PREVALENCE OF SELF-MEDICATION ANTIBIOTICS AMONG MEDICAL AND NON-MEDICAL STUDENTS IN ALQUWAYIYAH, RIYADH, SAUDI ARABIA

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ABSTRACT

Background: The self-medication practice is leading to inappropriate use of antibiotics for the treatment of patients with known infections which subsequently have the suggestion for increasing treatment costs and adverse events.[2] Self-medication with antibiotics is a common practice in most countries including Saudi Arabia due to flexible drug rules & regulation one of the reasons for the increase in the antibiotic resistance of the microbes increasing in these areas. **Objective:** This study was carried out to estimate the prevalence of self-medication of antibiotics among medical & nonmedical students of Alquwayiyah Shaqra University of Kingdom of Saudi Arabia. **Materials and Methods:** We conducted a cross-sectional survey on 400 students among medical & nonmedical colleges. A structured questionnaire was used for data collection. This study was conducted between the period of six months from September 2018 to March 2018.Data was analyzed by using Statistical Package for Social Science (SPSS). The Chi-square (χ2) test was used in determining statistically significant. A P value of <0.05 was considered as statistically significant **Results:** Total of 400 students, 200 (50%) medical and 200 (50%) non-medical students were considered and there was a significant difference between medical over non-medical students as far as understanding the term self-medication of antibiotics was concerned (p value 0.04). Most antibiotics for self-medication were obtained from the community pharmacy or previous prescriptions, selection of antibiotics was based majority agreed with their own experience. Saving time and money, previously resolved complains were the top two reported factors for self-medication. **Conclusion:** This study has shown that Students with a medical background are more aware of the pharmacological action of antibiotics comparative to the non-medical students who prefer self-medication of antibiotic during the illness because of the lack of drug knowledge. The self-medication of antibiotic in medical students found due to Drug-related knowledge gained during their studies and easy access to drugs might have encouraged their self-medication habit in Alquwayiyah, Shaqra University, Kingdom of Saudi Arabia. There is a need for a review of healthcare educational programs especially the teaching of clinical pharmacology to include topics on self-medication and antibiotic resistance.

KEYWORDS: Self-medication of Antibiotics, Medical & Nonmedical students, Drug Knowledge, Healthcare Educational Programs etc.

INTRODUCTION

Antibiotics are the drug that is used to treat bacterial infections and work by either killing or slowing the growth of bacteria. Antibiotics are chemicals produced by microorganisms in nature by soil bacteria and fungi. Nowadays, antibiotics available in the market are either produced by microbial fermentation or are obtained via semi-synthetic route using the existing antibiotic backbone structure.

Resistant to major antibiotic drugs is has become a new challenge as a key global public health hazard. The most important cause of this resistance is the irrational use of antibiotic by self-medication. Self-medication can be defined as a human behavior in which an individual uses nonprescribed medicine to diagnose untreated and often undiagnosed medical disease. Self-medication with the antibiotic is the most common phenomenon, especially in the developing countries where infectious diseases are usual causes of death.[1]

The self-medication practice is increasing to inappropriate use of antibiotics for the treatment of patients with known infections which subsequently have the suggestion for increasing treatment costs and adverse events.[2] Self-medication with antibiotics is a common practice in most countries including Saudi Arabia where drug rules & regulation is not much strict and is one of the reasons for the increase in the antibiotic resistance of the microbes increasing in these areas. According to one

surveillance conducted in Spain, the researchers have found that 30% of the antibiotics taken by the population have not been prescribed by medical doctors.[3] A high occurrence of self-medication with antibiotics has also been recurrently found in Southern and Eastern European countries and Sudan resulting in high doses of antibiotic resistance.[4,5] A study showed in Pakistan, that the researchers have noticed the prevalence of self-medication with antibiotics among the non-medical university students is higher up to 50%.[6] Some studies in the USA have also reported considerable self-medication with antibiotics received from previous courses, at a local pharmacy or from outside the state.[7-10]

In Saudi Arabia for more than three decades dispensing of antibiotic without a medical prescription has been illegal for pharmacists.[11] However, studies show due to lack of obedience to these regulations a high rate of antibiotic sales without prescription for various infections[12-14] Self-medication with non prescribed antibiotics always includes obtaining antibiotics without a prescription (over the Counter) as well as by using leftover antibiotics stored at a residential place or by sharing antibiotics with relatives or friends. Self-medication with the antibiotic is a serious global health problem.[15]

Antibiotics are infective to resistant bacteria and continue to cause infection. Some infections are difficult to treat even though with new or discovered drugs. Producing new molecules of antibiotics is an expensive and challenging task. Proper knowledge of antibiotics, the dose of administration and their Side-effects is necessary for its suitable use. Medical students are vulnerable to self-medication on account of handling and having access to different types of antibiotics in their upcoming practices. Various studies on nurses suggest that a substantial population of them experience self - medication with antibiotics.[16,17]

Studies on self-medication behavior and knowledge of Medical & non-medical students towards antibiotics are necessary to assist with the planning of interventions to improve the use of medicines in the country. The applied medical students are the future practicing medical staff and their behavior will largely influence the behavior of society. In this study, we evaluate the knowledge of the antibiotic and prevalence of self-medication with antibiotics among the students of medical & Nonmedical of Alquwayiyah, Shaqra University, Riyadh, Saudi Arabia.

MATERIAL AND METHOD
Study Design and Setting
A cross-sectional study was done on 400 medical and non-medical students of Applied Medical College of Science (Total number of students = 200) and College of Sciences & Community (Total number of students = 200), Alquwayiyah, Shaqra University, Riyadh, Saudi Arabia. 50% of samples from each institute was taken. All students were interviewed using a structured questionnaire from identified colleges for data collection. This study was conducted between the period of six months from September 2018 to March 2018.

Inclusion and Exclusion Criteria
Students were randomly selected from the common rooms, cafeterias and classes. Undergraduate students of age group (18-23) were included whereas postgraduate students, house officers were not included. Undergraduate, and postgraduate students of any age, familiar with the English language and Arabic language enrolled in medical and non-medical departments in any of the target colleges, were included in the study. Students those who were refused to participate in the study were not included. The use of any kind of medication in the previous 6 months of an individual's own volition without a doctor's consultation was the definition of self-medication used in this study. A period of 6 months was selected to minimize bias in recall. This period was considered adequate for one to the recall if he had used the antibiotics.

Data Collection Method
To achieve the appropriate sample size, the convenient sampling method was approved. The study objectives were explained to authorities and prior consent from respective departments was obtained. The data collectors were approached to the students in the target area for interviews. Students taking part in the study gave both written and verbal consent. A self-administered questionnaire was circulated among the study participants, and they were asked to complete it followed by the appropriate options. The filled questionnaire was then returned to the researchers. The Chi-square ($\chi2$) test was used in determining statistically significant. A P value of <0.05 was considered as statistically significant.

Study Questionnaire
Questionnaire's first part was designed by considering the students' behavior regarding the safety of self-medication of products while the second part of the questionnaire was designed with the aim to assess their knowledge of antibiotics. The evaluation was done using different parameter related to the questions.

Ethical Approval
Permission was taken from the dean of Applied Medical College of Science and College of Sciences & Community, Alquwayiyah, Shaqra University, Riyadh, Saudi Arabia. Prior to the commencement of the study. Written and verbal consent was sought from each and every individual. Request for the name or any other private info was not made purposefully.

Data analysis

All analyses were performed using SPSS version 20. Identification numbers were given for the collected questionnaire for counting and organizing purposes. All questions were coded and then imported to SPSS version 20for analysis. All variables categories were coded with numbers (for example, Category: medical as 1 and Nonmedical as 2). Descriptive statistics were used to compute the demographic data and it included: mean standard deviation and frequency. Chi-square test was used to analyze the proper questions. Frequencies and percentages were calculated. Data.

RESULTS AND DISCUSSION
Table 1: Prevalence of self-medication behavior among university students.

S.N	Questions	Medical n=200		Nonmedical n=200		All N=400 N (%)
		n	%	n	%	
1	**Have you ever taken antibiotics?** A. Yes B. No	178 22	89% 11%	154 46	77% 23%	332(83%) 68(17%)
2	**Have you ever treated yourself (self-medicated) with antibiotics?** A. Yes B. No	122 78	61% 39%	146 54	73% 27%	268(67%) 132(33%)
3	**How many times did you treat yourself with antibiotics in the past one year?**	168 32	84% 16%	117 83	58.5% 41.5%	285(71.25%) 115(28.75%)
4	**What was (were) your reason(s) of self-medication with antibiotics?** A. Cost saving B. Convenience C. Lack of trust in prescribing doctor	98 65 27	49% 32.5% 13.5%	88 74 38	44% 37% 19%	186(46.5%) 139(34.75%) 65(16.25%)
5	**For which of the following complaint(s) did you use antibiotics?** A. Runny nose B. Nasal congestion C. Cough D. Sore throat E. Fever F. Aches and pains G. Vomiting H. Diarrhea	24 42 12 53 14 05 07 18	12% 21% 6% 26.5% 7% 2.5% 3.5% 9%	28 56 21 59 21 07 11 22	14% 28% 10.5% 29.5% 10.5% 3.5% 5.5% 11%	52(13%) 98(24.5%) 33(8.25%) 112(28%) 35(8.75%) 12(3%) 18(4.5%) 40(10%)
6	**Your selection of antibiotics was based on …** A. Recommendation by community pharmacists B. Opinion of family members C. Opinion of friends D. My own experience E. Previous doctor's prescription F. The advertisement	32 28 35 62 20 23	16% 14% 17.5% 31% 10% 11.5%	36 32 39 37 25 31	18% 16% 19.5% 18.5% 12.5% 15.5%	68(17%) 60(15%) 74(18.5%) 99(24.75%) 45(11.25%) 54(13.5%)
7	**What did you consider when selecting antibiotics?** A. Type of antibiotics B. Brand of antibiotics C. Price of antibiotics D. Indications for use E. Adverse reactions	48 55 68 21 08	24% 27.5% 34% 10.5% 4%	30 68 81 16 05	15% 34% 40.5% 8% 2.5%	78(19.5%) 123(30.75%) 149(37.25%) 37(9.25%) 13(3.25%)
8	**Where did you usually obtain antibiotics from for self-medication?** A. Community pharmacies B. TCM practitioners C. Leftover from previous prescription D. Online shopping/E-pharmacies	80 28 52 30	40% 14% 26% 15%	72 33 70 35	36% 16.5% 35% 17.5%	152(38%) 61(15.25%) 122(30.5%) 65(16.25%)
9	**Did you ever check the instructions come with the package insert of antibiotics for self-treatment?** A. Yes, always B. Yes, sometimes C. Never	65 80 55	32.5% 40% 27.5%	38 71 91	19% 35.5% 45.5%	103(25.75%) 151(37.75%) 146(36.5%)
10	**How much did you understand the instructions?** A. Fully understood B. Partly understood (percentage:)	55 73 72	27.5% 36.5% 36%	19 54 127	9.5% 27% 63.5%	74(18.5%) 127(31.75%) 199(49.75%)

#	Question / Options					
	C. Did not understand at all					
11	**How did you know the dosage of antibiotics?** A. By checking the package insert B. By consulting a doctor C. By consulting a pharmacist By consulting family members E. From the newspapers, magazines, books, or TV programs F. From the Internet G. From my previous experience H. By guessing the dosage by myself	30 66 54 25 10 8 2 5	15% 33% 27% 12.5% 5% 4% 1% 2.5%	33 65 52 22 12 10 2 4	16.5% 32.5% 26% 11% 6% 5% 1% 25	63(15.75%) 131(32.75%) 106(26.5%) 47(11.75%) 22(5.5%) 18(4.5%) 4(1%) 9(2.25%)
12	**Did you ever change the dosage of antibiotics deliberately during the course of self-treatment?** A. Yes, always B. Yes, sometimes C. Never	98 67 35	49% 33.5% 17.5%	74 71 55	37% 35.5% 27.5%	172(43%) 138(34.5%) 90(22.5%)
13	**Why did you change the dosage of antibiotics during the course of self-treatment?** A. Improving conditions B. Worsening conditions C. To reduce adverse reactions Drug insufficient for complete treatment	72 35 75 18	36% 17.5% 37.5% 9%	86 38 57 19	43% 19% 28.5% 9.5%	158(39.5%) 73(18.25%) 132(33%) 37(9.25%)
14	**Did you ever switch antibiotics during the course of self-treatment?** A. Yes, always B. Yes, sometimes C. Never	86 72 42	43% 36% 21%	88 70 42	44% 35% 21%	174(43.5) 142(35.5%) 84(21%)
15	**Why did you switch antibiotics during the course of self-treatment?** A. The former antibiotics did not work B. The former antibiotics ran out C. The latter one was cheaper D. To reduce adverse reactions	72 18 65 45	36% 9% 32.5% 22.5%	71 16 64 49	35.5% 8% 32% 24.5%	143(35.75%) 34(8.5%) 129(32.25%) 94(23.5%)
16	**How many different antibiotics did you take maximally during a single illness?** A. Yes B. No	41 159	20.5% 79.5%	70 130	35% 65%	111(27.75%) 289(72.25%)
17	**Are you concerned that you might have taken counterfeit antibiotics?** A. Yes, very much B. Yes, somewhat	46 154	23% 77%	75 125	37.5% 62.5%	121(30.25%) 279(69.75%)
18	**Have you ever found out that you had taken the same antibiotics with different names at the same time?** A. Yes B. No	56 144	28% 72%	85 115	42.5% 57.5%	141(35.25%) 259(46.75%)
19	**When did you normally stop taking antibiotics?** After a few days regardless of the outcome B. After symptoms disappeared C. A few days after the recovery D. After antibiotics ran out E. At the completion of the course . After consulting a doctor/pharmacist	32 28 35 62 20 23	16% 14% 17.5% 31% 10% 11.5%	36 32 39 37 25 31	18% 16% 19.5% 18.5% 12.5% 15.5%	68(17%) 60(15%) 74(18.5%) 99(24.75%) 45(11.25%) 54(13.5%)
20	**Have you ever had any adverse reaction when you took antibiotics for self-medication?** A. Yes B. No	112 88	56% 44%	136 64	68% 32%	248(62%) 152(38%)
21	**What did you do for the adverse reactions?** *(check more than one if applicable)* A. Stopped taking antibiotics B. Switched to another antibiotic C. Consulted pharmacy staff D. Consulted a doctor Consulted family members/friends	32 28 35 62 20 23	16% 14% 17.5% 31% 10% 11.5%	36 32 39 37 25 31	18% 16% 19.5% 18.5% 12.5% 15.5%	68(17%) 60(15%) 74(18.5%) 99(24.75%) 45(11.25%) 54(13.5%)

	F. Nothing				
22	**What do you think about self-medication with antibiotics for self health care?** A. Good practice B. Acceptable practice C. Not acceptable practice	**94** 67 39	**47%** 33.5% 19.5%	**80** 68 52	**40%** 34% 26%	**174(43.5%)** 135(33.75%) 91(23.5%)
24	**Do you think you can treat common infectious diseases with antibiotics successfully by yourself?** A. Yes, I can B. Not sure C. No, I cannot	**98** 65 37	**49%** 33.5% 19.5%	**75** 68 57	**37.5%** 34% 28.5%	**173(43.25%)** 133(33.25%) 94(23.5%)

Table 2: *Reason of self-medication with Antibiotics.*

S.N	Questioners	Medical		Nonmedical		All N=400 N (%)
		n	**%**	**n**	**%**	
1	**Do you know what are antibiotics?** A. Yes B. No	**190** 10	**95%** 5%	**155** 45	**77.5%** 22.5%	**345(86.25%)** 55(13.75%)
2	**What are antibiotics used for?** A. Virus infection B. Bacterial infection	**65** 135	**32.5%** 67.5%	**98** 102	**49%** 51%	**163(40.75%)** 237(59.25%)
3	**Which of the following statement(s) about antibiotics is (are) correct?** *(True/False)* A. Broad-spectrum antibiotics are better than narrow-spectrum ones B. Higher doses result in faster recovery	**142** 58	**71%** 29%	**85** 115	**42.5%** 57.5%	**227(56.75%)** 173(43.25%)
4	**What is (are) the common adverse reaction(s) of antibiotics?** A. Nausea B. Vomiting C. Diarrhea D. Rash E. Vaginal thrush F. Drug resistance	**40** 36 30 38 33 36	**20%** 18% 15% 19% 16.5% 18%	**36** 31 26 34 29 32	**18%** 15.5% 13% 17% 14.5% 16%	**76(19%)** 67(16.75%) 56(14%) 72(18%) 61(15.25%) 68(17%)

Part B: Knowledge

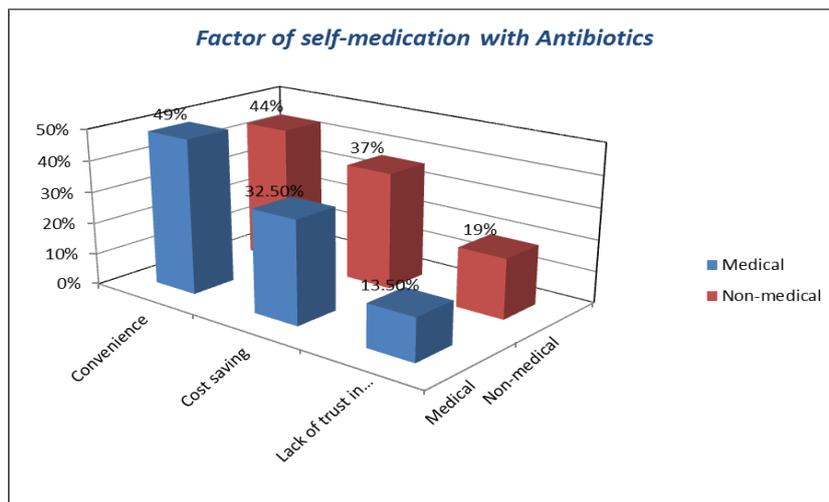| *Reason of self-medication with Antibiotics*	*Medical*		*Non-medical*	
	n	*%*	*n*	*%*
Convenience	98	49	88	44
Cost saving	65	32.5	74	37
Lack of trust in prescribing doctor	27	13.5	38	19
Total	200	100	200	100

Fig. 1: *Factor effecting on self-medication with Antibiotics in Medical and Non-Medical Students.*

Table 3: *Selection of antibiotics based.*

Selection of Antibiotics was Based	Medical		Non-medical	
	n	*%*	*n*	*%*
Recommendation by community pharmacists	32	16	36	18
Opinion of family members	28	14	32	16
Opinion of friends	35	17.5	39	19.5
Own experience	62	31	37	18.5
Previous doctor's prescription	20	10	25	12.5
The advertisement	23	11.5	31	15.5
Total	200	100	200	100
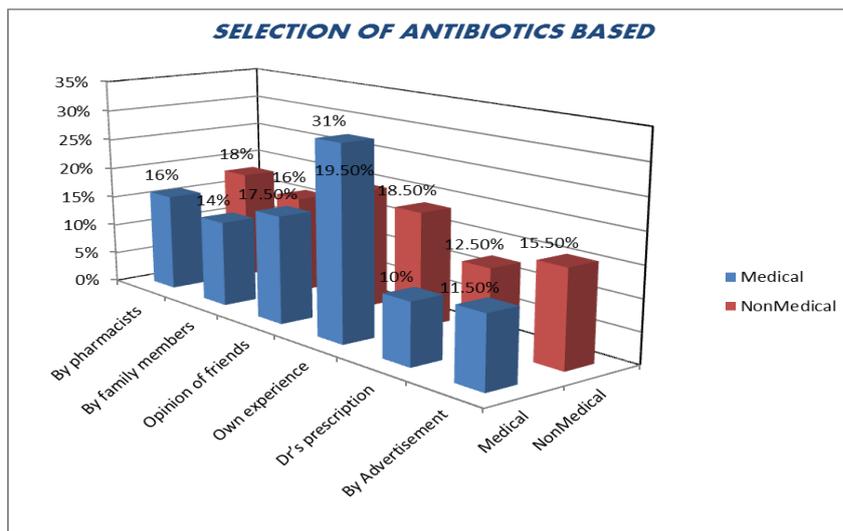
Fig. 2: *Selection of Antibiotics for Self-medication in Medical and Non-medical Students.*

RESULTS
In the current study participants were enrolled from two identified institutions of Al Quwayiyah, Shaqra University. The percentage of participants with a mean age of 21 ± 1.48.

In the current study, out of a total of 400 students, 200 (50%) medical and 200 (50%) non-medical students were considered and there was a significant difference between medical over non-medical students as far as understanding the term self -medication of antibiotics

was concerned (p value 0.04). Question No 4 & No 6 data was considered for statistical discussion & bar charts.

The reason of self-medication with Antibiotics parameter like "Convenience" by98 (49%) medical students as compared to 88 (44%) non-medical students. While factor like "Cost saving" found 65 (32.5%) & 74 (37%) among the Medical & non-medical students respectively, similarly they were asked for "lack of trust in prescribing

doctor" than medical27 (13.5%) and non-medical 38 (16.5%) students responded.

Subsequently when the selection of antibiotics was questioned regarding the "Recommendation by community pharmacists", 32 (16%) medical and 36 (18%) non-medical students. Medical 28 (14%) and non-medical 32 (16%) students responded with self-medication of antibiotics for "Opinion of family members" being able to treat their symptoms correctly.

Most important when they were asked for "own experience" & "Previous doctor's prescription" they showed Medical 20 (10%) and non-medical 25 (12.5%) students & Medical 23 (11.5%) and non-medical 31 (15.5%) students respectively.

"The advertisement" factor Medical 23 (11.5%) and non-medical 31 (15.5%) students were responded.

A significant difference with a p value < 0.05, was observed in the medical and non-medical students when asked about whether they used self – medication as an alternative to visiting the doctor (Table 1). As far as selection of antibiotics was based majority agreed with their own experience which was previously used which shown significant results with a p value of 0.0427 (Table 2).

DISCUSSION

Self-medication by itself has several consequences that depend on who and what one chooses to self-medication. Our study focused on the knowledge, practices and attitude of medical and non-medical students related to self-medication of antibiotics. Our study showed that the prevalence of self-medication was 67% among the medical & nonmedical students of Alquwayiyah, Shaqra University. However, it is not as common as found in a similar study conducted in India (87.50%)[16], India (65.1%)[18], Pakistan (53%)[6], Australia(91.7%)[19] and Brazil (38.8%)[20] But it is higher than that observed among medical workers of private hospitals in Brazil (28.2%)[21]

One population study done on student's prevalence of self-medication in Saudi Arabia on the nursing students, the prevalence of self-medication reached between77-80%.[22] The present self-medication among these students is expected to increase once they come in practice.

Antibiotics (Amoxicillin) has also been used most frequently as self-medication in other study conducted in Ghana[23] and Pakistan[6]. Similar observations were shown in studies conducted exclusively on self-medication with antibiotics in Nigeria[24], Zaria and Greece.[25] Beta-lactams types of antibiotics were most commonly used for self-medication. The self-medication with antibiotic (beta lactam) without proper dose and duration of use can lead to drug resistance which is really a great threat to the health of the human being.

Community pharmacy counter was the most mutual source for procurement of antibiotic in our study while the fact that antibiotic is legally a prescribed medicine. A study conducted in the central area of Saudi Arabia has shown that among the 50 percent over the counter (OTC) dispensed medicine; twenty percent of them were antibiotics.[26] In a similar study in India, almost 27 percent of the medical students used on counter antibiotic as self-medication.[27]

In the present study, the most common symptoms leading to antibiotic self-medication were nasal congestion, cough, sore throat and fever (70.3%) followed by skin wounds (25.9%). The medical students were found to be involved in antibiotic self-medication most frequently for the common symptoms of fever, runny nose and sore throat in similar studies in Pakistan and India.[28,29]

As compared to other studies, the knowledge about antibiotic of nursing and laboratory students was excellent. However, our study showed that knowledge of antibiotic resistance and implications of self-medication is inadequate. The same type of findings has been reported in other studies in Jordan[30] and USA[31] Insufficient knowledge of antibiotic.

CONCLUSION

This study has shown that Students with a medical background are more aware about the pharmacological action of antibiotics comparative to the non-medical students who prefer self-medication of antibiotic during the illness because of the lack of drug knowledge. The self-medication of antibiotic in medical students found due to Drug-related knowledge gained during their studies and easy access to drugs might have encouraged their self-medication habit.

There is a need for a review of educational programs especially the teaching of clinical pharmacology to include topics on self-medication and antibiotic resistance. In case of non-medical students, it has been observed that they choose self-medication due to opinion of friends, own experience and on previous doctor's prescription which is found quite strange so further educational interventions are necessary to improve students' understanding on antibiotic resistance, and to correct some wrong behaviors related to antibiotic use. It should be highlighted that antibiotics be used only on medical prescription, for a defined period of time to treat specific medical conditions (for e.g. cough, cold and flu should not be treated with antibiotics).

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