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Study the antibiotics use without a prescription and their misuse in Sana'a city

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Abstract:

This study aims to evaluate the knowledge and awareness of Sana'a city residents in Yemen about the correct use of antibiotics and their dangers. Additionally, it seeks to assess pharmacists' roles in the random dispensing of antibiotics and their knowledge of bacterial resistance. The study was conducted between June and August 2023 in Sana'a city, using a questionnaire for 261 adults who recently used antibiotics. The questionnaire included questions about participants' social status and both multiple-choice and open-ended questions. Results showed a very high level of antibiotic usage, with 68.6% using antibiotics more than five times in the past year. It was found that college-educated customers had the highest rate of antibiotic use. Most antibiotic users were aged 15-39 years. The main reasons for using antibiotics without a prescription were economic status followed by previous experiences. Public awareness was determined to be average regarding antibiotic use without a prescription. It is necessary to implement educational campaigns to increase awareness about antibiotic misuse and resistance.

Keywords:

Antibiotics, Questionnaires, Multivariate Analysis

دراسة استخدام المضادات الحيوية بدون وصفة طبية وسوء استخدامها في مدينة صنعاء

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الملخص

يهدف هذا البحث إلى تقييم معرفة سكان مدينة صنعاء في اليمن حول الاستخدام الصحيح للمضادات الحيوية ومخاطرها، بالإضافة إلى ذلك، يسعى البحث إلى تقييم دور الصيادلة في صرف المضادات الحيوية بشكل عشوائي ومعرفتهم بمقاومة البكتيريا. أجريت الدراسة بين يونيو وأغسطس 2023 في مدينة صنعاء، حيث تم استخدام استبيان شمل 261 شخصاً بالغاً استخدموا مضادات حيوية مؤخراً. تضمن الاستبيان أسئلة حول الوضع الاجتماعي للمشاركين وأسئلة متعددة الخيارات وأخرى مفتوحة. أظهرت النتائج أن مستوى استخدام المضادات الحيوية كان مرتفعاً للغاية حيث استخدم 68.6% من المشاركين المضادات الحيوية أكثر من خمس مرات في السنة الماضية. تبين أن العملاء الذين حصلوا على تعليم جامعي هم الأكثر استخداماً للمضادات الحيوية. كانت الفئة العمرية الأكثر استخداماً للمضادات الحيوية بين 15-39 عاماً. أشارت النتائج إلى أن السبب الرئيسي لاستخدام المضادات الحيوية دون وصفة طبية هو الحالة الاقتصادية يليها التجارب السابقة. توصلت الدراسة إلى أن مستوى الوعي العام بشأن استخدام المضادات الحيوية دون وصفة طبية كان متوسطاً. من الضروري تنفيذ حملات توعوية لزيادة الوعي حول إساءة استخدام المضادات الحيوية ومقاومتها.

Introduction

Antibiotics are a type of antimicrobial substance that are active against bacteria. These antimicrobial agents can be either cytotoxic, meaning they kill the cells, or cytostatic, meaning they inhibit the growth of microorganisms. This allows the body's natural defenses, such as the immune system, to eliminate the targeted bacteria. Antibiotics often work by disrupting key processes within the bacterial cell. They may inhibit the synthesis of the bacterial cell, proteins, DNA, or RNA. Alternatively, they may act as a membrane-disrupting agent or use other specific mechanisms to disrupt the normal functioning of the bacterial cell. Additionally, antibiotics can enter the bacterial cell wall by binding to it. They utilize the energy-dependent transport mechanisms within the ribosomal sites of the cell, which subsequently leads to the inhibition of protein synthesis. This further impairs the bacteria's ability to survive and replicate (Jagdambi et al., 2022). Antibiotic resistance is a growing global concern. Worryingly, resistance levels are rising to dangerously high levels in all regions of the world. New resistance mechanisms are continuously emerging and spreading globally. This threatens our capacity to effectively treat common infectious diseases. A wide range of infections, including pneumonia, tuberculosis, blood poisoning, gonorrhea, and foodborne illnesses, are becoming increasingly difficult, and in some cases impossible, to treat. This is because the antibiotics used to manage these conditions are becoming less effective. The spread of antibiotic resistance poses a serious threat to public health worldwide. As more infections develop resistance, our ability to combat them with available antibiotic therapies is severely compromised (World Health, 2020).

The main problem with antibiotic use without a prescription is the emergence of pathogenic resistance (Chalker, 2001). Bacterial resistance is the capability of bacterial cells to prevent antibiotic bacteriostatic or bactericidal effects.

The excessive and unintended usage of antibiotics contributes to resistance development in bacteria (Hasan & Al-Harmoosh, 2020). The study of antibiotics uses without a Prescription utilization in different countries.

Sub-Saharan African countries, the overall pooled proportion of non-prescription antibiotics requests or consultations that resulted in supply of antibiotics without prescription was 69% (p=95%) (Belachew et al., 2020). A China, survey of 854 people in rural China found that 62% of parents had given their children antibiotics in the previous year without the advice of a physician. In India, Antimicrobial drugs were obtained without prescription from 174 of 261 (66.7 %) pharmacies visited. Instructions regarding dose of these drugs were given by only 58.0 % pharmacies. In the upper respiratory infection simulation, 82 (71.3 %) of the 115 pharmacies approached dispensed antimicrobials without a prescription (Yang, 2014). In Europe, 4% of people obtained their last course of antibiotics without a prescription, but rates range from 3% in Northern Europe to nearly 30% in Eastern Europe, in lower-income and developing countries, including Argentina (53%) and Colombia (56%) (Aponte-González et al., 2021).

Methodology

Data were collected during 30 days, 261 questionnaires answered by customers who took anti-biotics without prescription A field survey was carried out on antibiotic use and misuse. This survey was divided into two phases took place in the same period of time. phase (1) finding the prevalence of antibiotic use. And phase (II) answering the questionnaire. And all data of the questionnaire DATA was admitted into the SPSS statistical software and the variables were analyzed.

Results

Several characteristics were assessed and below are the results. Cronbach's is a measure of how a set of items are closely related as a group and used as a reliability (validity) coefficient. By taking the square root of Cronbach's alpha we get (0.89) for Antibiotics' users.

Social profile

The sex of respondents, from table 1, many respondents (68.2%) were males while females were (31.8%).

Age of the respondents, the age of the respondents was categorized in groups ranging from 15-39 years, 40-49 years, and 50-60 years. The majority of respondents 58.2 % were between 15-39 years, 34.5 % between 40-49 years and only 34.5 % were between 50-60 years (Table 1)

In the profession category, in the profession category the highest percentage was for the employees at (51.3%), which implies that over 50% of our community are employees, which is obviously not the case, and the term worker came at (11.1%) (a person who does a specified type of work usually by hand).

Education levels of the respondents, the highest percent was obtained from the college educated at (55.6%), the lowest present was from non-educated at (1.5%), plausible percentage as the vast majority of the community is at least school educated (Table 1).

Chronic diseases, as the majority of the sample was between the ages 15-39, and most of the chronic diseases we mentioned (HTN. DM, etc) rarely inflect people under 40 years, the highest percentage was from people who used antibiotics without prescription, and had no chronic illnesses at (75.9%). The lowest percentage was from people who had asthma at (1.5%), because most people use antibiotics for common cold (will be disused further down the line) people with asthma do not randomly use antibiotics (Table 1).

Medical aid, People that don't use medical aid was the highest percent at (85.8%) (Table 1).

Table 2, demonstrates frequencies and percentages of each variable of the public's awareness study, understanding of antibiotics and their uses, and the reasons that may contributed to why they as a therapeutic option. To measure population awareness in the questionnaire we used a triple answer system for most questions, and presented them in the form of frequencies and percentages (in relative to the number of questionnaires answered) for each answer. This study obtained these answers. 1st question: mostly at 65.1%, 2nd question: no at 38.3%, 3^{ed} question: mostly at 70.5%, 4th question: mostly at 48.7%, 5th question: no at 60.2%, 14th question: mostly at 80.1%, 16th question: mostly at 65.1%, 17th question: mostly at 78.9%, 20th question: mostly at 67.8%, 21st question: mostly at 88.9%, 22nd question: mostly at 73.9%, 23^{ed} question: no at 44.4%, 24th question: yes at 39.5%, 25th question: yes at 37.2%, 26th question: no at 49.8%. (Table 3) contains questions that couldn't be simplified into a triple-question formula, and the most important answer percentages are:

A 6th question's most predominant answer and percentage is: Economic status (68.8%), 8th question's most predominant answer and percentage is: more than 5 times (68.8%), 9th question's most predominant answer and percentage is: saving money (44.4%),10th question's most predominant answer and percentage is: Running nose with diarrhea (45.6%), 11th question's most predominant answer and percentage is: other (33.7%), 12th question's most predominant answer and percentage is: previous experience (47.9%), 13th question's most predominant answer and percentage is: free samples (93.9%),15th question's most predominant answer and percentage is: Previous antibiotic didn't help (70.9%), 18th question's most predominant answer and percentage is: After the antibiotic is finished (28.0%), 27th question's most predominant answer and percentage is: After consulting with doctor/pharmacist (58.6%).

By statistically processing the public's awareness profile study towards antibiotics and how to use them, questions have gotten the following DATA, presented as mean (average) and S. D. (standard deviation), Table 4.

Tables

Variable	Data for consumers	Frequency	Percentage
Sex	Male	178	68.2
	Female	83	31.8
Age	15-39	152	58.2
	40-49	90	34.5
	50-60	19	7.3
Profession	Worker	29	11.1
	Student	98	37.5
	Employee	134	51.3
Education	Non-Educated	4	1.5
	Meddle-school	22	8.4
	High-school	54	20.7
	Diploma	24	9.2
	Collage	145	55.6
	Advanced studies	12	4.6
Diseases	No disease	198	75.9
	HTN/Heart disease	13	5.0
	DM	24	9.2

Variable	Data for consumers	Frequency	Percentage
	Kidney problems	22	8.4
	Asthma	4	1.5
Medical aid	Yes	1	0.4
	No	224	85.8
	Mostly	36	13.8

Table1 :Public social profile

Questions	Yes		No		Mostly	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
1. Does antibiotics treat bacteria?	66	25.3	25	9.8	170	65.1
2. Does antibiotics treat viruses?	88	33.7	100	38.3	73	28.0
3. Do you think antibiotics help in recovering from cold and cough?	33	12.6	44	16.9	184	70.5
4. Do you think the antibiotic works better if it was more expensive?	49	18.8	85	32.6	127	48.7
5. Have you heard about Bacterial Resistance?	2	8	157	60.2	102	39.1
14. Have you changed the type and/or dose of the antibiotic without consulting with an expert?	52	19.9	0	0	209	80.1
16. Have you read the leaflet that comes with the antibiotic?	0	0	91	34.9	170	65.1
17. Do you use antibiotic for the entire regimen specified by your doctor/pharmacist?	0	0	55	21.1	206	78.9
18. Do you know the dangers that come with antibiotics usage, and their effects on immunity?	0	0	84	32.2	177	67.8
21. Do you think there is a shortage in awareness about using drugs without prescription?	1	4	28	10.7	232	88.9
22. In most cases are their hardships in reaching a specialized doctor?	0	0	68	26.1	193	73.9
23. Do you often console a doctor before using antibiotics?	0	0	116	44.4	37	14.3
24. Do you give your children antibiotics without a prescription?	103	39.5	50	19.2	0	0
25. Does your doctor prescribe your child antibiotics over the phone?	97	37.2	56	21.5	0	0
26. Do you give your child the same antibiotics that you used in case of similar symptoms?	2	8	130	49.8	20	7.7

Table 2 : Awareness answers to the triple scale

Questions	DATA for consumers	Frequency	Percentage
6. In your opinion, what's the main contributor to antibiotics misuse?	Economic status	179	68.6
	Previous experience	48	18.4
	Difficulty in getting medical care	16	6.1
	Lack of medical awareness	18	6.9
8. How many times have you had antibiotic(s) during the last year?	1-3 times	29	11.1
	3-5 times	53	20.3
	More than 5 times	179	68.6
9. What are your reasons for antibiotics use without prescription?	Saving money	116	44.4
	Saving time and effort	80	30.7
	I don't like visiting doctors	49	18.8
	Other reasons	16	6.1
10. What are the reasons you use antibiotics?	Running nose (common cold)	119	45.6
	Nose congestion	7	2.7
	Throat-ache with fever	82	31.4
	Nausea, vomiting, diarrhea	14	5.4
	Body aches with fever	39	14.9
11. please, choose the names of antibiotics you used for self-medicating.	Amoxicillin	23	8.8
	Amoxicillin+ Clavulanic Acid	82	31.4
	Azithromycin	68	26.1
	Other	88	33.7
12. Your choice of antibiotic is dependent on...	Pharmacist recommendation	51	19.5
	Friend's recommendation	44	16.9
	Family member's recommendation	35	13.4
	Previous prescription	6	2.3
	Previous experience	125	47.9
13. When you self-medicate, where do you acquire your antibiotics from?	From pharmacies	245	93.9
	Remanence I used previously	1	0.4
	Remanence given by a friend that didn't use	6	2.3
	Free samples	7	2.7
15. Why do you change antibiotic type/dose?	Previous antibiotic didn't help	185	70.9
	Previous antibiotic is finished	25	9.6
	The other antibiotic is cheaper	6	2.3
	To decrease its side effects	12	4.6
	I didn't change my antibiotic	33	12.6
18. When do you usually stop the antibiotic(s) regimen?	After a few days regardless of the result	50	19.2
	After the symptoms had dissipated	71	27.2
	After the antibiotic is finished	73	28.0
	After the regimen in the prescription is finished	57	21.8

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Questions	DATA for consumers	Frequency	Percentage
	After consulting with doctor/pharmacist	10	3.8
27. When do you usually stop your child's antibiotic(s) regimen?	After the symptoms had dissipated	27	10.3
	Days after child's recovery	50	19.2
	After the antibiotic is finished	49	18.8
	After the regimen in the prescription is finished	10	3.5
	After consulting with doctor/pharmacist	17	58.6

Table 3 : Awareness answers to the non-triple scale

Question	Mean	S.D.	Semantic
1. Does antibiotics treat all diseases?	2.4	0.78480	Mostly
2. Do you use the antibiotic(s) properly?	2.7	0.40861	Mostly
3. Do you relies the side effects upon buying antibiotics?	2.3	0.33138	No
4. What's your level of buying antibiotics?	2.4	0.400969	Mostly
Total	2.5	0.540021	Mostly

Table 4 : The means and S. D. for the public's awareness questions

Interpretation of customer results.

- From public's point of view, antibiotics treat most diseases (bacterial, and viral).
- Antibiotics users sample mostly believe that they use antibiotics properly because they, read the leaflet, dose, and duration of usage (regimen).
- The public sample are not aware of antibiotic side effects, their risks, their role in lowering immunity, nor of bacterial resistance.
- The general papulation does mostly by antibiotics without consoling with a doctor.
- The total came out to be 2.5 as mean, and a semantic of 'mostly" thus indicating that antibiotics users' awareness of antibiotics and their uses is average.

Discussion

Cronbach's is a measure of how a set of items are closely related as a group and used as a reliability (validity) coefficient. By taking the square root of Cronbach's alpha we get (0.89) for Antibiotics' users, which indicates that the scale is reliable (valid) and the results are trustworthy. From the 261 participants a wearisome the prevalence of general antibiotics use without a prescription is at 68.6 % which is comparable to a study done in with a prevalence rate of 64% (Muhammad, 2013). In Sierra Leone 68.9% (Afolabi et al., 2014). In Ghana 70% (Donkor et al., 2012). In contrast to our study, with a study that was done in sub-Saharan countries that aimed to investigate over the counter acquisition of antibiotics in sub-Saharan countries that found 69% of their pharmacies' costumers took antibiotics without prescription (Belachew et al., 2020).

This showed a high prevalence in males. This can be attributed to the fact that males are more private to health needs than females (Saleem et al., 2011).

The majority of the respondents in this study were aged between 25 and 34 years at 35.9%. This was comparable to a study done in India which had 39% of the respondents with the same age who practiced antibiotic use without a prescription (Mateti et al., 2011) This could be due to the easy access to information from the internet. which observed that the youth are

especially exposed to the media and the increased advertising of pharmaceuticals which poses a larger threat to the young population, The prevalence of antibiotics uses without prescription decreased with age probably because of knowledge and being responsible about individual healthcare (Geissler et al., 2000). Forty-four percent of the respondents were employed, which is consistent to a survey done in Indonesia with a proportional of 46% (Puspitasari et al., 2011). Those with college education were 55.6 %. In this study, the respondents who had not „gone to school" were 1.5 % which is comparable to a study, this relationship between antibiotics use without prescription and education could be attributed to ease of access to information from many sources including the internet (Waleed, 2004). The unemployed had a lower proportion of 11.1 % among those who practiced.

This is inconsistent with a survey done and had a finding of 7.4% being unemployed (Askarian et al., 2013).

Public Awareness Profile

Public awareness can be measured by adding DATA of multiple questions to gather a final value that summarizes awareness towards a certain point.

Do antibiotics treat all diseases?

by using the SPSS range value, and by adding the DATA of the first and second question (1-Does antibiotics treat bacteria? 2-Does antibiotics treat viruses?) we got a semantic of mostly and a mean of 2.4, hence it is safe to assume that most of antibiotics users believe that antibiotics treat all diseases.

Do you use the antibiotic(s) properly?

From the questions: (3-Do you think antibiotics help in recovering from cold and cough? 4-Do you think the antibiotic works better if it was more expensive? 14-Have you changed the type and/or dose of the antibiotic without consulting with an expert? 16-Have you read the leaflet that comes with the antibiotic? 17-Do you use the antibiotic for the entire regimen specified by your doctor/pharmacist) we can get an idea about public's beliefs on the correct uses of antibiotics, which came as mostly and mean of 2.7. Thus, indicating that the antibiotics sample mostly believe that they use antibiotics correctly. Which in turn indicates that there is a misconception problem in the general knowledge about antibiotics.

Do you rely the side effects upon buying antibiotics?

From questions: (5-Have you heard about Bacterial Resistance? 20-Do you know the dangers that come with antibiotic usage, and their effects on immunity?) we got the semantic no and a mean of 2.3. which indicates a low awareness level for antibiotics dangers on society.

What's your level of buying antibiotics? (non-triple scale)

Questions: (8-How many times have you had antibiotic(s) during the last year? 10-What are the reasons you use antibiotics? 18-When do you usually stop the antibiotic(s) regimen? 27- When do you usually stop your child's antibiotic(s) regimen?) indicates that the public tend to over use/buy antibiotics for mostly non-bacterial illnesses, which contributes massively towards bacterial resistance.

Conclusion

In this study regarding antibiotics dispensing without prescription, among the population in Yemen the following results to be the most significant: A high prevalence utilization of antibiotics without prescription reaching to 68.6% more than 5 times during one year. Economic factors affect using antibiotics without a prescription. Poor education about antibiotics uses play a major role in antibiotic misuse and appearance of resistance. Most users of antibiotics, without prescription were university education people. Most users of antibiotics without prescription between 15-39 Years. In some pharmacies in non- education

workers work in it and dispense antibiotics upon their diagnosis.

Recommendations

Yemen is a developing county where there is an increase in using antibiotics without prescriptions which will lead to bacterial resistance problems. During the study, we tried to seek light on the size of the problem in Yemen.

1. Recommend the ministry of Health to put a clear law about sailing antibiotics in order to prevent sailing antibiotics without prescription.
2. Recommend the ministry of health to monitor pharmacists to make sure that workers have the certificate in pharmacy.
3. 3-Recommend that patient diagnosis at any symptoms that do not take the advice of friends and family on the type of treatment and refer them to specialized doctor.
4. 4-Recommend patient to used prescription Antibiotics in order to decrease incidence of Bacteria resistance.
5. 5- Recommend that the patient complete that dose of antibiotics.
6. 6- Recommend that all doctors and pharmacist are not dispending antibiotics without diagnosis.
7. 7- Further the studies regarding using antibiotics without prescription in other cities.

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