Risk Factors of Antibiotics Self-medication Practices among University Students in Cairo, Egypt

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Abstract

BACKGROUND: Self-medication is a practice with major global implications, especially with antibiotics intake. Self-medication among future health-care professionals could affect their way in prescribing medication in the future.

AIM: This study was conducted to estimate the magnitude and the determinants of antibiotics self-medication practices and to describe the pattern of antibiotics abuse among undergraduate university students.

METHODS: A cross-section study was conducted among 563 medical students from public and private universities in Cairo, Egypt, using a questionnaire.

RESULTS: About 77.7% of the students used antibiotics without prescriptions with no statistical differences by age, sex, residence, or type of universities. More than half of the students (51.7%) do not know the effect of antibiotics abuse on microbial resistance. Most self-treated antibiotics were used to manage gastroenteritis symptoms (70%), respiratory symptoms (63%), and dental infections (36%), other causes such as headache or prophylactic reasons (21%). About 91.7% of the self-medicated students reported access to antibiotics from the pharmacy without a prescription and 71% of them mentioned discontinuation of a course of antibiotics at least once during the last year. About 81% of the students who do not know the effect of antibiotic abuse are self-medicated versus 75% of their counterpart who know and this difference is statistically significant. The multivariate analysis identified the residence as an independent predictor of their knowledge (area of residence = 1.6, 95% confidence interval [1.1–2.3]).

CONCLUSION: The prevalence of self-medication with antibiotics among university students in Cairo is high. Our findings highlight the urgent need for tailored interventions to control this practice.

Introduction

Self-medication is the use of drugs to treat self-diagnosed disorders or symptoms, or the intermittent or continued use of a prescribed drug for chronic or recurrent diseases or symptoms [1]. This includes acquiring medicines without a prescription, sharing medicines or using leftover medicines stored at home [2]. Self-medication causes many problems: Incorrect self-diagnosis, inadequate treatment of diseases, and waste of public expenditure [3]. Self-medication is a practice with serious global implications especially with antibiotics intake [4]. About 57% of the 3.5 billion health problems treated annually in the US were treated with a nonprescription drug. Up to 60–80% of the health problems in developing countries are self-medicated [3].

In a study of the knowledge, attitude, and practice of the university students toward self-medication in Egypt, the prevalence of self-medication was 55%. Of which 87.2%, 58.8%, and 54.4% took analgesics, antibiotics, and vitamins without physician prescription [4]. Purchase of antibiotics without prescription for self-medication is a significant public health problem in developing countries [5]. Self-medication with antibiotics may lead to masking symptoms, treatment failure, and development of drug resistance by bacteria [6], [7].

There is evidence showing that antibiotics use varies according to patient characteristics, geographic location, medical education, availability of drug, law, and characteristics of the market (socioeconomic and cultural determinants) [5], [8].

Self-medication habit is related to the level of education. People who have higher levels of education tend to practice self-medication more [7].

Medical students and health-care professionals are usually facing difficulty when seeking health care [9], [10], [11]. Prevalence of self-medication among medical students range from 12% to 99% [9], [10], [11]. Knowledge about drugs and diseases has shown to influence self-medication practice [12]. Self-medication...
among future health-care professionals could affect the way they could prescribe medication in the future. Health-care professionals have an essential impact on the efficiency and effectiveness of the health system [13].

There is a growing consensus that antibiotics abuse is a serious problem that needs new strategies for prevention. The study of the prevalence and factors associated with self-medication of antibiotics is necessary to help with the planning of tailored interventions to reduce this practice among Egyptians. Compliance of researches to national priorities generates knowledge that promotes health and prevents health problems in Egypt [14]. Despite the risk of this problem, few studies regarding students' self-medication practices have been conducted in Egypt [4], [15], [16]. Hence, this study was conducted to estimate the magnitude and the determinants of antibiotics self-medication practices and to describe the pattern of antibiotics abuse among undergraduate university students in Cairo.

Methods

Study population

A cross-sectional study was conducted among 4th-year students of medical colleges (medicine, dentistry, pharmacy, and physical therapy) from two randomly selected universities (one public: Cairo University and one private: Heliopolis University) in Cairo, Egypt. The study was carried out during the academic year 2018–2019.

Sampling

The sample size was estimated to determine a prevalence of self-medication among university students of 55% [4], with 4% acceptable margin of error and 95% level of confidence. The estimated sample size is 594 [17], after adjustment for non-response, the sample size was increased to 600 students. A multistage sampling technique was adopted. In the first stage, Cairo's universities were stratified into public and private, and one university was selected randomly from each stratum. The sample size was distributed proportionally between two groups. In the second stage, a college or more was chosen from each university. Finally, from each college, a cluster (section) or more were selected randomly. All the students in the selected clusters were included in the study.

Data collection

A questionnaire was used to collect the data. The final version of the questionnaire had 12 questions subdivided into two categories. The first part of the questionnaire included background data of the respondents (age, sex, type of university, and place of residence). The second part of the questionnaire included data about self-medication practices covering self-prescribing antibiotics, reasons for self-medication, reported symptoms associated with antibiotics self-medication, knowledge of the side effect of the antibiotic abuse (development of microbial resistance), methods of purchase from pharmacy, types of antibiotics, reading the instructions, and the discontinuation practices. All items in the questionnaire relate to the period of the previous year. The questionnaire was modeled after that used in a previous study [9].

Ethical consideration

The Ethical Committee of the Public Health Department, Faculty of Medicine, Cairo University reviewed and approved the study. All participants voluntarily participated in the survey after being briefed about the study objectives. An informed verbal consent of study subjects with a full right to withdraw was obtained. The questionnaire was anonymous and all obtained data were kept as confidential.

Data analysis

All collected data were revised for completeness and logical consistency. Pre-coded data were entered on the computer using a database developed for data entry on Microsoft Office Excel program for windows 10. Data were then transferred to the computer program IBM SPSS (Statistical Package for the Social Science; IBM Corp, Armonk, NY, USA) release 22 for Microsoft Windows for data analysis. Descriptive statistics including frequencies and percentages were displayed to summarize the data, while Chi-square test was used to assess the relationship between categorical variables. The multivariate logistic regression analysis was used to compute adjusted odds ratio (OR) and 95% confidence intervals (95% CI) to assess the independent associations of these variables with knowledge of risk of antibiotics self-medication on development of bacterial resistance. p ≤ 0.05 was considered statistically significant.

Results

The questionnaires were returned in by 563 (94%) respondents of a total of 600 students, as follows: 243 (43%) were from a public university (Cairo) and 320 (57%) from a private university (Heliopolis).
Eight in every ten self-medicated students use unprescribed antibiotics due to their past experience with similar symptoms. One-quarter of them hate to visit a doctor. A relative offers advice on the type of antibiotics to 16% of the respondents. The majority of the students who are self-medicated reported ease access to antibiotics without a prescription in pharmacies and two in every ten students did not read the antibiotics instructions. More than 70% of them reported antibiotics discontinuation during the last year (Table 2).

Most self-treated antibiotics were used to manage gastroenteritis symptoms (70%), respiratory symptoms (63%), and dental infections (36%), other causes such as headache or prophylactic reasons (21%), as shown in Figure 1. The most common antibiotics used are Augmentin followed by penicillin (21%), as shown in Table 1. The most common symptoms associated with antibiotics self-treatment are others: headache or prophylactic reasons.

More than half of the students do not know the effect of antibiotics abuse. Knowledge of the consequences of the antibiotics abuse was shown to be significantly associated with the residence. About 48.3% of the students know the results of antibiotics abuse on the development of antimicrobial resistance development secondary to the antibiotic abuse. The bivariate analysis shows that the likelihood of their knowledge is higher in residents living in urban areas and attends a private university than those living in rural areas and from a public university (crude odds ratios [COR] = 1.8, 95% CI [1.1–1.5]) and (COR = 1.9, 95% CI [1.4–2.7]), respectively. The multivariate analysis identified the residence as an independent predictor of knowledge (area of residence = 1.6, 95% CI [1.1–2.3]) (Table 4).

Table 1: Demographic characteristics of the respondents and their self-medication history

| Sociodemographic characteristics | Self-medication (Yes) | Self-medication (No) | Total | X² | p value |
|----------------------------------|-----------------------|----------------------|-------|----|---------|
| Age                              |                       |                      |       |    |         |
| 18                               | 259                   | 78.5                 | 21.5  | 330| 100     |
| 20                               | 179                   | 76.8                 | 23.2  | 233| 100     |
| Sex                              |                       |                      |       |    |         |
| Male                             | 160                   | 76.4                 | 23.6  | 204| 100     |
| Female                           | 278                   | 76.8                 | 23.2  | 364| 100     |
| University                       |                       |                      |       |    |         |
| Public                           | 195                   | 80.2                 | 19.8  | 243| 100     |
| Private                          | 243                   | 75.9                 | 24.1  | 320| 100     |
| Residence                        |                       |                      |       |    |         |
| Urban                            | 161                   | 75.6                 | 24.4  | 213| 100     |
| Rural                            | 277                   | 79.1                 | 20.9  | 350| 100     |
| Know effects of antibiotics abuse|                       |                      |       |    |         |
| Yes                              | 203                   | 74.6                 | 25.4  | 272| 100     |
| No                               | 235                   | 80.8                 | 19.2  | 291| 100     |

Table 2: Pattern of antibiotics use among self-medicated students

| Reason for antibiotics self-medication | Frequency | Percent |
|----------------------------------------|-----------|---------|
| Experience with similar symptoms        | 364       | 83.1    |
| Do not want to visit doctor             | 110       | 25.1    |
| Advice from a relative                  | 69        | 15.8    |
| All                                     | 26        | 5.9     |
| Purchase in pharmacy without a prescription |         |         |
| Yes                                     | 402       | 91.7    |
| No                                      | 36        | 7.3     |
| Read the Ab instructions                | 365       | 83.3    |
| No                                      | 73        | 16.7    |
| Ever discontinue the Ab course          | 311       | 71      |
| None                                    | 127       | 29      |
| Total                                   | 438       | 100     |

Table 4: Predictors of knowledge of the microbial resistance risk of the antibiotics abuse

| Predictors | Knowledge | Crude OR [95% CI] | Adjusted OR [95% CI] |
|------------|-----------|------------------|----------------------|
| Age        |           |                  |                      |
| 18         | 151 (45.8) | 179 (54.2)       | 1.3 [0.9–1.8]        | 0.7 [0.5–1.0] |
| 20         | 121 (51.9) | 112 (48.1)       | 1.0 [0.7–1.4]        | 0.9 [0.6–1.3] |
| p value    | 0.09      |                  |                      |
| Sex        |           |                  |                      |
| Male       | 97 (48.3)  | 104 (51.7)       | 1.0 [0.7–1.4]        | 0.9 [0.6–1.3] |
| Female     | 175 (48.3) | 187 (51.7)       | 1.0 [0.7–1.4]        | 0.9 [0.6–1.3] |
| p value    | 0.5       |                  |                      |
| University |           |                  |                      |
| Private    | 178 (55.6) | 142 (44.4)       | 1.9 [1.4–2.7]        | 0.5 [0.4–0.7] |
| Public     | 94 (38.7)  | 149 (61.3)       | 1.9 [1.4–2.7]        | 0.5 [0.4–0.7] |
| p value    | ≤0.001    |                  |                      |
| Residence  |           |                  |                      |
| Urban      | 123 (57.7) | 90 (42.3)        | 1.8 [1.1–1.6]        | 1.6 [1.1–2.3] |
| Rural      | 149 (42.6) | 201 (57.4)       | 1.8 [1.1–1.6]        | 1.6 [1.1–2.3] |
| p value    | ≤0.001    |                  |                      |
| Total      | 272 (48.3) | 291 (51.7)       | 1.8 [1.1–1.6]        | 1.6 [1.1–2.3] |

Table 4 provides the crude and the adjusted ORs with 95% CI that quantify the association between the characteristics of the students and the knowledge of the long-term effect of antibiotics abuse on the increase in the antimicrobial resistance using Chi-square test and multiple logistic regression models, respectively.
Discussion

Antibiotic misuse is a significant public health problem in Egypt [5]. Prevalence of self-medication is common among university students [4], [15], [18]. The understanding of patients’ characteristics associated with the antibiotic misuse is essential to provide social awareness for the effective management of antibiotic use [19]. The study revealed that more than three-quarters of the medical undergraduate university students used antibiotics without prescriptions during the previous year which is fairly high compared to a previous population-based study in Cairo where the usage of unprescribed antibiotics was (29.8%) [5] and to a study in Ain Shams University (55%) [4]. Our finding was in accordance with that of medical university students in Mansoura, Egypt [15] (72.4%) and that of Karachi (76%) [20]. About 79.5% of the undergraduate university students in Khartoum, Sudan, were self-diagnosed and self-medicated for antibiotics/antimalarial [3]. Some studies reported a higher prevalence of self-medication practices: 98% in Palestine [21], 94% in Hong Kong [22], 92.3% in Slovenia [23], and 88% in Croatia [24]. Diving deeper into the root of this problem is important to understand the behavior of subjects toward antibiotic use. The study displayed that gender did not affect the behavior of response toward antibiotic use as 79.6% of males and 76.8% of females were self-medicated with no statistical significance difference. The Cairo study [5] and UAE study [25] ensured this finding while the Lithuanian study [26] revealed that females tended to misuse antibiotics more than males. In contradiction with our results, age and sex were significantly associated with self-medication in city of Mansoura, Egypt and city of Rio Grande, Brazil [15], [27].

The study showed that self-medicated students use antibiotics due to their past experience with similar symptoms (83.1%), or because they do not want to visit a doctor (25.1%), or due to an advice from a relative (15.8%). The majority of students disclosed easy access to antibiotics without a prescription from community pharmacies and more than 70% of them revealed dropping the antibiotic course not less than once during the final year. On the contrary, the previous Cairo study showed that the population use antibiotics without a prescription due to the belief that common diseases do not worth physician’s consultation (47.3%), financial issues (33.8%), and medical knowledge (21.6%) [5]. People do not use physicians’ consultation due to financial reasons or because it is time consuming [5]. About 59% of university students in Southwestern Nigeria raised the issue of long waiting time at hospitals as one of the reasons for self-medication [28].

Moreover, the study revealed that 70% of gastrointestinal infections and 63% of respiratory infections were managed by those who use antibiotics (Augmentin followed by penicillin and amoxicillin) without a prescription. Conversely, the Cairo based study showed that 55.7% of respiratory infections were managed by the unprescribed penicillin [6] and that penicillin was the common unprescribed antibiotics used in Greece [29], UAE [25], Jordan [30], Ghana [31], and Nigeria [32]. The most frequent causes in which the undergraduate students in Mansoura, Egypt, self-medicated were cold, headache, sore throat, intestinal colic, and lastly cramps [15].

The analysis displayed that more than half of the students (51.7%) do not know the effect of antibiotics abuse on the development of microbial resistance and this was a predictor of antibiotics self-medication. In Brazil, poor medication knowledge was significantly associated with less self-medication [27]. The previous Cairo based analysis showed that 70.8% of the population are aware of the antibiotic side effects [5]. However, other influences such as age, education, and residence; financial issues had an impact on the behavior response of the population toward antibiotic use. Age and sex were not associated significantly with self-medication practices among students in our study and in Karachi study [20]. The logistic regression analysis showed that being from urban area and going to a private university were independent predictors of students’ knowledge. Moreover, residence was the independent predictor of the knowledge of the students as described by the multivariate analysis.

The study is one of the few studies that illustrate the scale of antibiotics abuse among undergraduate students in Egypt. The study is the first step in the planning of tailored interventions to control the problem. However, the study had some limitations. It was conducted among medical students with no control group from nonmedical students. Although self-reported tool is common sources of information about drug exposure, the structure of a questionnaire may have contributed to the difference in the recall of pharmacological treatments. For proper interpretation of data, it is essential to consider the impact of data collection instrument on the validity of estimates [33].

Conclusion

The antibiotics misuse and nonadherence practices are high among undergraduate university students in Cairo. Our findings highlight the urgent need for tailored interventions to control these practices. This could be achieved through discussing the prudent use of antibiotics and the consequences of misuse in health education campaigns in the universities and in the undergraduate compulsory courses.
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References

1. World Health Organization. Guidelines for the Regulatory Assessment of Medicinal Products for Use in Self Medication. Geneva: World Health Organization; 2000. Available from: http://wwwapps.who.int/medicinedocs/pdf/s2218e/s2218e.pdf. [Last accessed on 2018 Dec 10].
2. Loyola Filho AI, Lima-Costa MF, Uchôa E. Bambuí project: A qualitative approach to self-medication. Cad Saude Publica. 2004;20(6):1661-9. https://doi.org/10.1590/s0102-311x2004000600025 PMid:15608689
3. Awad AI, Eltayeb IB. Self-medication practices with antibiotics and antimalarials among Sudanese undergraduate university students. Ann Pharmacother. 2007;41(7):1249-55. https://doi.org/10.1345/aph.1k008 PMid:17565044
4. El Ezz NF, Ez-Elarab HS. Knowledge, attitude and practice of medical students towards self medication at Ain Shams University, Egypt. J Prev Med Hyg. 2011;52(4):196-200. PMid:22442925
5. Elmasry AA, Bakr AS, Kolkailah DA, Khaskia MA, Mohammed ME, Amany Yehia. The authors also thank the students of the “Heliopolis University” who have contributed to this study.

6. Huang Y, Gu J, Zhang M, Ren Z, Yang W, Chen Y, et al. Knowledge, attitude and practice of antibiotics: A questionnaire study among 2500 Chinese students. BMC Med Educ. 2013;13:163. https://doi.org/10.1186/1472-6920-13-163 PMid:24321445
7. Okyay RA, Đerđan A. Self-medication practices and rational drug use habits among university students: A cross-sectional study from Kahramanmaraş, Turkey. PeerJ. 2017;5:e3990. https://doi.org/10.7717/peerj.3990 PMid:29109916
8. Pirzadeh A, Mostafavi F. Self-medication among students in Isfahan University of medical sciences based on health belief model. J Educ Health Promot. 2014;3:112. https://doi.org/10.4103/2277-9531.145904 PMid:25540785
9. Lukovic JA, Miletic V, Pekmezovic T, Trajkovic G, Ratkovic N, Aleksic D, et al. Self-medication practices and risk factors for self-medication among medical students in Belgrade, Serbia. PLoS One. 2014;9(12):e114644. https://doi.org/10.1371/journal. pone.0114644 PMid:25503967
10. Brimstone R, Thistlethwaite JE, Quirk F. Behaviour of medical students in seeking mental and physical health care: Exploration and comparison with psychology students. Med Educ. 2007;41(1):74-83. https://doi.org/10.1111/j.1365-2929.2006.02649.x PMid:17208985
11. Roberts LW, Warner TD, Carter D, Frank E, Ganzini L, Lyketsos C. Caring for medical students as patients: Access to services and care-seeking practices of 1,027 students at nine medical schools. Collaborative Research Group on Medical Student Healthcare. Acad Med. 2000;75(3):272-7. https://doi.org/10.1097/00001888-200003000-00019 PMid:10724317
12. Sharif SI, Ibrahim OH, Mousili L, Waisi R. Evaluation of self-medication among pharmacy students. Am J Pharmacol Toxicol. 2012;7(4):135-40.
13. Elden NM, Rizk HI, Wahby G. Improving health system in Egypt: Perspectives of physicians. Egypt J Community Med. 2016;34(1):45-57.
14. El Lawindi MI, Galal YS, Khairy WA. Health research and millennium development goals: Identifying the gap from public health perspective. Glob J Health Sci. 2015;8(5):1-10. https://doi.org/10.15539/gjhs.v8n5p1 PMid:26652084
15. Helal RM, Abou-ElWafa HS. Self-medication in university students from the city of Mansoura, Egypt. J Environ Public Health. 2017;2017:9145193. https://doi.org/10.1155/2017/9145193 PMid:28479921
16. Mostafa A, Hany A, Ayed E, et al. Patterns of self-medication misuse among university student. Int J Healthc Sci. 2015;2:180-6.
17. Epi infoTM CDC. Available from: https://www.cdc.gov/epiinfo/index.html. [Last accessed on 2019 Jun 01].
18. James H, Handu SS, Al Khaja KA, Otoom S, Sequeira RP. Evaluation of the knowledge, attitude and practice of self-medication among first-year medical students. Med Princ Pract. 2006;15(4):270-5. https://doi.org/10.1159/000092989 PMid:18673393
19. Kobt M, ElBagoury M. Sale of antibiotics without prescriptions in Alexandria Egypt. J Pure Appl Microbiol. 2018;12(1):287-91. https://doi.org/10.22207/jpam.12.1.34
20. Zafar SN, Syed R, Waqar S, Zubairi AJ, Vaqar T, Shaikh M, et al. Self-medication amongst university students of Karachi: Prevalence, knowledge and attitudes. J Pak Med Assoc. 2008;58(4):214-7. https://doi.org/10.18654/jpam.2008.214-7
21. Sawalha AF. A descriptive study of self-medication practices among Palestinian medical and nonmedical university students. Res Social Adm Pharm. 2008;4(2):164-72. https://doi.org/10.1016/j.sapharm.2007.04.004 PMid:18559569
22. Lau GS, Lee KK, Luk CT. Self-medication among university students in Hong Kong. Asia Pac J Public Health. 1995;8(3):153-7. https://doi.org/10.1177/101059929500800301 PMid:10050180
23. Klemenc-Ketis Z, Hladnik Z, Kersnik J. Self-medication amongst university students of Karakê: Prevalence, knowledge and attitudes. J Pak Med Assoc. 2008;58(4):214-7. https://doi.org/10.18654/jpam.2008.214-7
24. Aljinović-Vucić V, Trkulja V, Lacković Z. Content of home pharmacies and self-medication practices in households of pharmacy and medical students in Zagreb, Croatia: Findings in 2001 with a reference to 1977. Croat Med J. 2005;46(1):74-80. PMid:15726679
25. Abasaee A, Vlcek J, Abuelkhair M, Kubena A. Self-medication
with antibiotics by the community of Abu Dhabi Emirate, United Arab Emirates. J Infect Dev Ctries. 2009;3(7):491-7. https://doi.org/10.3855/jidc.466
PMid:19762966

26. Berzanskyte A, Valinteliene R, Haaijer-Ruskamp FM, Gurevicius R, Grigoryan L. Self-medication with antibiotics in Lithuania. Int J Occup Med Environ Health. 2006;19(4):246-53. https://doi.org/10.2478/v10001-006-0030-9
PMid:17402220

27. Quadra GR, Oliveira de Souza H, Costa RD, Fernandez MA. Do pharmaceuticals reach and affect the aquatic ecosystems in Brazil? A critical review of current studies in a developing country. Environ Sci Pollut Res Int. 2017;24(2):1200-18. https://doi.org/10.1007/s11356-016-7789-4
PMid:27734317

28. Osemene KP, Lamikanra A. A study of the prevalence of self-medication practice among university students in Southwestern Nigeria. Trop J Pharm Res. 2012;11(4):683-9. https://doi.org/10.4314/tjpr.v11i4.21

29. Mitsi G, Jelastopulu E, Basiaris H, Skoutelis A, Gogos C. Patterns of antibiotic use among adults and parents in the community: A questionnaire-based survey in a Greek urban population. Int J Antimicrob Agents. 2005;25(5):439-43. https://doi.org/10.1016/j.ijantimicag.2005.02.009
PMid:15848301

30. Al-Bakri AG, Bustanji Y, Yousef AM. Community consumption of antibacterial drugs within the Jordanian population: Sources, patterns and appropriateness. Int J Antimicrob Agents. 2005;26(5):389-95. https://doi.org/10.1016/j.ijantimicag.2005.07.014
PMid:16221541

31. Tagoe DN, Attah C. A study of antibiotic use and abuse in Ghana: A case study of the cape coast metropolis. Int J Health. 2010;11(2):5580. https://doi.org/10.5580/bec

32. Oyetunde OO, Olugbake OA, Famudehin KF. Evaluation of use of antibiotic without prescription among young adults. Afr J Pharm Pharmacol. 2010;4(10):760-2.

33. Gama H, Correia S, Lunet N. Effect of questionnaire structure on recall of drug utilization in a population of university students. BMC Med Res Methodol. 2009;9:45. https://doi.org/10.1186/1471-2288-9-45
PMid:19563651