Research paper

Evaluation of risk factors affecting parental knowledge and attitude toward antibiotic use in children with upper respiratory tract infections

Khawla Abu Hammour[a], Rana Abu Farha[b,*], Mervat Alsous[b], Mai Rizik[b], Walid Abu Hammour[c]

[a] Department of Biopharmaceutics and Clinical Pharmacy, Faculty of Pharmacy, The University of Jordan, Amman, Jordan
[b] Department of Clinical Pharmacy and Therapeutics, Faculty of Pharmacy, Applied Science Private University, Amman, Jordan
[c] Al-Jalila Children's Specialty Hospital, Dubai, United Arab Emirates

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ABSTRACT

Introduction: Viral infection is the main cause of Upper respiratory tract infections (URTIs). However, antibiotic resistance is promoted through inappropriate prescription of antibiotics for children with URTIs. This study aimed to assess the possible risk factors which may be associated with such antibiotic misuse.
Methods: This prospective study was designed to evaluate parents' knowledge and attitudes towards antibiotic use for their children. Study questionnaires were distributed to adult parents caring for children aged between 4 and 8 years at Jordan University Hospital. Detailed content analysis was conducted to obtain all relevant information.
Results: A total of 1301 parents agreed to participate in this study. Parents' knowledge score was 7.02/14 (SD = 1.52). The knowledge score was positively associated with both the age of parents and the income level (p-value = .001 and < .001 respectively). Also, parents who had less than 4 children had better knowledge about the use of antibiotics compared to those who had more children (p-value = .03). Regarding parents' attitude, a mean attitude score was calculated for parents (2.33/5) (SD = 0.44). Older parents ($\geq$45 years), those with higher income and higher number of children had higher attitude scores than those with a lower income and a lower number of children (p-values = .002, .001, .000 respectively).
Conclusions: This study showed there was a relationship between the number of children, the age of parents and income on parent's knowledge and attitude towards using antibiotics. Additional intervention programs may be required for such groups of parents.

1. Introduction

On average, children may suffer from more than five infectious episodes per year [1]. Acute upper respiratory tract infections (URTI)s are considered one of the most common acute infections affecting children worldwide [1]. Although most of URTIs affecting children are of viral origin [2], most cases receive antibiotics [3].

The tremendous growth in antibiotic utilization is not without its dangers, as inappropriate prescription of antibiotics by physicians and overuse of antibiotics by the public raises serious concerns about the emergence of resistant bacterial strains and the development of side effects [3–6]. These concerns stem from the well-established relationship between antibiotic use and resistance, as previous research has demonstrated that countries with the highest antibiotic consumption have the highest prevalence of resistant pathogens [6].

Bacterial resistance to antibiotics places an avoidable burden on health economy due to the necessity of using more expensive and specific antibiotics to treat infections, increasing intensive care unit admissions, the duration of hospitalization, the need of more diagnostic tests; including laboratory tests and imaging, and increasing costs due to treatment failure or death [4,7,8]. Therefore, effort should focus on decreasing antibiotic misuse and resistance and optimize their use in clinical settings.

Several cross-sectional studies have evaluated factors contributing to antibiotic misuse in children with URTIs [9–16]. These studies found that insufficient parental knowledge and negative attitudes were among the most important factors contributing to inappropriate antibiotic prescription [9,10,12–14,17]. Low educational level, being a single parent, having low income, and being without experience in recurrent URTIs were significantly related to inadequate knowledge and negative attitude toward antibiotic use in children with URTIs [11].

Antibiotics in Jordan, similar to other developing countries, can be dispensed without a doctor's prescription [18]. This leads to high prevalence of self-medication with antibiotics. The impact of the open

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access to antibiotics on the overall health of Jordanian citizens needs to be assessed and highlighted through surveying parents who, in this setting, are the decision makers. To enable correct decisions of initiating the antibiotics in URTIs with appropriate use, it is necessary to improve parents' attitude and knowledge regarding this issue. This can be achieved by identifying risk factors affecting parental knowledge and attitude toward antibiotic use in children with URTIs. Moreover, identifying the risk factors affecting parents' knowledge and attitude will greatly help to develop interventional strategies aiming to improve knowledge and enhance attitudes, thus making the right practices regarding the use of antibiotics and consequently minimizing the risk of antimicrobial resistance.

Therefore, the primary aim of this study was to evaluate and identify the risk factors affecting parental knowledge and attitudes towards antibiotics use among children with URTI.

2. Methods

2.1. Study design, settings and study subjects

This study adopted a cross-sectional design that was carried out across pediatric clinics and wards at Jordan University hospital in Amman-Jordan. The study was carried out between December-2015 and May-2016. During the study period, 1380 individuals were approached who were adult parents of children aged between 4 and 8 years, who were able to read and write Arabic, had no apparent cognitive deficit, had an appointment at pediatrics clinic at the study sites, and who were willing to participate in the study. Parents were approached and asked to participate in this study regardless of the reason for their clinic appointment. Parents were told that their participation was voluntary and that all the information they provided would be kept anonymous and would be used only by the research team for research purposes.

2.2. Sampling and sample size

During the study period, 1380 questionnaires were distributed with the assistance of a group of pharmacy students who were trained to administer the questionnaires in the same manner (to decrease the risk of assessment bias).

This sample size was calculated using the following formula:

$$n = P \times (100 - P) \times z2/d2$$

Where

P is the anticipated prevalence.

d is the desired precision.

z is the appropriate value from the normal distribution for the desired confidence.

Using 95% confidence level, 5% precision level and 50% anticipated prevalence of inappropriate knowledge (the most conservative percentage to yield the largest minimal sample size), a sample size of 385 was considered to be representative of this sampling frame, so in this study a larger sample size was targeted.

2.3. Questionnaire

The questionnaire was developed by reviewing available questionnaires in the literature, the questions were adapted with modifications from published validated Greek questionnaires that were also utilized in a Palestinian study [13,17,19].

This questionnaire was used by the research team to evaluate parents' knowledge and attitude toward antibiotics use among children with URTI, and in this current study, efforts were made to identify risk factors associated with inadequate knowledge and attitude toward antibiotic use among children with URTI.

To achieve this purpose, two outcomes were measured for each participant (knowledge and attitude scores). Parents' knowledge about antibiotics use among children with URTI was evaluated using 14 questions. Participants' response was either yes, no, or I don't know. For each correct answer, the patient was awarded 1 point and a total knowledge score out of 14 was calculated. Attitudes to antibiotic use among children with URTI were assessed using 10 statements. We used a Likert scale of 5 domains to evaluate each participant's attitude towards antibiotics use. In case of positive statements (those which do not favor antibiotics administration in URTIs), scoring system was as the following: strongly agree: 5; agree: 4; neutral: 3; disagree: 2; and strongly disagree: 1. For reverse questions (those which favor antibiotics administration in URTIs), the scoring system was reversed as the following: strongly agree: 1; agree: 2; neutral: 3; disagree: 4; and strongly disagree: 5. For each participant, a mean attitude score out of 5 was calculated.

The scores were afterwards associated with parental demographic characteristics to evaluate possible risk factors affecting each. These factors include parents' age, gender, educational level, family income, medical insurance, and the number of children.

2.4. Ethical consideration

The Institutional Review Board Committee at the Jordan University Hospital on 28th September 2015 approved the study protocol (Reference number: 10/2015/20657). The study was conducted following the ethical standards outlined in the World Medical Association Declaration of Helsinki guideline [20]. Participants' confidentiality was preserved by using anonymous questionnaires. Due to the anonymity of the questionnaire, only verbal informed consent was obtained from all participants before the interview.

2.5. Statistical analysis

Data was analyzed using statistical package for social science (SPSS) version 22 (SPSS Inc., Chicago, IL, USA). The descriptive analysis was done using mean and SD for continuous variables and percentage for qualitative variables. Normality was checked using Shapiro-Wilk test (with P-value > .05 indicates a normally distributed continuous variables). Univariate analysis including independent sample t-test and analysis of variance (ANOVA) were used to evaluate factors affecting individuals' knowledge and attitude score. For all statistical analysis, a P-value of less than .05 was considered statistically significant and all tests were two tailed.

3. Results

A total of 1301 questionnaires were completed by parents (response rate 94.2%). Almost half of the respondents were female (666; 51.2%) and were aged between 25 and 55 years (1098; 84.4%). More than two-thirds of respondents (935; 71.9%) were insured. The majority of respondents were Jordanian (1179; 90.6%) and had between two and six children (1050, 80.7%). The demographic profile of the study sample is presented in Table 1.

Parents were asked about the sources of information they had accessed about antibiotic use. About two third (65.2%) of parents got their information from physicians, followed by television (18.5%) and family relatives (17.6%) (Fig. 1). Radio and newsletters were the least commonly used source for information about antibiotics (8.7% and 12.8% respectively).

When evaluating parents' knowledge about the use of antibiotics in children with URTI, the mean score was (7.02 ± 1.52). The Knowledge score was positively associated with the age of parents (p-value = .001). Parents ≥ 45 years had higher knowledge score compared to < 45 years. Also, parents who had less than 4 children had better knowledge about the use of antibiotic compared to those who