SELF-MEDICATION WITH ANTIBIOTICS IN JORDANIAN POPULATION

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Abstract
Objectives: A survey was conducted to estimate the prevalence of self-medication with antibiotics in Jordan and evaluate the factors associated with antibiotic misuse. Methods: Validated questionnaire was used to collect data from a sample of 1943 households (9281 persons) selected from among different cities in Jordan. Results: 842 (39.5%) of 2133 antibiotic users identified via the survey had used antibiotics without a prescription within a one-month study period. Self-medication with antibiotics was found to be significantly associated with age, income, and level of education. The main reason for self-medication as reported by the participants was their previous experience on the efficacy of treatment. The main sources of antibiotics were the previously prescribed pharmaceuticals stored in the household and those purchased in pharmacies. Conclusion: The prevalence of self-medication with antibiotics in Jordan is alarmingly high. Given the growing global resistance to antibiotics and the documented health problems related to their inappropriate use, our findings may have major public health policy implications in Jordan.

Key words:
Self-medication, Antibiotics, Jordan, Abuse, Mediterranean, Prescription

INTRODUCTION

Self-medication with antibiotics is defined as the acquisition of antibiotics and self-administering them [or administering them to the children] with the aim of treating a perceived infection [1]. This practice is a worldwide problem, not only in the developing countries (Sudan [1], Trinidad and Tobago [2], Pakistan [3], Brazil [4,5]) but also in the developed countries (Spain [6], Greece [7,8], Russia [9], USA [10], Israel [11], and Malta [12]). Furthermore, some European countries, namely Romania and Lithuania, were found to have high rates of self-medication [13]. The presence of antibiotics as a prescription-only medicine does not exclude a possibility that they can be used for self-medication. For this purpose, antibiotics can be obtained as the leftovers of the pharmaceuticals from an incomplete course of treatment, or can be supplied by friends or relatives. Some patients insist that the physician should write a prescription for antibiotics for them. For example, the pediatricians [14], in response to the pressure from parents believing in the efficacy of antibiotic treatment, sometimes agree to write a prescription for their children. In some countries, antibiotics can be purchased through the internet, a new source for indiscriminate drug use [11].

Many reports outlined the direct relation between the abuse of antibiotics and increased bacterial resistance...
The misuse of antibiotics is another reason for the development of bacterial resistance [18]; an example being an incomplete course of the therapy, which reflects the low level of the patient’s knowledge about antimicrobials.

Even though self-medication is perceived as a health-related hazard, people without health insurance may try to avoid paying for the General Practitioner’s service and other laboratory tests by going directly to a pharmacy.

In Jordan, this practice is very common [23] despite the fact that according to the Jordanian Drug and Pharmacy Law, it is a criminal offence to dispense antimicrobial drugs of any formulation without a prescription, and the violation of this law is subject to a financial penalty. It has been postulated that the competition between the pharmacies may account for such practices, despite the existing legislation against them [12,20]. A review of available literature did not reveal a study conducted in a similar setting as in the present study.

The purpose of this study was to determine the extent of self-medication with antibiotics and its relation to other demographic characteristics of the Jordanian population.

METHODS

The present study employed a community-based nationwide questionnaire survey in Jordan that was conducted on a house-to-house basis. It was conducted over a one-month period between January and March, 2006.

Questionnaire survey

The survey concerned a large number of households from all over Jordan. For reasons related to the resources, a proper strict sampling methodology was not applied. Basically, the sample consisted of a convenient sample of households that agreed to participate in the survey. The selected families were contacted personally and briefed about the purpose of the study. On this preliminary visit, oral consent to participate was obtained. The survey was conducted by specially trained undergraduate, fifth-year, pharmacy students. The respondents completed a self-administered questionnaire but the interviewer was present in case the respondent might need assistance. The questionnaire was distributed to a total of 2034 families and eventually 1943 families, comprising a total of 9281 persons, participated in the survey (95.5% response rate). Respondents were inquired about the use of antibiotics within the preceding month. The respondents who reported no use of antibiotics over the study period did not complete the questionnaire beyond the eighth question but were asked to estimate the general rate of antibiotic use. Also the patients using prescribed antibiotics were included in the estimation of the rate of self-medication with antibiotics in the population of total antibiotics users.

Some participants (45 individuals) were excluded from analysis as they were using medications other than antibiotics (analgesics, decongestants, antihistamines, etc.) and mistakenly thought they were taking antibiotics. As the participants were asked to provide the name of the medication(s) used during the study period, these pharmaceuticals were classified by the researchers as antibiotics or non-antibiotics and the latter were disregarded.

The odds ratio and P value were calculated by setting the reference value and comparing it with other values. P < 0.05 was considered statistically significant.

Questionnaire and validation

A 14-item questionnaire was developed by a team of clinical pharmacists, family physicians, and socialists: 7 questions concerned the demographic data and the other 7 dealt with the patterns of self-medication with antibiotics (e.g. type of antibiotics used, condition for which antibiotic was used, source of information the patient depended on, source of antibiotic supply). Preliminary validation of the questionnaire was conducted with thirty individuals and they confirmed the clarity of the questionnaire and that the completion time would not exceed 15 minutes.

RESULTS

Of the 9281 participants, 2133 (23%) were using antibiotics over the study period: 842 (39.5%) of them were self-medicating with antibiotics and 1291 had antibiotics prescribed for treatment. The analysis of questionnaire data showed that the main source of antibiotic supply were the
previously prescribed antibiotics stored in the household (392) or purchased at retail pharmacies (370). Supplies by friends and relatives accounted for about 68 cases, as shown in Figure 1.

The sources of information the participants needed for self-medication with antibiotics, such as drug selection and/or treatment regimen, were investigated. The survey results indicated that the participants relied mainly on their previous experience with the medication, and on pharmacist advice. To a lesser extent, they made use of the information available in leaflets, advice from relatives or friends, and physician consultation, as shown in Figure 2.

It should be stressed that the physicians were not prescribers in this case, they would rather guide the patients (who decided to self-medicate with antibiotics) on the proper dose and duration of treatment.

The majority of self-medicated participants (47.4%) used antibiotics for 4–7 days, while 39.5% used them for less than four days and only 13.1% continued treatment for

![Fig. 1. Sources of supply for self-medication with antibiotics.](image1)

![Fig. 2. Information sources for self-medicating with antibiotics.](image2)

| Table 1: Relationship between the demographic factors and the rate of self-medication |
|---------------------------------|------------|-----------|-----------|-----------|-----------|
| Age category                    | Self-medicating [n] | Total [n] | % Self-medicating | Odds Ratio | 95% CI | P value  |
| 0–17 years (Ref.)               | 246        | 740       | 33.24       |           |       |         |
| 18–39 years                     | 394        | 891       | 44.22       | 1.59      | 1.3–1.95 | < 0.05*  |
| 40–59 years                     | 176        | 434       | 40.55       | 1.37      | 1.07–1.75 | 0.012*   |
| > 60 years                      | 26         | 68        | 38.24       | 1.24      | 0.74–2.08 | 0.405    |
| Education                       |             |           |             |           |       |         |
| Illiterate (Ref.)               | 86         | 315       | 27.30       |           |       |         |
| Primary school                  | 143        | 396       | 36.11       | 1.51      | 1.09–2.08 | 0.013*   |
| Secondary school                | 313        | 709       | 44.15       | 2.1       | 1.58–2.81 | < 0.05*  |
| University graduates            | 300        | 713       | 42.08       | 1.93      | 1.45–2.58 | < 0.05*  |
| Gender                          |             |           |             |           |       |         |
| Male (Ref.)                     | 409        | 1040      | 409         |           |       |         |
| Female                          | 433        | 1093      | 433         | 1.01      | 0.85–1.2 | 0.892    |
| Monthly income (JOD)            |             |           |             |           |       |         |
| 0–250 (Ref.)                    | 204        | 606       | 33.66       |           |       |         |
| 250–500                          | 309        | 721       | 42.86       | 1.48      | 1.18–1.85 | 0.001*   |
| > 500                            | 329        | 806       | 40.82       | 1.36      | 1.09–1.69 | 0.006*   |

*Ref. — reference value.
*JOD — Jordanian Dinars [1 JOD = 0.71 US $].
tended to self-medicate with antibiotics to a lesser extent than did the other participants. The above refers also to the participants with low income.

Table 2 displays the antibiotics that were most frequently used for self-medication. Penicillins were ranked highest (70.7%), and in this group, amoxicillin was most frequently misused (53.56%) among all the antibiotics. Figure 3 presents the conditions for which antibiotics were taken, both in the group of self-medicating and non-self-medicating subjects. The three most common conditions were sore throat, flu, and runny nose.

When using antibiotics without prescription, most of the participants (661) based on their previous experience with those antibiotics. A total of 52 participants had difficulties seeking physician care, 29 participants reported poor economic status, and the other 100 participants indicated other reasons for self-medicating with antibiotics.

DISCUSSION
Antibiotics were used by 23.0% of the study population, and the rate of self-medication was about 39.5%. This rate is almost similar to the findings of a European study conducted in Finland [16], but surprisingly less than that reported in the project conducted in Sudan [1], taking into account that the Sudanese project concerned self-medication with antimicrobials in general. Interestingly, high rates of self-medication were also reported in some European countries (19.8% in Romania, 15.2% in Spain, and 21.0% in Lithuania), with low response rates observed in all European countries [13].

Previous experience with a given antibiotic was the main source of information the participant based on when deciding to use that medication again. Ranked second was the pharmacist consultation. Relying on previous experience might not be a logical behavior in the case the drug was used for a different type and/or severity of infection, especially with regard to the dose and duration of treatment. Mild actinomycosis, for example, is treated with 2–4 g/day of penicillin V in 4 divided doses for 8 weeks, while

Table 2. The rate of self-medication with specific antibiotics

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Frequency (number)</th>
<th>Percentage [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillins</td>
<td>595</td>
<td>70.7</td>
</tr>
<tr>
<td>Cephalosporins</td>
<td>107</td>
<td>12.7</td>
</tr>
<tr>
<td>Macrolides</td>
<td>63</td>
<td>7.5</td>
</tr>
<tr>
<td>Quinolones</td>
<td>30</td>
<td>3.6</td>
</tr>
<tr>
<td>Tetracyclines</td>
<td>10</td>
<td>1.2</td>
</tr>
<tr>
<td>Sulfonamides</td>
<td>9</td>
<td>1.1</td>
</tr>
<tr>
<td>Others</td>
<td>28</td>
<td>3.3</td>
</tr>
<tr>
<td>Total</td>
<td>842</td>
<td></td>
</tr>
</tbody>
</table>

more than seven days. As for the participants who reported no self-medication, the majority (52.6%) had been taking antibiotics for 4–7 days, 19.7% for up to three days, and 27.7% for more than a week.

Table 1 shows the rate of self-medication with antibiotics, taking into account the demographic characteristics of the participants, as well the odds ratio and 95% confidence intervals. The survey results showed that the rate of self-medication was significantly affected by age (P < 0.001), income (P = 0.037), and educational level (P < 0.001), but not by gender (P = 0.528). The risk for self-medication with antibiotics was higher in the age groups of 18–39 years (OR: 1.59; 95% CI: 1.3–1.95; P < 0.05) and 40–59 years (OR: 1.37; 95% CI: 1.07–1.75; P = 0.012). Illiterate people...
for streptococcal pharyngitis, it is used as 1.5–2 g in 3–4 divided doses for 10 days [21]. Obviously, for a successful treatment, the patient’s condition should be evaluated on an individual basis, especially if he is going to pass on his experience in drug use to another individual.

Most of the participants used antibiotics for about 4–7 days (n = 399), which is the average for most antibiotics, but a considerable number used them for three days or less (n = 333). Using antibiotics for a short period of time, usually till the symptoms subside, exposes the infecting or even commensal bacteria to the sub-therapeutic levels of antibiotics, which leads to bacterial resistance to the drug [18,19]. A small number of patients (n = 110) followed the course of antibiotic treatment for more than 7 days. Strangely, about 19.7% of the participants who had antibiotics prescribed reported taking them for three days or less. This percentage is higher than that of the participants who self-medicated with antibiotics (13.3%). Apparently, this must have been due to the poor education of the prescribing physician and/or dispensing pharmacist, as the patient should be counseled about the treatment regimen.

The risk factors for self-medication in this study were the age, income, and educational level. The socio-economic and educational variables are the main contributors to the self-medication practice in many countries around the world; with lower income and higher educational levels being associated with the tendency to self-medication [1,2,6,10,22]. In Jordan, the situation was different: self-medication was associated with higher levels of income and education. The main antibiotics used for self-medication were penicillins in general, particularly Amoxicillin which was taken without prescription by 53.6% of the participants. This finding was consistent with the results of other studies worldwide [1,3,11,23], 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 Sturm et al. [3].

As regards the conditions for which antibiotics were self-medicated, pharyngitis (commonly known as sore throat) was most prevalent, followed by flu (common cold) and rhinorrhoea (runny nose), a finding similar to other studies [11]. The above conditions are known to be mostly viral [24], requiring no antibiotic treatment. Some studies show that even the physicians could be wrong and prescribe antibiotics for such conditions, while considering minor diagnostic criteria [25,26]. They would thus contribute in a way to antibiotic abuse. In the present study, even the prescribed medications were abused, which points to the need for revising the educational programs for general practitioners.

CONCLUSION

This study revealed a considerable rate of self-medication in the Jordanian community, which should drive the attention of the authorities to this problem. Educational programs for the general public should be initiated and the physicians should instruct their patients not to use the prescribed medications for upcoming conditions, but for the current ones. Also, attention should be focused on the practice of selling antibiotics without prescription, as this might pose a hazard to the population health due to the development of bacterial resistance. Penalties should be imposed on the pharmacists who violate such laws.

TRANSPARENCY DECLARATION

None to declare.

REFERENCES


Annex 1

Questionnaire Investigating the Use of Antibiotics in the Jordanian Community

Enrolment criteria:
Oral consent from participants
Each family interviewed not more than once
Every question has only one answer

Number of family members: ………………

DEMOGRAPHIC DATA
Age: ………………..

Educational level:
1. None  2. Primary education  3. Secondary education
4. Diploma  5. University student  6. BSc
7. MSc  8. PhD

Gender:
1. Male  2. Female

Monthly income [Jordanian dinars/month]:
1. < 100
2. 100–250
3. 250–500
4. > 500

Profession:
1. Related to medical professions
2. Not-related to medical professions

Medical insurance
1. Yes  2. No
SELECTED QUESTIONNAIRE ITEMS

Did you take any antibiotics last month?
1. Yes  2. No

If yes, answer the following questions:

Why did you take the antibiotics?
1. Diarrhea  2. Runny nose  3. Flu
10. Ear infection  11. Other causes

Did a physician prescribe this medication for you?
1. Yes  2. No

If no, why did you take antibiotics without a prescription?
1. Poor economic status
2. No access to physician care
3. Previous experience
4. Others

What was the source of antibiotic supply?
1. Pharmacy  2. Relatives and friends
3. Household  4. Others

What was the name of this antibiotic?
…………………………………………

Information on the use of this antibiotic was obtained from:
1. Physician
2. Pharmacist
3. Relative or friend
4. Leaflet
5. Previous experience
6. Others

The duration of antibiotic intake was:
1. 1–3 days
2. 4–7 days
3. >7 days