# Irrational Self-Medication of Antibiotic in University of Kufa in Annajaf

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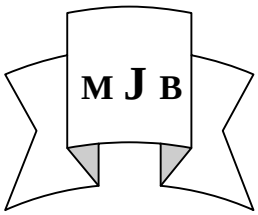


## Abstract

Background :Inappropriate antibiotic use refers to improper administration with respect to drug dose, interval duration (whether singly or collectively) in the light of proper clinical situations and/or financial considerations. The recognized effects of inappropriate use (whether overuse or underuse) of antibiotics are multiple: (1) rapid emergence of resistance, (2) selection pressure on resistant microorganisms, (3) adverse reactions, (4) treatment failures, (5) occurrence of preventable morbidity and mortality and (6) waste of resources.

One of the triggers for using self-medication may be past experience with antibiotics prescribed by health professionals. We examined the association between prescribed use and self-medication with antibiotics.

Aim:To estimate irrational self-medication with antibiotics by a population in Annajaf / IRAQ

Design of study: Interview -based questionnaire study.

Methods: In total, 1041 respondents were interviewed on their attitudes towards appropriateness of self-medication with antibiotics and situational use of antibiotics, beliefs about antibiotics for minor ailments, knowledge about the effectiveness of antibiotics on viruses and bacteria and awareness about antibiotic resistance.

Public knowledge, beliefs, and experiences of antibiotics, as well as predictors of accurate knowledge of antibiotic effectiveness, were measured using 28 questions with sub-items. The questionnaire was given to a Annajaf /Iraq community-based 1041 individuals. Of these, 1041 eligible responders were invited to participate; 835 responders (82%) completed the questionnaire.

Results: Of the 1041 respondents questioned, 853 (82%) well-informed antibiotic and 188(18%) mis-informed antibiotics. From well-informed only 558(65.4%) were self-medicated and 295(34.6%). The most frequently used agents were amoxycillin (50.2%), Cephalosporins (13.1%), Aminoglycosides (2.9%), Tetracycline's (0.9%), co-trimoxazole (0.8%), Macrolides (0.6%), and Quinolones (0.5%).

Conclusions: Our study shows consistent associations between prescribed use and self-medication

with antibiotics. Preventing leftovers may be one effective way of preventing self-medication. This can be achieved by ensuring that the amount dispensed corresponds to the amount prescribed, by educating patients and by making doctors aware that prescribing for minor ailments may increase the risk of self-medication for such ailments.

**الخلاصة**

أجريت هذه الدراسة لتقدير مدى الاستخدام الذاتي الغير منطقي بالمضادات الحيوية من قبل السكان في جامعة الكوفة في النجف في العراق.

تصميم الدراسة: مقابلة القائم على الدراسة للمستجيبين على الاستبيان.
الأساليب : في المجموع ، أجريت مقابلات مع 1041 من المستجيبين على الاستبيان لمعرفة مواقفهم تجاه ملائمة الاستخدام الذاتي بالمضادات الحيوية واستخدام المضادات الحيوية الآنية ، والمعتقدات عن المضادات الحيوية للأمراض البسيطة ومعرفتهم عن فعالية المضادات الحيوية ضد الفيروسات والبكتيريا ومدى معرفتهم بالبكتريا المقاومة للمضادات الحيوية وهل يكملون الوجبة المقررة من المضاد الحيوي حتى لو تحسنت صحتهم وهل يحتفظون بوجبة من المضاد في بيوتهم وهل سمعوا عن البكتريا المقاومة للمضاد الحيوي والى غير ذلك من الأسئلة التي توقفنا على حقيقة الاستخدام الذاتي وغير شرعي للمضادات الحيوية من عدمه.

النتائج: ومن 1041 ممن أجاب على الاستبيان وجدنا إن 853 (82 ٪) لديهم معرفة جيدة بالمضادات الحيوية و 188 (18 ٪) لا يعرفون المضادات الحيوية ومن أولئك المطلعين على المضاد الحيوي فقط 558 (65.4 ٪) الذين يستخدمون المضاد الحيوي بشكل بتقدير شخصي دون الرجوع إلى الطبيب و 295 (34.6 ٪) الذي لا يستخدمون المضاد الحيوي إلا بمشورة الطبيب . وكان أكثرا لمضادات الحيوية استخداما هو الاموكسيسيلين (50,2%) ، السيفالوسبورينات (13.1 ٪) ، الأمينوغليكوزيدات (2.9 ٪) ، التتراسكلين و(0.9 ٪) ، و الكوترايموكسازول (0,8%) ، الماكروليدات (0.6 ٪) ، والكوينولونات (0.5 ٪) .
الاستنتاجات: دراستنا تبين إن هناك علاقة ذات تأثير إحصائي بين الاستخدام الذاتي للمضاد الحيوي والاستخدام المقرر من قبل الطبيب.وينبغي البدء في البرامج التعليمية لعامة الناس والأطباء وينبغي إرشاد المرضى على عدم استخدام الأدوية فضلا عن المضادات الحيوية و ينبغي أن يتركز الاهتمام على عدم بيع المضادات الحيوية بدون وصفة طبية ، لأن ذلك قد يشكل خطرا على صحة السكان نظرا لتطور مقاومة البكتيريا. ويجب فرض العقوبات على الصيادلة الذين يخالفون هذه القوانين.

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## Introduction

Since the discovery of antibiotics many substances have become available for the treatment of infections. Unfortunately, following several decades of optimism, the inappropriate use of these drugs has resulted in the current alarming situation of ever-growing bacterial resistance, accompanied by unwanted side effects and high costs [16]. The antibiotic resistance aggravated by inappropriate use of antibiotics which represented the self-medication with antibiotics which may lead also to a wrong choice of antibiotics, use of insufficient dosages or unnecessary therapy [1]. Antibiotic resistance has become a global public health problem. Since the discovery of antibiotics in the 1940s, their widespread use has promoted bacterial resistance. As a result, patients with antibiotic resistant infections are likely to experience longer and more costly hospital stays, requiring treatment with more powerful antibiotics that may cause additional and more severe side effects [2].

Several studies have identified and examined specific causes of the misuse of antibiotics, including unnecessary prescribing [8–14] and patient demand [15–17]. Factors contributing to inappropriate prescribing practices have been elucidated. In particular, numerous studies of adults have shown that patients' expectations or physicians' perceptions of those expectations affect the physicians' prescribing behavior [10,13,16].

The purpose of this study was to determine the extent of self-medication with antibiotics and its relation to other

demographic characteristics of the Iraqi population.

## Methods

The present study employed a community-based questionnaire survey in University of Kufa /Annajaf /Iraq that was conducted on interview basis excluding medical colleges. Information regarding antimicrobials used, indications and prescribers were obtained through a semi-structured interview

The questionnaire was distributed to a total of 1041 respondents. The respondents completed a self-administered questionnaire but the interviewer was present in case the respondent might need assistance.

Questionnaire consisted of both closed- and open-ended questions. In addition to questions on demographic information. The questions included attitudes towards antibiotic use and self-medication with antibiotics, beliefs about antibiotics for minor ailments, knowledge about the effectiveness of

antibiotics on bacteria and viruses and awareness of any health dangers associated with taking antibiotics, names of antibiotics used, sources of information on antibiotics and reasons for self prescribing of antibiotics. The questionnaire was pre-tested for content and design on 10 individuals and the percent of success was 91 between test and pretest.

## Results

### Demographic data

The sample consisted of 1041 respondents approximately 0.001% of the Annajaf population: there were 435(41.8%) females and 606(58.2%) males (table 1). The results indicated that the age of all respondents are classified into 3 groups, the age frequencies and percent in each group are: first group age <30y 332 (31.9%), the second group age30-50y 364(35.0%),the last group age >50y 345(33.1%) (table 1). The level of education of all respondents also classified into three classes; only 31(3.3%) whom had primary and intermediate (low education) and 870(83.6%) those had secondary and bachelor degree ( intermediate education) but the respondents were have MSc and PhD (high education) are 137(13.1%) (table 1)

**Table 1** Demographic characteristics of respondents

| Sex | N=1041 | % |
|---|---|---|
| Male | 606 | 58.2 |
| Female | 435 | 41.8 |
| Age (y) | N=1041 | % |
| <30 | 332 | 31.9 |
| 30-50 | 364 | 35.0 |
| >50 | 345 | 33.1 |
| Education | N=1041 | % |
| Primary school | 9 | 0.9 |
| Intermediate school | 25 | 2.4 |
| Secondary school | 469 | 45.1 |
| Bachelor's Degree | 401 | 38.5 |
| MSc | 71 | 6.8 |
| PhD | 66 | 6.3 |

Knowledge, beliefs, behaviors, and experiences

Of the 1041 respondents, 853(82%) are well-informed antibiotics, and 188(18%) of them are mis-informed antibiotics, thus were excluded from the analysis. From the informed antibiotics, 558(65.4%) of them were self-medicating with antibiotics and 295(34.6%) were found for the perceived need to consult a doctor with these symptoms see the below diagram in Fig (1).

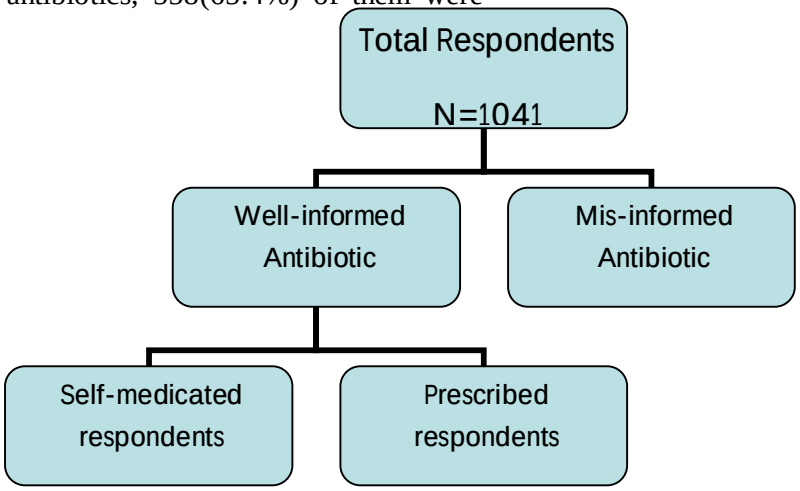


**Figure 1** show the classification of respondents in the sample

The symptoms/diseases that led to self-medication are demonstrated in table (2) which show the common cold has high percent 374(66.9%) and to a lesser extent is sore throat 73(13.1), cough 39(7%), toothache 30(5.4%) and others( like urinary tract infection and tonsillitis) 43(7.7%) respectively.

**Table 2** Symptoms or diseases leading to self medication

| Symptom | Frequency (number) | Percentage [%] |
|---|---|---|
| Common cold | 374 | 66.9 |
| Sore throat | 73 | 13.1 |
| Cough | 39 | 7 |
| Toothache | 30 | 5.4 |
| Others(mainly UTI) | 43 | 7.7 |

In the study there are many antibiotics irrationally used are penicillins mostly amoxicillin then ampicillin Table (3) display the antibiotics that were most frequently used for self-medication. Penicillins was ranked the highest 598(67.8%), and in this group, amoxicillin was most frequently misused (50.2%) among all the antibiotics. The Cephalosporins comes in the second stage 116(13.1%), Aminoglycosides 26 (2.9%), Tetracycline's 8(0.9%), co-trimoxazole 7 (0.8%), Macrolides 5(0.6%), and Quinolones 4(0.5%).

**Table 3** The rate of self-medication with specific antibiotics

| Antibiotic | Frequency (number) | Percentage [%] |
|---|---|---|
| 1-Penicillins | 598 | 67.8 |
| 2-Cephalosporines | 116 | 13.1 |
| 3-Aminoglycosides | 26 | 2.9 |
| 4-Tetracycline's | 8 | 0.9 |
| 5- Co-trimoxazole | 7 | 0.8 |
| 6-Macrolides | 5 | 0.6 |
| 7-Quinolones | 4 | 0.5 |

Self-medicated users frequently used high potency of antibiotic. Fig(2) shows high percent of them 378(67.6%) vs ordinary potency 181(32.4%)

Potency

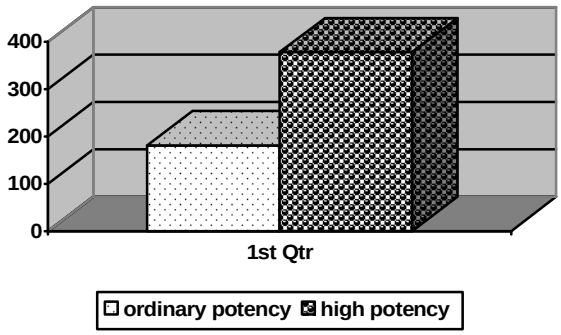


**Figure 2** show the difference in the potency of antibiotics

The sources of information the participants needed for self-medication with antibiotics were investigated. The survey results indicated that the participants relied mainly on pharmacist advice 217(38.8%). To a lesser extent, they made use of the information from previous experts 164(29.3%), physician consultation 97(17.4), advice from relatives or friends 39(7%), leaflets 33(5.9%), and, others 9(1.9%) as shown in Fig(3).

Sources of information

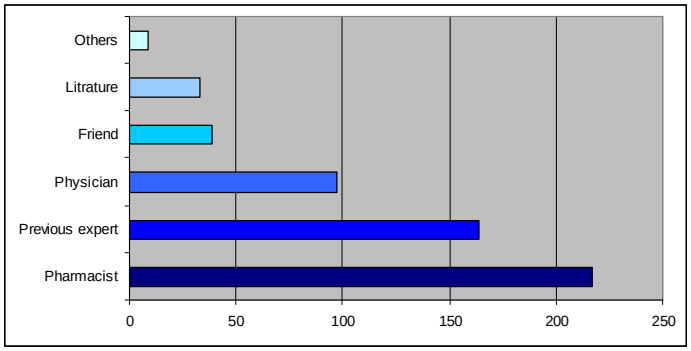


**Figure 3** show the difference between the sources of information

Of 558 self-medicated respondents highly differ in their way to use antibiotics, most of them 250(44.8%) take antibiotics 3times daily. Secondly 140(25.1%) of 558 respondents who take antibiotics twice daily, 85(15.1%) who take antibiotics 4 times daily and 83(14.9%) they take antibiotics one time daily as shown in fig (4).

Frequency of doses

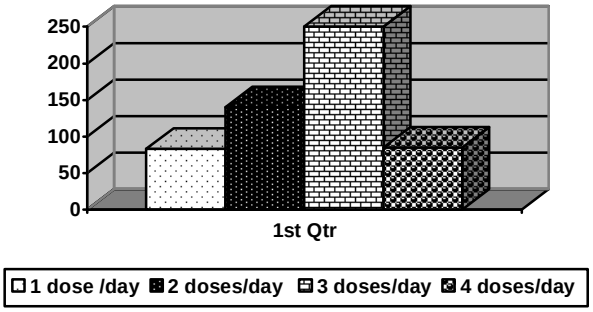


**Figure 4** show the difference between frequency of doses per day

It was stronger also for respondents whom informed antibiotic users with low education i.e the self-medication rate increase when the level of education decreases ($P < 0.05$).

The study was recorded different types of improper use of antibiotics which classified mainly into two groups: the first one underlay overuse that included self-medication 558(65.4%), high dose 378(67.6%), unnecessary therapy 512 (82.4%), Parenteral antibiotics 245(28.7%), Combination antibiotics 651(81.2%), Prophylaxis antibiotics 646(75.7%), and treatment of non-bacterial diseases 569(66.7%), while the second group consist of many states like: Incomplete course of antibiotics 522(61.2%), inadequate frequency of antibiotics 223(40%), and stored leftover antibiotics at home 484(56.7%), as in table (4).

**Table 4** there are many forms of irrational use of antibiotic have been recorded in the study, we are summarized in

| Improper use of Antibiotics | | | | | |
|---|---|---|---|---|---|
| Over-use | | | Under-use | | |
| Condition | N | % | Condition | N | % |
| Self-medication A.B | 558 | 65.4 | Incomplete course of A.B | 522 | 61.2 |
| High dose of A.B | 378 | 67.6 | Inadequate frequency (how often)A.B | 223 | 40 |
| Unnecessary therapy of A.B | 512 | 82.4 | Stored leftover A.B at home | 484 | 56.7 |
| Parenteral A.B | 245 | 28.7 | | | |
| Combination A.B | 651 | 81.2 | | | |
| Prophylaxis A.B | 646 | 75.7 | | | |
| Treatment of non-bacterial diseases | 569 | 66.7 | | | |

The high percentage was found regarding the attitudes towards appropriateness of self-medication with antibiotics 558(65.4%). More inadequate knowledge was reported about the effectiveness of antibiotics on viruses 569(66.7%) of the respondents answered incorrectly. The respondents who don't believe that irrational use produce fungal infection 200(23.4%). The informed antibiotic users who had incorrect knowledge about allergy 485(56.9%). only 284(33.3%) of respondents correctly reported that antibiotics are used for bacterial infections (but not for viral infections). Nearly half 432(49.6%) of adults reported that they do not take their antibiotics until they are gone as prescribed, as prescribed. Overall, non-awareness of antibiotic resistance was high 345(40.4%) approximately lower than half of the respondents. Non-awareness of adverse effects of antibiotics was 269(31.5%) inadequate knowledge of respondents about antibiotics by them had no effect on immune system table (5).

**Table 5** Percentage of respondents who had inappropriate attitudes, beliefs and knowledge concerning antibiotic use.

| Condition | N=853 | % |
|---|---|---|
| Awareness about antibiotic resistance | 508 | 59.6 |
| Attitudes towards fungal infection caused by irrational use of antibiotics | 653 | 76.6 |
| Knowledge about the allergy produced by antibiotics | 368 | 43.1 |
| Beliefs about antibiotics for minor ailments | 693 | 81.2 |
| Attitudes towards situational use of antibiotics | 430 | 50.4 |
| Knowledge about the effectiveness of antibiotics on viruses | 569 | 66.7 |
| Awareness about adverse effect | 584 | 68.5 |
| Beliefs about antibiotic undermine immunity | 595 | 69.8 |

## Discussion

To our knowledge, this is the first study exploring the relationship between prescribed antibiotic use and self-medication with antibiotics.

Our results indicate that, while the inappropriate attitudes and knowledge at Annajaf /Iraq community, lack of awareness of antibiotic resistance and adverse effects is a problem in all the participating our survey. This is an indication that most people still do not realize enough that excessive use of antibiotics is associated with serious risks affecting individuals as well as the ecosystem as a whole [18].

These data reveal important misconceptions that members of the general public have about the antibiotic 18% misinformed users which may be due incorrect health knowledge, therefore we excluded them in survey[3].

Self-medication with antibiotics may increase the risk of inappropriate use and the selection of resistant bacteria

[1,10]. The association between prescribed use and self-medication in general implies that antibiotics prescribed for one symptom/disease may be used both as self-medication for (repeated) episodes of the same symptom/disease and for another symptom/disease [1]. One could hypothesize that respondents with low education are less aware about the consequences of repeating prescriptions of the doctors for the same symptom/disease or for another symptom/disease [1].

The main cause of inverse proportion between self-medication and level of education was poor health information in primary education [1].

The main antibiotics used for self-medication were penicillins in general, particularly Amoxicillin which was taken without prescription by 50.2% of the respondents. This finding was consistent with the results of other studies in other countries [3,5,6,8], but may be due to the rather low costs of this antibiotic. The tendency to self-medication with a given antibiotic correlated with increased resistance to that particular agent, as shown in the study by Jodi et al.[6].

Our study found that patients, too, contribute to inappropriate antibiotic use. About 67.6 25% of respondents take antibiotic in high potency due to their belief that high potency accelerate killing of microorganisms[8], 86.6% of respondents stored antibiotics at home, 56.7% of respondents were considered leftover antibiotics, 61.2% of respondents were stop taking antibiotics when be well, many surveys over the world support our results [7,9,11,12].

URTIs are usually not an appropriate indication for the use of antibiotics, so in these cases antibiotics should not be used either prescribed or as self-medication. The use of leftover antibiotics for a variety of

indications without professional advice is just as inappropriate. In both cases action should be undertaken to prevent the use of leftovers [11,17].

Our findings indicate that preventing leftovers from prescribed courses may be one effective way of preventing self-medication with antibiotics. In addition, doctors should be aware that prescribing for minor ailments may also increase the risk of self-medication for such ailments.

We should note that the inappropriate use of antibiotics to treat colds and flus is only one of several factors which are believed to have caused the evolution of new strains of bacterial resistance to antibiotics. Other possible causes include non-compliance by patients who fail to complete their antibiotic treatments and the widespread use of antibiotics to increase the growth of cattle, sheeps and chickens.

Continuous efforts are needed to reduce these misconceptions. Strategies to improve the situation however, will have to be country-specific in view of the different problems identified in this study. Such attitude shifts have occurred before for example in public's beliefs about tobacco use and saturated fat consumption [18]. This will require concerted action of the medical world in collaboration with

patient organizations and policy makers with a long-term view.

## Conclusion

The most important step in enhancing public knowledge on antibiotics is to restrict unnecessary prescriptions of them, thereby establishing evidence-

based expectations about antibiotic treatment. More effective education about appropriate antibiotic use, focusing on the treatment of cough and acute bronchitis, could help in this regard.

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**References**

1- Larissa Grigoryan, Johannes G. M. Burgerhof, Flora M. Haaijer-Ruskamp, John E. Degener, Reginald Deschepper, Dominique L. Monnet, Antonella Di Matteo, Elizabeth A. Scicluna, Ana-Claudia Bara, Cecilia Stalsby Lundborg And Joan Birkin On Behalf Of The Sar Group 2006 (Is Self-Medication With Antibiotics In Europe Driven By Prescribed Use? ) Journal Of Antimicrobial Chemotherapy Advance Access Published November 22.

2- L. A. County Board Of Supervisors: Gloria Molina, First District,Yvonne Brathwaite Burke, Second District;Zev Yaroslavsky, Third District;Don Knabe, Fourth District;Michael D. Antonovich, Fifth District 2003(Antibiotic Misuse) Http://Publichealth.Lacounty.Gov/Acd /Docs/Lahealth092003_Antib.Pdf

3- Humphrey Taylor Chairman Of The Harris Poll;Robert Leitman Group President, Health Care,

Education & Public Policy 2002 (The Use And Abuse Of Antibiotics Surprise! Most People Are

Reasonably Well Informed ) Harris Interactive Inc.Volume 2, Issue 2.

4- Abdelmoneim Awad, Idris Eltayeb,,Lloyd Matowe Lukman Thalib 2005 (Self-Medication With Antibiotics And Antimalarials In The Community Of Khartoum State, Sudan) J Pharm Pharmaceut Sci (Www.Cspscanada.Org) 8(2):326-331.

5- Sayer I. Al-Azzam, Belal A. Al-Husein, Firas Alzoubi, Majed M. Masadehand "Mohammad Ali" S. Al-Horani 2007 (Self-Medication With Antibiotics In Jordanian Population) International Journal Of Occupational Medicine And Environmental Health;20(4):373 – 380

6- Jodi Vanden Eng, Ruthanne Marcus, James L. Hadler, Beth Imhoff, Duc J. Vugia, Paul R. Cieslak, Elizabeth Zell, Valerie Deneen, Katherine Gibbs Mccombs, Shelley M. Zansky, Marguerite A. Hawkins, And Richard E. Besser 2003 ( Consumer Attitudes And Use Of Antibiotics) Emerging Infectious Diseases • Vol. 9, No. 9, September.

7- Eddie Hedrick, Ms, Mt (Ascp), Cic(Misuse Of Antibiotics: Correct Use Of Antibiotics) Http://Www.Vhct.Org/Case899/Correct_Use_Of_Antibiotics.Htm

8- Manhattan's Dr. Jerome Weiss(Medicine: Misuse Of Antibiotics) Http://Www.Time.Com/Time/Magazine/Article/0,9171,866656,00.Html

9- Misuse Of Antibiotics; Http://Library.Thinkquest.Org/25462/ Misuse.Html

10- Antibiotic Use And Misuse; Http://Www.Fawco.Org/Index.Php?Option=Com_Content&Task=View&Id=301&Itemid=605

11- Marlies A. Van Houten And Jan L.L. Kimpen 2000 (Antimicrobial Practice And Malpractice In

Paediatrics ) Reviews In Medical Microbiology: 11(4); 189-195

12- Theodore Mbata(Misuse Of Antibiotics) Http://Tilz.Tearfund.Org/Publications/ Footsteps+71-80/Footsteps+74/Misuse+Of+Antibiotics.Htm

13-A. W. Sturma*, R. Van Der Polb, A. J. Smitsb, F. M. Van Hellemondtb, S. W. Moutonb, B. Jamila,

A. M. Minaia And G. H. M. A. Sampersc1997 (Over-The-Counter Availability Of Antimicrobial Agents, Self-Medication And Patterns Of Resistance In Karachi, Pakistan) Journal Of Antimicrobial Chemotherapy 39, 543–547

14- Jean Claude Pechere 2001 (Patients' Interviews And Misuse Of Antibiotics ) Clinical Infectious Diseases; 33(Suppl 3):S170–3

15- Joshua P.Mettay, Judy A.Shea,Linda B.Crossette,David A.Asch 2002 (Tension In Antibiotic Prescribing)Jgim;17:87-94.

16- A.V. Bugnon-Rebera, A. de Torrentéa, N. Troillet b, D. Gennéa, for the ETUDAS group 2004 (Antibiotic misuse in medium-sized Swiss hospitals ) SWISS MED WKLY;134:481–485

17-Dalton Espíndola Volpato, Bárbara Vicente de Souza, Luana Gabriela Dalla Rosa, Luíz Henrique Melo, Carlos Antonio Stabel Daudt and Luciane Deboni 2005 (Use of Antibiotics Without Medical Prescription ) The Brazilian Journal of Infectious Diseases;9(3):288-291

18- Avorn J. and Solomon DH. 2000 (Cultural and economic factors that mis-shape antibiotic use: the nonpharmacologic basis of therapeutics). Ann Intern Med.;133(2):128-135.