Journal of Pharmacoeconomics and Pharmaceutical Management
http://jppm.tums.ac.ir

Original Article

Parental self-medication with antibiotics in Iran

Farahnaz Zeinali[1], Nazila Yousefi[2], Farzad Peiravian[2*]

[1] *Department of Pharmacoeconomics and Pharmaceutical Management, School of Pharmacy, Alborz University of Medical Sciences, Karaj, Iran*
[2] *Department of Pharmacoeconomics and Pharmaceutical Management, School of Pharmacy, Shahid Beheshti University of Medical Sciences, Tehran, Iran*

ABSTRACT

Background: Parents behavior is an important factor to reduce self-medication, which not only affects health outcomes negatively but also influences health economy. In the present study, parents behavior regarding self-medication using antibiotics for children and its relation to their social status, especially education, are studied in primary schools.

Methods: A cross-sectional descriptive analysis was performed using a self-administered anonymous questionnaire.

Results: 600 anonymous questionnaires were distributed among the children's parents in primary schools in Tehran, Iran, and 62.0% of which were returned. Responses showed that 11.1% of parents did not visit a physician to treat their children seasonal cold, while about half of them did self-medication. Furthermore, 52.8% of those who had visited a doctor in the first seasonal disease of their children did not refer again in next events and just refilled their last prescription. In addition, the results of this study indicated significant correlation between self-medication and mothers' education ($P < 0.05$); that means mothers with higher education had higher rates of physician visits.

Conclusion: Mothers' education and health literacy are main factors in the rational use of medicines in children and should be addressed by policy makers in public health training programs.

Keywords: Self-medication; Antibiotics; Parent education; Children; Iran

Citation: Zeinali F, Yousefi N, Peiravian F. **Parental self-medication with antibiotics in Iran.** J Pharmacoeconomics & Pharm Manage 2016; 2(3-4): 60-3.

1. Introduction

Self-medication means using a medicine without a physicians' prescription, and is common in both developing and developed countries [1]. It is affected by several factors, namely parents' education, economic and social situations, insurance status, type of disease and medicine availability [2].

Bacterial drug-resistance which may cause treatment failures [3] is an increasing worldwide problem arising from the irrational use of antibiotics [4]. Antibiotic overuse influences health outcomes. Furthermore, it affects health economy by increasing several costs including cost of irrational use of antibiotics, the cost of their adverse effects management, the cost of hospitalization due to drug-resistant occurrence [5], and the cost of managing allergic reactions to the additives such as sweeteners and colors [6,7].

This is especially a major concern in pediatrics, as children take more antibiotics than other groups [8]. They usually have high rates of antibiotic use, prescribed for colds, upper respiratory tract infections, bronchitis [9] and other conditions that typically do not benefit from antibiotics and they are mostly unnecessary [10]. The use of antibiotics in viral infections such as colds, flu, herpes infections, and gastroenteritis is useless and leads to an increase of bacterial resistance in children [11-13]. As many parents do not have proper knowledge about the true indication of antibiotics, use of antibiotics by parents in non-approved infections or viral infections [14,15], in addition to bacterial resistance [16], may lead to serious adverse effects [17].

Parents not only increase bacterial resistance by irrational antibiotics use but also they influence physicians' prescription for antibiotics even when they are unnecessary [12]. Therefore, improving parents' knowledge and attitudes regarding antibiotics can increase rational use of antibiotics through decreasing both self-medication and demands for prescribing them.

This study was designed to evaluate the rate of self-medication and irrational use of antibiotics; moreover, the correlation between the antibiotic use and social status of parents, including educational level and health insurance situation is investigated. It is envisaged to provide some useful information for public health policy makers and help them to make effective interventions in parents' perception regarding antibiotics, in order to improve rational use of these medications.

2. Methods

A descriptive analytical cross-sectional study was performed in

[*]Corresponding author. Tel.: +98 21 88665692, Fax: +98 21 88665692, E-mail: peiravianfarzad@gmail.com, Farzad Peiravian
Article information: Received date: 17/11/2015, Accepted date: 05/03/2016, Available online: 14/12/2016

Tehran, Iran, in 2014. The data were gathered through 600 self-administered questionnaires, randomly delivered to the students' parents in primary schools to assure the sufficient sample size of 380 (using the Cochrane equation). Afterward, multicluster sampling was applied for data collection. Subsequently, the city was classified into five different geographical and socioeconomical clusters. Then, in each cluster two primary schools (students aged between seven to twelve), each with sixty questionnaires, were selected randomely.

The questionnaire was designed based on literature reviews, and its content and face validity were assessed with regard to comprehension and clarity. The self-administered questionnaire comprised of three sections including demographics questions about education, medical insurance status, the amount of out-of-pocket expenditures in each child's disease event, and 10 questions on a 5-point Likert scale on parents' attitude toward antibiotics administration and their practice during the last year. For example, they were asked about how many times in the last year they took antibiotics, what kind of antibiotics they used, whether they used antibiotics without physician prescription, as well as if they could easily access non-prescribed antibiotics through pharmacies.

A statistical analysis was performed by applying the SPSS software (version 16, SPSS Inc., Chicago, IL, USA). All tests were two-tailed, and alpha levels of less than 0.05 were considered significant.

3. Findings

Of 600 distributed questionnaires, 372 ones were completed with a response rate of 62.0%, and no response bias was detected about the demographic characterization of respondents. The individuals demographic and background characteristics are shown in table1.

In this study, 81.5% (303 persons) of the respondents had health insurance, and 18.5% (69 persons) did not have any kind of insurance.

Children's antibiotics consumption in the past year and its related cost are illustrated in table 2.

About 77.0% of participants used antibiotics at least once in the last year. Additionally, the majority of participants (80.9%) spent about 5-50 United States dollars (USD) per year for antibiotics.

Amoxicillin was the highest frequently used antibiotic (40.6%), cephalexin (37.9%) and cefixime (12.1%) were also consumed.

As it is presented in table 3, responses indicated that the majority of the parents visited physicians when their children were sick. However, 52.8% of those who had visited a physician in their first seasonal disease did not refer again in next events and only refilled the last prescription. Among 11.1% of the participants did not visit a physician for seasonal cold, 53.6% did self-medication, and the rest did not use any antibiotics.

Table 1. Demographic and background characteristics of participants

Characteristics	Categories	n (%)
Gender	Women	171 (46.0)
	Men	201 (54.0)
Insurance situation	Yes	303 (81.5)
	No	69 (18.5)
Mothers' education level	Diploma	152 (40.9)
	Bachelor/Master	193 (51.8)
	PhD	27 (7.3)
Fathers' education level	Diploma	160 (43.0)
	Bachelor/Master	200 (53.7)
	PhD	12 (3.3)
Family size	One child	149 (40.1)
	More	223 (59.9)

According to the research findings shown in table 4, the chi-square test showed a significant association between mothers' education and physician visits ($P < 0.05$). Likewise, a significant relationship was detected between mothers' education and spending on medications.

There was also a negative relationship between insurance situation and expenditure on medicines. Similarly, the family size had a negative effect on parents' spending on antibiotics.

Lastly, in this survey, 56.5% of the participating parents declared that the antibiotics were accessible in pharmacies without prescription and a positive relationship existed between access to antibiotics without prescription and expenditure on medication. No significant relationship existed between other variables.

In this study, 88.9% of the individuals referred to physicians due to their children seasonal cold diseases; however, 52.8% of those who had visited a physician in their children's first seasonal disease, did not refer again in next similar events and they refilled the last prescription. Furthermore, 53.6% of the participants not visiting a physician for the seasonal disease of their children, had self-medication.

4. Discussion

According to the literature, access to antibiotics without prescription, which is usually high in unregulated markets, increases self-medication. For instance, in a research done in Greece, most of the purchased antibiotics were not prescribed [18].

Table 2. Antibiotics consumption and related cost

		n (%)
Antibiotic use during the last year	No use	86 (23.1)
	Once	109 (29.3)
	Twice	98 (26.3)
	More	79 (21.2)
The amount of money spent for treatment in every sickness event	Less than 5 USD	54 (14.5)
	5 to 10 USD	169 (45.4)
	10 to 50 USD	132 (35.5)
	More than 50 USD	17 (4.6)

USD: United States dollar

Table 3. Descriptive analysis of the questionnaires

Questions	Agree n (%)	Disagree n (%)
Q1- Do you take your children to visit a physician for seasonal cold disease?	331 (88.9)	41 (11.1)
Q2- If your answer is "no", did you use non-prescribed antibiotics?	22 (53.6)	19 (46.4)
Q3- If your answer is "yes", did you refill the last prescription in the recurrence of the disease?	175 (52.8)	156 (47.2)
Q4- Do you have access to non-prescribed antibiotics through pharmacies?	210 (56.5)	162 (43.5)

Table 4. Participants' characteristics and response correlation

Grouping variables	Questions			
	Visiting physician (Q1)	Self-medication (Q2)	Refilled prescription (Q3)	Antibiotic expenditure
	Sig. (2-tailed)			
Mothers' Education	0.001*	0.010*	0.778	0.016*
Fathers' education	0.500	0.709	0.968	0.545
Insurance situation	0.776	0.065	0.860	0.028*
Family size	0.336	0.173	0.868	0.048*
Access to non-prescribed antibiotics	0.800	0.128	0.764	0.029*

*: $P < 0.05$

Similarly, in Iran, this study indicated that 56.5% of the respondents could easily access antibiotics in pharmacies without physicians' prescription. Although easy access to antibiotics without prescription logically may lead to self-medication, it was not found any significant relationship between easy access to antibiotics without prescription and self-medication.

Educated mothers visited a physician more frequently; however, in line with other studies, those who did not refer to physicians, used non-prescribed antibiotics more often than mothers with lower education. This higher rate of self-medication by higher-educated mothers, which is shown in this study, may be because of better access to medical knowledge by the media [19].

As the literature indicates, higher-educated parents tend to refer more to media sources for information [20]. Therefore, high-educated mothers, as well as low-educated ones, need public health education to provide more information with respect to the adverse effects of self-medication [21]. In other words, although mothers' education leads to more attention to children's health and more physician visits for seasonal cold, it does not sufficiently prevent self-medication. Thus, improvement of health literacy should be considered by policy makers to decrease self-medication with antibiotics. This means training mothers on public health for increasing their health literacy and their awareness regarding subjects such as antibiotic resistance and viral infection can be considerably useful in decreasing antibiotic self-medication and avoiding its consequences.

In this study, it was recognized that self-medication rate in Iran was 5.9% (22 of 372 responders) which was an acceptable rate in comparison to the high rate of 50.4 % reported in a Chinese study [2]. However, sum of refilling the last prescription, 47% (175 of all 372 responders), and self-medication, 5.9% (22 of 372 responders) was 52.9%, which shows the high level of antibiotics irrational use for children.

Similar to Bi et al.'s study, we found no significant relationship between self-medication and fathers' education [2].

Moreover, our study showed a significant relationship between lack of health insurance and treatment expenditure. It is shown in the literature that a patient with health insurance might be more encouraged to visit a doctor; therefore, they might be able to store some medicine at home, which may lead to higher self-medication for their children [2]. Nevertheless, most probably, due to the low price of medicines in Iran, we did not find such a correlation in our study, and insurance coverage is not significantly correlated to self-medication.

Finally, before applying the results of the current study, it is recommended to consider the following limitations:

Since the data were collected using self-administered questionnaires, respondents' misunderstanding might be relevant. More specifically, it was probable that some participants did not have an accurate understanding about antibiotics and could not distinguish whether a medicine was an antibiotic or not [22].

In addition, the participants were asked several retrospective questions about their children's past use of antibiotics, which may have resulted in recall bias.

Moreover, as the sample population was limited to Tehran City, the accurate generalization of results is required.

5. Conclusion

The result of this study showed the high level of irrational use of antibiotics in children. Since the self-medication is associated with mothers' educational attainment, mothers' education and health literacy is the main factor in the rational use of medicines for children and should be seriously considered by policy makers in public health programs.

6. Conflict of Interests

Authors have no conflict of interests.

7. Acknowledgments

We would like to express our appreciation to Dr. Rajabzadeh for his kind cooperation in designing this study; Mr. Pandi, Mrs. Asadi, and Mrs. Bahrami for their great help in collecting data; and all the participated parents for assigning time to fill the questionnaire.

References

(1) Schorling JB, De Souza MA, Guerrant RL. Patterns of antibiotic use among children in an urban Brazilian slum. Int J Epidemiol 1991; 20(1): 293-9.
(2) Bi P, Tong S, Parton KA. Family self-medication and antibiotics abuse for children and juveniles in a Chinese city. Soc Sci Med 2000; 50(10): 1445-50.
(3) Sabuncu E, David J, Bernede-Bauduin C, Pepin S, Leroy M, Boelle PY, et al. Significant reduction of antibiotic use in the community after a nationwide campaign in France,

2002-2007. PLoS Med 2009; 6(6): e1000084.
(4) Neu HC. The crisis in antibiotic resistance. Science 1992; 257(5073): 1064-73.
(5) Avorn J, Solomon DH. Cultural and economic factors that (mis)shape antibiotic use: The nonpharmacologic basis of therapeutics. Ann Intern Med 2000; 133(2): 128-35.
(6) Martinez FD, Holt PG. Role of microbial burden in aetiology of allergy and asthma. Lancet 1999; 354 (Suppl 2): SII12-SII15.
(7) Braun-Fahrlander C, Riedler J, Herz U, Eder W, Waser M, Grize L, et al. Environmental exposure to endotoxin and its relation to asthma in school-age children. N Engl J Med 2002; 347(12): 869-77.
(8) McCaig LF, Besser RE, Hughes JM. Trends in antimicrobial prescribing rates for children and adolescents. JAMA 2002; 287(23): 3096-102.
(9) Nyquist AC, Gonzales R, Steiner JF, Sande MA. Antibiotic prescribing for children with colds, upper respiratory tract infections, and bronchitis. JAMA 1998; 279(11): 875-7.
(10) Barden LS, Dowell SF, Schwartz B, Lackey C. Current attitudes regarding use of antimicrobial agents: Results from physician's and parents' focus group discussions. Clin Pediatr (Phila) 1998; 37(11): 665-71.
(11) Del Fiol FS, Lopes LC, Barberato-Filho S, Motta CC. Evaluation of the prescription and use of antibiotics in Brazilian children. Braz J Infect Dis 2013; 17(3): 332-7.
(12) Zolaly MA, Hanafi MI. Factors affecting antibiotics prescription in general pediatric clinics. Journal of Taibah University Medical Sciences 2011; 6(1): 33-41.
(13) Tenaiji A, Al Redha K, Khatri F, Hashmey RH. Knowledge, attitudes and behavior towards antibiotic use among parents in Al-Ain City, United Arab Emirates. Int J Infect Dis 2008; 12(1): e434.
(14) Hare ME, Gaur AH, Somes GW, Arnold SR, Shorr RI. Does it really take longer not to prescribe antibiotics for viral respiratory tract infections in children? Ambul Pediatr 2006; 6(3): 152-6.
(15) Friedman BC, Schwabe-Warf D, Goldman R. Reducing inappropriate antibiotic use among children with influenza infection. Can Fam Physician 2011; 57(1): 42-4.
(16) Huang SS, Rifas-Shiman SL, Kleinman K, Kotch J, Schiff N, Stille CJ, et al. Parental knowledge about antibiotic use: Results of a cluster-randomized, multicommunity intervention. Pediatrics 2007; 119(4): 698-706.
(17) Zwar N, Henderson J, Britt H, McGeechan K, Yeo G. Influencing antibiotic prescribing by prescriber feedback and management guidelines: A 5-year follow-up. Fam Pract 2002; 19(1): 12-7.
(18) Plachouras D, Antoniadou A, Giannitsioti E, Galani L, Katsarolis I, Kavatha D, et al. Promoting prudent use of antibiotics: The experience from a multifaceted regional campaign in Greece. BMC Public Health 2014; 14: 866.
(19) Richman PB, Garra G, Eskin B, Nashed AH, Cody R. Oral antibiotic use without consulting a physician: A survey of ED patients. Am J Emerg Med 2001; 19(1): 57-60.
(20) Kuzujanakis M, Kleinman K, Rifas-Shiman S, Finkelstein JA. Correlates of parental antibiotic knowledge, demand, and reported use. Ambul Pediatr 2003; 3(4): 203-10.
(21) Al-Azzam SI, Al-Husein BA, Alzoubi F, Masadeh MM, Al-Horani MA. Self-medication with antibiotics in Jordanian population. Int J Occup Med Environ Health 2007; 20(4): 373-80.
(22) Hong JS, Philbrick JT, Schorling JB. Treatment of upper respiratory infections: Do patients really want antibiotics? Am J Med 1999; 107(5): 511-5.