resistance, 70.8% of the respondents had not heard about antibiotic resistance. Among heard, half of them (51.4%) had correct knowledge of the meaning of antibiotic resistance. This finding is in line with the study done in Palastine which showed that 65.0% of respondents had correct knowledge of the meaning of antibiotic resistance[1]. This study also showed that most of the respondents (88.6%) in each agreed that not completing the full course of therapy and taking antibiotic with another drug as the main reasons of the antibiotic resistance. This finding agree with the study done among Chinese in Hong Kong revealing75.1%, agreed that incomplete courses of antibiotics would lead to undesirable consequences[15]. Moreover, 48.6% mentioned to visit doctor more or be treated in hospital if the resistance last longer. This is similar to what was reported on awareness study done regarding the impact of antimicrobial resistance by Eliopoulos, Cosgrove & Carmeli[16]and Kim, Moon, Kim [17]which stated that there is a direct correlation of hospital length of stay and the cost, future length of stay, and mortality.

Regarding the overall awareness on antibiotic use and resistance, this study revealed that majority (66.7%) of the respondents had got inadequate level of awareness and 33.3% were having adequate level of awareness. Though direct comparison of the awareness level observed in the present study with those in the literature is difficult, various studies have reported the differences in knowledge concerning antibiotic therapy issues including when antibiotics should be used, indication for using, the risk of antibiotic resistance, and effectiveness of antibiotics etc[18,19, 20]. The findings of this study may vary significantly among other countries and this may be due to differences in the selection of the study population, health and educational status of the population, setting, and instruments.

CONCLUSION

Respondents have several misconceptions and a lack of awareness on antibiotic use and resistance. The majority of respondents had incorrect awareness as regards to action, reasons for using antibiotics, possible side effectsof the antibiotic, and reasons of the antibiotic resistance. These findings strengthen the need to enhance measures enforcing public health educational programs using all media targeting the general public in order to promote appropriate antibiotic use and prevent antibiotic resistance. Besides, minimizing non-prescription use of antibiotics and empowering the pharmacists' role in raising awareness around the use of antibiotics and the growing antibiotic resistance are also required.

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REFERENCES

1. Abu Taha A, Abu-Zaydeh AH, Ardah RA, Al-Jabi SW, Sweileh WM, Awang R, Zyoud SH. Public Knowledge and Attitudes Regarding the Use of Antibiotics and Resistance: Findings from a Cross-Sectional Study Among Palestinian Adults. Zoonoses and public health. 2016; 63(6):449-457.
2. WHO. Antibiotic Resistance: Multi-Country Public Awareness Survey. 2015. [Cited 2016 April 10]Available from: http://apps.who.int/iris/bitstream/10665/194460/1/9789241509817_eng.pdf
3. World Health Organization. Antimicrobial resistance: global report on surveillance. 2014.[Cited 2016 April 10] Available from: http://www.who.int/drugresistance/documents/surveillancereport/en/
4. King S, Exley J, Taylor J, Kruithof K, Larkin J, Pardal M. Antimicrobial stewardship: the effectiveness of educational interventions to change risk-related behaviours in the general population, a systematic review. RAND Corporation. 2015. Available from: http://www.rand.org/content/dam/rand/pubs/research_reports/RR1000/RR1066/RAND_RR1066.pdf.
5. Frieden T. Meeting the Challenges of Drug-Resistant Diseases in Developing Countries.CDC. 2013. [Cited 2016 April 11]Available from: https://chrissmith.house.gov/uploadedfiles/2013.04.23_meeting_the_challenge_of_drug_-_resistant_diseases_in_developing_countries.pdf
6. Nayak S, Rana M, Mayya SS, Gupta GP, Sartaj Singh Wazir, Kumari Shipra Parmar, Kapil Goel. Antibiotics to cure or harm: Concept of antibiotic resistance among health professional students in Nepal. 2016; International Journal of Medical Science and Public Health. 2016; 5(12).DOI: 10.5455/ijmsph.2016.14052016515
7. WHO Fact sheet. Antimicrobial resistance. 2016. [Cited 2016 April 11] Available from: http://www.who.int/mediacentre/factsheets/antibiotic-resistance/en/
8. Kotwani A, Wattal C, Joshi PC, Holloway K. Knowledge and perceptions on antibiotic use and resistance among high school students and teachers in New Delhi, India: A qualitative study. Indian J Pharmacol.2016; 48 (4):365-71.
9. World Health Organization. Global Strategy for Containment of Antimicrobial Resistance; 2001. [Cited 2016 April 10]Available from: http//www.whoint/drugresistance/WHO_Global_Strategy_Englishpdf.
10. Lundborg SC, Tamhankar AJ. Understanding and changing human behaviour – Antibiotic mainstreaming as an approach to facilitate modification of provider and consumer behaviour. Ups J Med Sci. 2014; 119:125-33.
11. Pereko DD, Lubbe MS, Essack SY. Public knowledge, attitudes and behaviour towards antibiotic usage in Windhoek, Namibia. Southern African Journal of Infectious Diseases. 2015; 30(4): 134-137.
12. Shehadeh M,Suaifan G, Darwish RM, Wazaify M, Zaru L, Alja'fari S. Knowledge, attitudes and behavior regarding antibiotics use and misuse among adults in the community of Jordan. A pilot study. Saudi Pharmaceutical Journal. 2012; 20(2): 125–133
13. Kandelaki K, Lundborg CS, Marrone G, Antibiotic use and resistance: a cross-sectional study exploring knowledge and attitudes among school and institution personnel in Tbilisi, Republic of Georgia. BMC Res Notes. 2015; 8: 495.
14. Carter RR, Sun J, Robin LP. A Survey and Analysis of the American Public's Perceptions and Knowledge about Antibiotic Resistance. Open Forum Infectious Diseases. 2016; 3(3): ofw112.DOI: 10.1093/ofid/ofw112
15. Wun YT, Lam TP, Lam KF, Ho PL, Hung W, Yung R. The public's perspectives on antibiotic resistance and abuse among Chinese in Hong Kong. Pharmacoepidemiology and Drug Safety. 2013; 22(3):241–249.
16. George M, EliopoulosSE, Cosgrove YC. The Impact of Antimicrobial Resistance on Health and Economic Outcomes. Clin Infect Dis. 2003; 1433-1437.
17. Kim SS, Moon S, Kim EJ. Public knowledge and attitudes regarding antibiotic use in South Korea. J Korean AcadNurs. 2011; 41(6):742-9.
18. Belongia EA, Naimi TS, GaleCM, et al. Antibiotic use and upper respiratory infections: a survey of knowledge, attitudes, and experience in Wisconsin and Minnesota. Prev Med. 2002; 34: 346-52.
19. Grigoryan L, Burgerhof JG, Degener JE, et al. Attitudes, beliefs and knowledge concerning antibiotic use and self-medication: a comparative European study. Pharmacoepidemiol Drug Saf. 2007; 16:1234-43.
20. André M, Vernby A, Berg J, Lundborg CS. A survey of public knowledge and awareness related to antibiotic use and resistance in Sweden. J Antimicrob Chemother. 2010; 65(6):1292-6.