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KNOWLEDGE, ATTITUDE & PRACTICE OF ANTIBIOTIC USE, SELF MEDICATION & RESISTANCE IN GENERAL POPULATION OF MIRPUR AJK

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Abstract

Introduction: *Good knowledge, attitude and practice about antibiotic use and resistance among the general population, are significant contributors to reduce the antibiotic resistance. Antibiotics resistance is one of the leading health concerns worldwide. Excessive prescription of antibiotics in primary care often originates from patient expectations and requests for treatment.*

Objective: *The aim of study was to assess Knowledge, Attitude & Practice (KAP) of Antibiotic use, self-medication, and ABR among general population.*

Method: *A cross-sectional descriptive study was carried out in Mirpur AJK using a self-structured questionnaire distributed through online survey form from February 2023 to August 2023. The non-probability convenient sampling was used including adult participants who voluntarily consented to take part. 386 respondents were included in the study; data was analyzed using SPSS by applying Chi-Square test.*

Results: *Most of the participants were female (56%), of age group between 18-40 (78%), 60% of them had education above high school. 77.4% know about all the symptoms of URTI, 53.1% respondents showed significant association (p=0.000) living in extended families. There was significant association 74.6% between family decision maker and the typical symptoms of URTI (p=0.000). 85% respondents of urban area had good knowledge. 99% significant relationship was found between age group (>64years) and irrational use of antibiotics. 84.4% said the main reason of irrational use of antibiotics was patients. Majority of the respondents with low education (54.2%) and rural background (44.1%) showed significant association (0.008) with switching practitioners if antibiotics were not prescribed.*

Conclusion: *The study concluded that the knowledge about antibiotic use and resistance was good in our community. Females of age between 18-40 years and education above high school were perceived that Health Care Professional was responsible for irrational use of antibiotics. Most of the people age above 64 was*

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responsible for irrational use of antibiotics. Majority of patients demand prescribers to prescribe antibiotics.

INTRODUCTION

Antibiotics resistance is one of the leading causes of health concerns worldwide. Irrational use of currently available antibiotics and unable to discover new antibiotics is taking the world to a worrisome scenario which could take place in future. The arising issue of drug resistance has become one of the major health concerns not only for general human population but also other creatures like animals, plants and overall environment (Akhund et al., 2019). ABR is the most prevalent issue of 21st century due to irrational use of antibiotics among all age groups without any geographical boundaries. It can ultimately lead to treatment failure, increased stay at hospital; raise the cost of treatment in health care department and emergence of life threatening infections that will increase the ratio of morbidity and mortality. (Nguyen et al., 2022)

Antibiotics resistance happens when bacteria develop the ability to defeat the drugs designed to kill them. There usage is increasing day by day and often misuse, certainly. Inadequate prescription practices and the availability of antibiotics without proper medical oversight contribute significantly to the emergence of antibiotic-resistant bacterial strains, thus playing a major role in the issue of antibiotic resistance (ABR).(Iqbal et al., 2020)

Frequent use of antibiotics is one of the most potent risk factor of resistance to microbial pathogens. In population or communities where there is less use of antibiotics, there will be less emergence of microbial resistance, so there will be strong association of antibiotic use and microbial resistance. (Dutt et al., 2018).

Antibiotic resistance is significantly fueled by the irrational use of antibiotics. This includes situations where antibiotics are prescribed, when they're not necessity such as for viral infections like the common cold where antibiotics are ineffective, it also includes not completing the full course of antibiotics as prescribed which can allow the bacteria to survive and multiply, in appropriate self administration, sharing antibiotics and use of leftover antibiotics.(Higuita-Gutiérrez et al., 2020). In 2011, the World Health Organization (WHO) designated the theme of World Health Day as 'Combating Antimicrobial Resistance: No Action Today, No Cure Tomorrow.' This underscores the gravity of antibiotic resistance as a critical issue worldwide.(Iqbal et al., 2020).

Upper Respiratory Tract Infections (URTIs) are a primary driver of primary healthcare consultations and significantly contribute to antibiotic overuse, fostering widespread antimicrobial resistance (AMR) (Bhanwra, 2013). In 2013, URTIs accounted for approximately 18.8 billion cases globally, resulting in 4 million deaths [2]. By 2050, AMR-related mortality in Asia is projected to reach 4.7 million [3]. URTIs are caused by viruses, including Rhinovirus, Parainfluenza, Coronavirus, Adenovirus, Respiratory syncytial virus, Coxsackievirus, Epstein-Barr virus, and Influenza, as well as bacteria such as Streptococcus pyogenes, Corynebacterium diphtheriae, Neisseria gonorrhoeae, Chlamydia pneumoniae, Mycoplasma pneumoniae, Streptococcus pneumoniae, Haemophilus influenzae, Bordetella pertussis, and Moraxella catarrhalis (Zelelie and Mekonnen, 2019). Inappropriate antibiotic prescribing in primary care, often driven by patient expectations, includes using non-first-line or broad-spectrum antibiotics when narrow-spectrum options suffice.

In contrast to the progress made in addressing the ABR issue, the search for new antibiotics has yielded less productive results in research and development. Antibiotics are frequently used inappropriately in both hospital and community settings.(Li et al., 2020a).

The practice of self-medicating with antibiotics (SMA) is widespread in both developing and developed nations. Despite strong recommendations for cautious antibiotic use in medical literature, the excessive prescription of antibiotics continues to be a prevalent issue worldwide. The World Health Organization reports that over 60% of all antibiotics are utilized in community settings, with nearly half of these being improperly used.

Additionally, the use of antibiotics in agriculture and their presence in environment also contribute to the

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development of resistant bacteria. Intake of food products acquired from animals treated with antibacterial substances is also a cause of ABR occurrence. Food products like milk, meat especially beef is found to be contaminated with antibiotic remnants. In addition to animal food products, people also encounter various antibiotics throughout their life.

Excessive use of antibiotics needs to be circumvented by both human doctors and veterinarians. Scrutinizing the people's knowledge and attitude about ABR is important to prevent its further spread.(Higuita-Gutiérrez et al., 2020).

Similar to many other developing nations, Pakistan is grappling with the challenge of antibiotic resistance (ABR). The Severity of the antibiotic resistance problem in Pakistan can sometimes be higher compared to some other countries in the world, due to factors such as high antibiotic usage, inadequate healthcare infrastructure, and limited awareness about responsible antibiotic use. 95% of junior doctors considered antibiotic resistance a national issue, whereas only 63% regarded it as significant in their daily medical routines. Merely 31% and 21% of physicians were aware of the accurate prevalence of hospital-acquired methicillin-resistant Staphylococcus aureus due to antibiotic misuse.(Iqbal et al., 2020)

Objectives of Study:

General objectives: The aim of study was to assess KAP about antibiotic use, self-medication, and ABR among general population.

Secondary objectives:

- To assess knowledge of general population about URTI, antibiotic use and ABR.
- Association of KAP with sociodemographics variables/ indicators.
- Association of ABR and ABU with demographic indicators.

Materials and Methods:

Study design & population:

A cross-sectional descriptive study was carried out in Mirpur AJK using a validated questionnaire distributed through social media platforms between February, 2023 to August 2023. The non-probability convenient sampling was used included adult participants who voluntarily consented to take part, utilizing a prevalence rate within a 95% confidence interval and a significance level of 5%.

Data collection tools and methods:

An expert panel developed a validated questionnaire for data collection. During the initial phase, a systemic literature review was undertaken. This review involved the utilisation of various combinations of terms such as antibiotics, antibiotic resistance, upper respiratory tract infection(URTI),along with survey and questionnaire, encompassing aspects of knowledge, attitude, and practice.

The questionnaire was designed based on prior research conducted on a related topic. In order to evaluate the questionnaire, 386 adults from the Mirpur region (by using Raosoft calculator) were enrolled for this study.

The questionnaire consisted of two sections with a total of 24 questions. Sections 1 was information on socio-demographic characteristic comprising of 7 questions such as age, gender, education level etc. Section 2 consists of 4 questions based on URTI. Sub sections included 12 questions to evaluate the Mirpur population's perception regarding the KAP of antibiotic use and antibiotic resistance (4 for knowledge, 4 for attitude, and 4 for practice). The questionnaire was based on multiple choice formats. It was a self-administered questionnaire, and surveyors were trained to assist participants with reading and writing challenges. Convenience sampling was employed for data collection, as it was the most suitable method given the nature of the large event with a diverse attendee population. (Nguyen et al., 2022). Data analysis was done using SPSS version 20.

Results:

3.1. A total of 400 individuals were approached out of which 386 respondents participated in the present study and fill out the questionnaire. The majority of individual was from age group of 18 to 40 years of age majority were form 18-40 years of age(78%).Participants from age group (41-63) were 17% and 4% of respondents were of age group 64 or more.

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Age group					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-40	303	78.5	78.5	78.5
	41-63	66	17.1	17.1	95.6
	64 or more	17	4.4	4.4	100.0
	Total	386	100.0	100.0	

3.2. Gender distribution among total of 386 respondents, 170 (44%) were male and 216(56%) were females. Gender distribution is depicted clearly that females are more in number as compared to males whereas among total respondents 60% had an education above high school.

Education attainment					
		Frequency	Percent	Valid Percent	Cumulative Percent
	Below	83	21.5	21.5	21.5
	High School	69	17.9	17.9	39.4
	Above high school	233	60.4	60.4	99.7
	4	1	.3	.3	100.0
	Total	386	100.0	100.0	

3.4. Knowledge of respondents about URTI

Of the 386 respondents, there was a 100% significant association between ages of people (18-40) and the knowledge about typical symptoms of URTI as compared to people of higher age group. Out of which 77.4% said that those have developed all the typical symptoms of URTI. 60.1% female believed that they have developed all the typical symptoms of URTI. 53.3% male respond that they did not developed have any of the typical symptoms about URTI. Place of residents did not show any significant relationship with the symptoms about URTI. 53.1% show significant association between respondents living in extended families and the knowledge about symptoms of URTI while the rest 46.9% respondents living in unit family. 60.4% respondents have education above high level and they had experienced all the typical symptoms of URTI compared to other respondents whose knowledge is below high school. There was the significant association between family decision maker and the typical symptoms of URTI 74.6% in families where father is the decision maker compared to other families. The type of occupation did not show any significance with the symptoms of URTI.

80.3% respondents with education above high school perceive that the URTI is communicable whereas 30.9% people with education below high school sensed that URTI is not a communicable disease. 57.5% people living in rural area answered that URTI is caused by bacteria while 73% people living in cities perceived that the virus is the cause of URTI. There is no significant association between education level and the causative agent of URTI. 69% respondents who do not have a job and perceive that the URTI is caused by organism or germ.

Questions	Responses	n (%)
1. What are the most typical symptoms of URTI?	Runny Nose Sore throat Cough Fever All of the above	15 (3.9) 16 (4.1) 15 (3.9) 7 (1.8) 318 (82.4)
2. Is URTI a communicable disease?	YES	292 (75.6)

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		NO	94 (24.4)
3.	What do you think are the main causes of URTI?	Organism or germ Contact with a sick person	297 (76.9) 89 (23.1)
4.	Do you know what the causative organism of URTI is?	Bacteria Virus Do not know	211 (54.7) 152 (39.4) 23 (6.0)

3.5. Knowledge about antibiotics use:

81.9% people with age group (18-40) give the correct answer for the question that "What are antibiotics?" There was the no significant relationship between gender and the antibiotics. There was the significant relationship of 79.6% respondents of urban areas give the incorrect answer to the above question while 65.3% answer correctly. The type of family also shows significant association of 81.6% by people living in extended families answer incorrectly about the question that "what are antibiotics?" while 51% people living in unit family answered correctly. There was the 66.5% significant association between respondents who have knowledge above high school answered correctly while 18.4% give incorrect answer. The respondents who do not have job show significant association of 70.9% by answering correctly as compared to people who have job i.e. 28.9%. 76.9% respondent living in families where father is respond correctly. 81.9% respondents of age (18-40) give response that antibiotics have adverse effects. Jobless respondents show 71% significant relation with the adverse effects of antibiotic. The respondents in families where father is the decision maker show significant association of 77.7% with the adverse of antibiotics. 69.3% females respond with the idea that antibiotics do not have side effects/ adverse effects. Respondents whose education is above high school show significant relationship of 71.3% with the adverse effects of antibiotics. People living in extended families have 69.3% significant association with that antibiotic do not cause adverse effects. Place of residence have no significant relationship with that antibiotics cause adverse effects. 96% of the respondents show significant association of antibiotic resistance, severe disease and ADR are the consequences of irrational use of antibiotics. Respondents without job show significance of 81.2% with the antibiotic resistance, severe disease and ADR are really the causes of irrational use of antibiotics. Families where father is decision maker show significance of 85.1%. 67.5% females respond with the answer that severe disease is the result of irrational use of antibiotics. 83.2% respondents whose education is above high school perceive with the idea that irrational use of antibiotics can cause antibiotic resistance, severe disease and ADRs. Respondent of the unit families show significant association of 65.3% with the consequences of irrational use of antibiotics. There is no relationship with place of residence with the results of irrational use of antibiotics. Respondents with age group 18-40 perceive with the answer that antibiotics are losing their efficacy show significance of 87.7%. The people living in extended families show significance of 81.4% and antibiotics are losing their efficacy. 72% females show significant association with the idea that antibiotics are not losing their efficacy while the males also have the same idea. 76.3% respondents whose education is above high school, 53.8% people living in unit family also perceive with significant relationship with the answer that antibiotics are losing their efficacy. 65.9% perceive with significant relationship that antibiotics are not losing their efficacy by people living in extended family system.

Questions	**Responses**	**n** (%)
1. What are antibiotics? (Medicine that kill bacteria)	(CORRECT) (INCORRECT)	337 (87.3) 49 (12.7)
2. Do antibiotics have side effects or adverse reaction?	(YES) (NO)	310 (80.3) 75 (19.4)
3. What can be the consequences of the irrational use of	(Antibiotic Resistance)	196 (50.8)

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antibiotics?	(Severe Disease) (ADR) (All of the above)	77 (19.9) 12 (3.1) 101 (26.2)
4. Do you think that antibiotics are losing their efficacy?	(YES) (NO)	253 (65.5) 132 (34.2)

3.6. Attitude toward antibiotic use and resistance:

65% respondents who do not have a job and 34.2% people with job said that antibiotics should be kept as preserved medicine for future. While 77.2% people said that antibiotics should not be preserved as medicine for future use. There was no significant relationship between education level with antibiotics usage for future use, age group, gender, place of residence and type of family.

There was a 99% significant relationship between age group (18-40) that patients are responsible for the irrational use of antibiotics, 95.5% pharmacies, 71.8% pharmaceutical companies and 68.9% practitioners. 68.2% females have the perception that pharmaceutical companies are responsible for irrational use of antibiotics as compared to male i.e. 31.8%. 52.1% males think that patients are responsible for irrational use of antibiotics, 47.9% female also have the same idea. Place of residence did not show any significant relation with the question that who is responsible for irrational use of antibiotics. People living in extended family type said that 70.6% pharmaceutical companies are responsible for the irrational use of antibiotics as compared to people in unit family system show 29.4% relationship. 63.5% relationship between patients and irrational use of antibiotics by respondents of unit family system. 54.5% pharmacies and 45.4% practitioners. 84.4% respondents with knowledge level above high school said that patients are the main reason for the irrational use of antibiotics while 81.8% showed that pharmacies are responsible for this. The families where father is decision makes respond with 87.5% significance that patients are the main cause of irrational use of antibiotics, as compared to the families where mother is decision maker respond with 13.6% significant relationship between pharmacies and irrational use of antibiotics.

Respondents who do not have any job perceive with the idea that 91.7% patients, 72.7% pharmacies, 61.2% practitioners, 58.8% pharmaceutical companies are the main reasons for the irrational use of antibiotics. 87.6% respondents with age group (18-40) respond that they did not pressurize the doctor to prescribe antibiotics. 63.2% answered with yes. There was the no significant association between gender and the question about that did they pressurize the doctor or not. There was the no significant relationship between place of residence and the above question. People living in extended families has significant relationship of 63.2% answered Yes while 47.1% answered NO. There was the significant relationship about 71.9% people who have education above high school answered that they did not pressurize doctor to prescribe antibiotics. 81% people living in families where father is the decision maker answered no to the above question. There was the significant relationship of 73.6% between people who do not have job with the above answer. There was the significant relationship between gender and the question that "If a doctor does not prescribe antibiotics, will you go to another doctor who might prescribe an antibiotic?" with 64.5% female answered Yes. Whereas 68.3% Respondents whose education is higher than school level answered that they did not go to another doctor for antibiotic.

Questions	Responses	n (%)
1. Do you think that antibiotics should be kept as preserved medicine for the future?	(YES) (NO)	263 (68.1) 123 (31.9)
2. If a doctor does not prescribe antibiotics, will you pressurize him/her to prescribe an antibiotic(s)?	(YES) (NO)	144 (37.3) 242 (62.7)
3. If a doctor does not prescribe antibiotics, will you go to another doctor	(YES)	141 (36.5)

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who might prescribe an antibiotic(s)?	(NO)	243 (63.0)
4. Who is responsible for the irrational use of antibiotics?	(Practitioners) (Pharmaceutical companies) (Pharmacies) (Patients)	183 (47.4) 85 (22.0) 22 (5.7) 96 (24.9)

3.7. Practice Regarding Antibiotic Use and ABR:
Evaluation of participant's practice regarding antibiotic use and ABR, by asking five questions and the results are illustrated in Table___. There was a significant relationship exit between education level and practice regarding antibiotic use that the use leftover antibiotics with 64.3% answered that they did not take antibiotics without prescription. There was the significant relationship between education level above high school respondents show 66.5% with the question that they have showed the redline on some medical strips. 61.4% females said that they did not show any redline on medical strips. 77.5% significant association between the families where father is the decision maker with complete purchase of antibiotic course. There was significant relationship of 67.3% between respondents who have education attainment above high school with that they purchased the complete course of antibiotics prescribed by the doctor. 64.7% females answered No that they did not purchased the complete course of antibiotics prescribed by doctor. 82.1% respondent with age group (18-40) has significant association with compliance of entire course of antibiotics. 64.4% people living in extended families said that they did not compliance the entire course of antibiotics. There was the significant relationship between family decision make i.e. 76.5% with compliance of entire course of antibiotics. 69.5% respondents with education above high school show significance with the compliance of the entire course of prescribed antibiotics. Significant association between females with compliance of entire course of antibiotics as 68.3% females said that they did not do this.

Questions	**Responses**	**n** (%)
1. Have you ever purchased and administered an antibiotic without a doctor's prescription?	YES NO	249 (64.5) 136 (35.2)
2. Have you noticed a Redline on some medical strips?	YES NO	197 (51.0) 189 (49.0)
3. Would you use any leftover antibiotics or the same prescription to purchase the antibiotics whenever you have similar symptoms with previous infections?	YES NO	232 (60.1) 154 (39.9)
4. Do you purchase the complete antibiotic(S) course written within the prescription by the doctor?	YES NO	284 (73.6) 102 (26.4)
5. Do you comply to the entire course of the prescribed antibiotics (compliance to the administer prescribed antibiotic(s) for complete duration)?	YES NO	285 (73.8) 101 (26.2)

Factors Associated with KAP about Antibiotic Use and ABR:
In the present study, significant knowledge about URTI was observed among age group of 18-40years (p=0.000). Comparing both genders females have more better knowledge about symptoms of URTI as compared to males(p=.003).Moreover in extended families decision makers have impact on the knowledge. (p=0.000). There was no association found for occupation. Educated community had more knowledge for URTI with significance of p=.000.

Discussion
The present study conducted on the specific group concluded that the knowledge of people about URTI is not enough. While people of middle age group and those who are more educated have better understanding. Majority of people who are educated and have extended family have correct idea about

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antibiotics. Knowledge about antibiotics use, resistance, their consequences and side effects is quite better in educated people of the community. Similar results were found in the study conducted on mass gathering in central India, where positive association was found between socio demographic characteristics and KAP. While it showed relatively poor score of antibiotics use, resistance, consequences and ADR in majority of participants who responded incorrectly towards these questions (Ngoc V. Nguyen) Also a study conducted in community pharmacies of china shows poor knowledge, attitudes and practices of customers towards antibiotics. (Li et al., 2020b).

In the recent study the specific attitude of people regarding the use of antibiotics is quite rational as 68% of participants think that the antibiotics should be reserved for future. Majority of them respond that they don't force doctors to prescribe them and will not visit any other doctor for antibiotic prescription. A study in medical and non-medical students of Lahore also shows positive attitudes of participants towards antibiotics use as they think that antibiotics can only be used when prescribed by doctor and it should be kept for latter more serious illnesses, because antibiotic resistance is one of the major challenge the world is facing know a days and not only healthcare workers but everyone needs to take the responsibility of antibiotic use. (Muhammad (Iqbal et al., 2020)

Practice regarding use of antibiotics seems quite poor again as majority of participants agree that they administer antibiotics without healthcare professional's prescription, they hardly notice and did not knows the meaning of Redline on medical strips. 60% stated that they refill and use leftover antibiotics for the same symptoms. While almost 74% agrees that they complete the prescribed course and shows compliance towards the regimen. Worse results were seen in central India where more than 80% of respondents agree to buy antibiotics without prescription and easy access to them on retail pharmacies is considered as a major contributor to misuse and resistance.

87% agree that they don't complete the entire course and skip the course when symptoms disappear. (Ngoc V. Nguyen) The present study concluded that the significant knowledge about URTI is present in young adults. Females have better understanding towards antibiotics use as compared to males and people with extended families have significant effect on the knowledge and decision making.

The attitude towards antibiotic use is better in educated community while practice of use is poor and because of lack of medical knowledge and awareness. It depends on healthcare professionals they needs to run educational campaigns regarding practices and use of antibiotics, there should be restrictions on easy access towards redline medications and awareness

REFERENCES

AKHUND, R., JAMSHED, F., JAFFRY, H. A., HANIF, H. & FAREED, S. 2019. Knowledge and attitude of general Pakistani population towards antibiotic resistance. Cureus, 11.

BHANWRA, S. 2013. A study of non-prescription usage of antibiotics in the upper respiratory tract infections in the urban population. Journal of Pharmacology and Pharmacotherapeutics, **4**, 62-64.

DUTT, H. K., SARKHIL, M. Z., HASSEB, A. & SINGH, G. 2018. A comparative knowledge, attitude, and practice study of antimicrobial use, self-medication and antimicrobial resistance among final year students of MBBS, BDS, and BSc Nursing at a tertiary care hospital at Kannur. National Journal of Physiology, Pharmacy and Pharmacology, 8**,** 1305-1305.

HIGUITA-GUTIÉRREZ, L. F., RONCANCIO VILLAMIL, G. E. & JIMÉNEZ QUICENO, J. N. 2020. Knowledge, attitude, and practice regarding antibiotic use and resistance among medical students in Colombia: A cross-sectional descriptive study. BMC public health, 20**,** 1-12.

IQBAL, M. T., AHMED, M. H., OMAR, N., AHMED, M. R., FAHAD, M., ALI, M. & KAUKAB, M. 2020. Antibiotic Resistance: KAP Study on Medical and Non-Medical Students of Lahore, Pakistan. Pakistan Journal of Public Health, 10**,** 24-31.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

LI, P., HAYAT, K., SHI, L., LAMBOJON, K., SAEED, A., MAJID AZIZ, M., LIU, T., JI, S., GONG, Y. & FENG, Z. 2020a. Knowledge, attitude, and practices of antibiotics and antibiotic resistance among chinese pharmacy customers: a multicenter survey study. Antibiotics, 9**,** 184.

LI, P., HAYAT, K., SHI, L., LAMBOJON, K., SAEED, A., MAJID AZIZ, M., LIU, T., JI, S., GONG, Y., FENG, Z., JIANG, M., JI, W., YANG, C., CHANG, J. & FANG, Y. 2020b. Knowledge, Attitude, and Practices of Antibiotics and Antibiotic Resistance Among Chinese Pharmacy Customers: A Multicenter Survey Study. Antibiotics (Basel), 9.

NGUYEN, N. V., MAROTHI, Y. & SHARMA, M. 2022. Knowledge, Attitude, and Practice Regarding Antibiotic Use and Resistance for Upper Respiratory Tract Infections among the Population Attending a Mass Gathering in Central India: A Cross-Sectional Study. Antibiotics, 11**,** 1473.

ZELELIE, T. Z. & MEKONNEN, Y. T. 2019. Bacterial profile and antimicrobial resistance patterns in patients with upper respiratory tract infections In Debre Berhan referral hospital, Ethiopia. Egyptian Journal of Ear, Nose, Throat and Allied Sciences, 20**,** 9-15.