

Mothers' Knowledge, Attitudes, and Practices of Antibiotic Use for Children in Jordan

Sireen M. Alkhaldi^{1*}, Masar F. Al-Mahmoud², Hashem Kanaan³

Abstract

Objective: Children very frequently attend to physicians with upper respiratory tract infections (URTIs). Antibiotics (ABs) are prescribed often for URTIs despite their viral origin and are often used inappropriately. This study investigates factors that influence knowledge, attitudes and practices related to antibiotic use among mothers of children with URTI in Irbid Governorate.

Methods: A cross-sectional design is used for this research. A sample of 401 mothers of children 6 months to 12 years old were surveyed using interviewer-administered knowledge-attitudes-practices questionnaire, between January and April 2011, recruited from two comprehensive health centers in Irbid Governorate.

Results: A small proportion (21.7%) of Jordanian mothers demonstrated adequate knowledge about antibiotics, some of them (14.5%) provided responses suggesting positive attitude, and only 11.2% reported good AB practices. Logistic regression revealed that antibiotic knowledge is associated with father's education (OR= 2.21, p=0.022) and with mother's work in the medical field (OR= 2.9, p=0.011). Mother's occupation predicted positive AB attitudes (OR=3.1, p=0.009). Antibiotic practices were associated with having positive AB attitudes (OR= 6.3, p<0.001) and with mothers being informed about AB resistance (OR= 5.1, p=0.012). No association was detected between Knowledge about ABs and AB practices.

Conclusions: The majority of Jordanian mothers lack the basic knowledge and the positive attitude towards antibiotic use, complicated with poor AB practices. Comprehensive multilevel national campaigns to boost positive attitude towards ABs are urgently needed in Jordan.

Keywords: Knowledge, Attitudes, Practices, Antibiotics, Children.

(J Med J 2015; Vol. 49 (4):215-226)

Received

Accepted

March 2, 2015

Aug. 13, 2015

Introduction

Children with Upper Respiratory Tract Infections (URTIs), which are predominantly self-limiting, constitute a significant

proportion of primary care physician's visits. Antibiotics (AB) are too often prescribed for children with URTIs symptoms despite the fact that they are mostly of viral origin, and there is no evidence that antibiotics would

1. The University of Jordan, Amman, Jordan.
2. Irbid, Jordan.
3. Jordan University of Science and Technology, Irbid, Jordan

* Correspondence should be addressed to:

Assistant Professor, Department of Family and Community Medicine, Faculty of Medicine, the University of Jordan.

E-mail: s.alkhaldi@ju.edu.jo

P. O. Box: 13603, Post code 11942, Amman, Jordan.

improve their outcome^(1,2). This prescription behavior contributes to the development of antibiotic resistance, with its clinical and economic consequences⁽³⁾. Furthermore, Parents in Jordan can purchase antibiotics for their children from community pharmacies easily without prescription. Although there are laws in Jordan that prevent dispensing antibiotics without prescription, these laws are not enforced. Research has shown high rates of self-medication with antibiotics in Jordan and in other Arab countries⁽⁴⁻⁹⁾.

Inappropriately used and unnecessarily prescribed antibiotics for self-limiting URTIs are well recognized public health problems worldwide, including Jordan^(3, 4, 10-12). This concern is due to unnecessary adverse reactions, extra cost, and resulting bacterial resistance. The association between inappropriate use of antibiotics and occurrence of resistance is strong and supported by a large number of studies^(13, 14).

The emergence of antibiotic resistant bacteria, resulting from AB overuse and inappropriate use, has drawn the attention to what leads to this behavior. A number of factors that determine antibiotic overuse and misuse in children have been reported, among which are knowledge, attitudes, and practices of parents, in addition to physicians' beliefs and practices^(6, 15-22).

Physicians frequently report that antibiotics are prescribed for children with URTIs to meet mothers' expectations. Evidence shows that physicians do respond to pressure from parents when they think that an AB is needed for their child. Nevertheless, other studies reported that pediatricians' prescribing of antibiotics is not driven by parental pressure and that parents' contribution to AB misuse is less than expected^(2, 18, 19).

In Jordan, 82.3% of the population have

health insurance, and 11% of them are double insured, with good access to primary health care⁽²³⁾. In addition, antibiotics can be purchased from community pharmacies without prescriptions, and the prices of AB are relatively cheap, all that, has provided a fertile environment for over use and misuse of antibiotics in Jordan. Since no studies exist in the literature about factors associated with antibiotic over use and misuse in Jordan; this study attempts to investigate the knowledge, attitudes and practices related to antibiotic use among mothers of children with URTIs in Irbid governorate, in the North of Jordan.

Methods

Study Design, Population, and setting

This study used a cross-sectional design. It took place in two comprehensive health care centers (CHCs) in Irbid governorate, each of which serves a population of about 25,000 beneficiaries. One of these CHCs is located in Irbid city and is a teaching and training health center for Jordan University of Science and Technology (JUST), and serves the students of the university and all its employees with their families. The other health center is located in a town near Irbid city (Alsareeh) and serves its population in addition to surrounding villages. We believe that the populations served by these health centers do represent the population of Irbid governorate.

The target population in this study is all mothers visiting the assigned Comprehensive Health Centers (CHC's) accompanying their children. A convenience sample of 401 mothers attending the health centers was obtained (201 from JUST health center, and 200 from Alsareeh health center). Data collection took place during the period between January and April 2011. The eligibility criteria were being a mother who

has at least one child between 6 months and 12 years of age attending the assigned health centers. On the day of visit of the researcher to the center, each eligible mother was invited to participate in the study. Consenting participants were interviewed while waiting to see the physician.

This study had considered research ethics guidelines in all phases of the study. Permission to conduct the study was obtained from the Institutional Review Board (IRB) in Jordan University of Science and Technology. Furthermore, a written informed consent was obtained from each participant before filling the questionnaire. Participants were assured of the confidentiality of the data.

Study Instrument

Study data were collected using a structured interview questionnaire which was adapted from the original instrument developed by Panakakou S, et. al.(24). The English version of the original questionnaire was translated to the Arabic language and then back-translated to English by an independent translator to improve reliability and validity of the questionnaire. The Arabic version was then pilot tested on 20 mothers, and was minimally modified accordingly. The items of the questionnaire measure three main outcomes: knowledge, attitudes, and practices concerning antibiotic use (table 2). The questionnaire consists of four sections. Section A gathered information on mothers' demographic and socio-economic characteristics. Section B consists of 12 items and includes questions that address mothers' knowledge about AB use. Typical example is "Antibiotics are used for viral infection (agree/ disagree/ don't know). Section C consists of three items. It is related to mothers' attitudes towards antibiotic use such as expectation for AB for a child with

URTI. Typical example is "When my child gets cold, I should give him an antibiotic to prevent getting a more serious illness (agree/ disagree/ don't know)". Section D of the questionnaire contains three items that concern practices related to antibiotics. A typical example is "How often do you give your child antibiotics without the pediatrician's advice? (Always/ often/ never)".

Dependent variables are variables that measure knowledge, attitudes, and practices. Mothers' knowledge score is the sum of the right answers on the 12 items; and the cut-off point of 8 or more out of 12 is set to indicate adequate knowledge. Attitudes score consists of the sum of three items and the cut-off for positive attitude (proper or desirable attitude) is set as 3 out of 3. Practices score is the sum of three items related to AB use and the cut-off point for good practices is all three right answers. The questionnaire was administered by a trained interviewer.

Statistical Analysis

The SPSS software version 19 was used to analyze the data. Statistical analysis consists of descriptive statistics that included frequencies and percentages for the independent variables (demographics) and for dependent outcome variables. Chi-Square test was used to assess the relationship between each of knowledge, attitudes, and practices with certain socio-demographic variables. The level of significance was set at p-value of 0.05 or less.

Before logistic regression analysis, correlation between independent variables was investigated. Weak to moderate correlation was detected between age and number of children ($r=0.50$), mother's education and father's education ($r=0.46$), mother's education and total income ($r=0.40$), and

between total income and father's education ($r=0.32$).

Binary logistic regression analyses were performed to test for the net effect of some demographics and socio-economic variables on the dependent variable after controlling for the effect of other variables included in the model. Variables with significance level of 0.25 or less in the bivariate analysis were entered into the logistic regression model. The level of significance was set at p-value of 0.05 or less.

Results

A total of 401 mothers participated in the

study. Socio- economic and demographic characteristics of mothers are reported in Table1. Responses to items related to antibiotic knowledge, attitudes, and practices are shown in Table 2. One quarter (23.4%) of mothers acknowledged that antibiotics should not be used for viral infections. Regarding attitudes, 54.4% of mothers did not expect their pediatricians to prescribe an antibiotic for their child with URTI, 35.7% affirmed that antibiotics should not be given to a child with URTIs, and 34.2% of them believed that antibiotics will not make their child get better faster in case of URTIs.

Table 1. Socio-demographic characteristics of study subjects in antibiotic KAP study in Jordan 2011 (N= 401)

| Characteristics | N | % |
|--------------------------------------|-----|--------|
| Age | | |
| ≤35 | 254 | 63.3% |
| >35 | 147 | 36.7% |
| Mother's Education | | |
| ≤High school | 138 | 34.4% |
| >High school | 263 | 65.6% |
| Father's Education | | |
| ≤High school | 141 | 35.2% |
| >High school | 260 | 64.8% |
| Mother's Occupation | | |
| Medical Field | 30 | 7.5% |
| Non-Medical Field | 371 | 92.5% |
| Number of Children | | |
| 1 | 73 | 18.2% |
| 2-3 | 175 | 43.6 % |
| ≥4 | 153 | 38.2% |
| Health Insurance | | |
| Insured | 338 | 84.3% |
| Not insured | 63 | 15.7% |
| Monthly Family Income (N=372) | | |
| ≤500 JD | 237 | 63.7% |
| >500 JD | 135 | 36.3% |

Table 2. Overall and individual items measuring mothers' knowledge, attitudes, and practices related to antibiotic use in Antibiotic KAP study, Jordan 2011 (N=401)

| Question | Accepted Answer | Accepted % (n) |
|--|---|-------------------|
| Knowledge | | |
| Antibiotics are used for viral infections | No | 23.4 (94) |
| Most of URTIs are caused by viruses, and antibiotics do not work with them | Yes | 40.1 (161) |
| Antibiotics have no side effects | No | 54.9 (220) |
| Antibiotics overuse reduces antibiotics effectiveness | Yes | 81.8 (328) |
| Antibiotics reduce URTIs symptoms | No | 11.2 (54) |
| Antibiotics are used to reduce fever | No | 35.7 (143) |
| Antibiotics are used to overcome pain | No | 18.5 (74) |
| Antibiotics are used for common cold | No | 31.2 (125) |
| Antibiotics treatments should be started by | prescription by physician | 78.3 (314) |
| Antibiotic treatment is continued until | bottle finished or physician advise to stop | 74.1 (297) |
| Administering antibiotics twice a day means once when you wake up and once before you go to sleep. | Yes | 65.3 (262) |
| Have you ever read or heard about antibiotic resistance? | Yes | 66.8 (268) |
| Mothers with adequate overall knowledge * | | 21.7 (87) |
| Attitudes | | |
| What do you expect the doctor to prescribe if he saw your children with URTI? | Analgesic or antipyretic | 54.4 (218) |
| When my child has URTI, I should give him/her antibiotic. | No | 35.7 (134) |
| In case of URTI, antibiotics make my child get better faster. | No | 34.2 (137) |
| Mothers with positive (desirable) attitude towards proper use of AB * | | 14.5% (58) |
| Practices | | |
| Have you ever given your child, with URTI, an antibiotic without doctor advice? | Never | 49.1 (197) |
| How have you got the antibiotic you used for your child the last time he/she had URTI? | Doctor's prescription | 66.8 (267) |
| What do you do when you find that the antibiotic is not effective? | Use as recommended | 33.0 (132) |
| Mothers with good AB use practices * | | 11.2 (45) |

* Definition of adequate knowledge (8/12 right answers), positive (desirable) attitude (3/3 right answers) and good practices (3/3 right answers).

Practices related to antibiotic use are reported in Table 2. Results indicate that 49.1% of mothers reported never giving an antibiotic to their child with URTI without physician's advice. Most mothers (66.8%) declared having AB through a physician's prescription the last time their children suffered from URTIs, while 33.2% used left-over or bought antibiotic directly from the pharmacy. Table 2 also shows overall scores, where 21.7% of mothers have adequate knowledge about AB, 14.5% have positive attitude towards AB, and 11.2% reported good AB practices.

Results also show that the source of mothers' information about proper AB use. The vast majority reported getting the information from their physicians (82.3%). It

also shows that 63.4% of mothers have been informed by their physicians about AB resistance.

Results of bivariate and multivariate analyses

Chi-square test results in Table 3 show that mothers who have adequate AB knowledge were those with higher level of education, married to highly educated husbands, work in the medical field, and have higher income. Positive attitude toward antibiotic use was significantly more evident among mothers who work in the medical field, mothers who have more knowledge about ABs, and demonstrate good AB related practices. Mothers with good AB practices were significantly more likely to have more children, and to be informed by their physicians about antibiotic resistance.

Table 3. Chi-square distribution and p-values of knowledge, attitudes, and practices by certain variables in the antibiotic KAP study, Jordan 2011(N=401).

| Characteristics | % Adequate knowledge N= 87 | p-value | % Positive Attitude N= 58 | p-value | % Good Practices N= 45 | p-value |
|-----------------------------------|-------------------------------|------------------|------------------------------|--------------|---------------------------|-------------|
| Age | | | | | | |
| ≤35 | 19.7% | | 15.0% | | 13.0% | |
| >35 | 25.2% | 0.199 | 13.6% | 0.710 | 8.2% | 0.140 |
| Mother's Education (N=400) | | | | | | |
| <High school | 13.0% | | 10.1% | | 8.0% | |
| ≥High school | 26.2% | 0.002 | 16.7% | 0.075 | 12.9% | 0.135 |
| Father's Education (N=400) | | | | | | |
| <High school | 9.9% | | 10.6% | | 9.9% | |
| ≥High school | 28.0% | <0.001 | 16.5% | 0.109 | 11.9% | 0.546 |
| Mother's Occupation | | | | | | |
| Medical Field | 46.7% | | 33.3% | | 10.5% | |
| Non-Medical Field | 19.7% | 0.001 | 12.9% | 0.002 | 20.0% | 0.129 |
| Number of Children | | | | | | |
| 1 | 21.9 | | 15.1% | | 19.8% | |
| 2-3 | 20.0 | 0.740 | 16.0% | 0.686 | 10.9% | 0.04 |
| ≥4 | 23.5 | | 12.4% | | 7.8% | |
| Health Insurance | | | | | | |
| Insured | 22.1 | | 14.5% | | 10.90% | |
| Uninsured | 19.3 | 0.627 | 14.5% | 1.00 | 14.81% | 0.648 |
| Monthly Income (N=372) | | | | | | |
| ≥500 JD | 17.7% | | 15.6% | 0.690 | 10.1% | |
| >500 JD | 28.1% | 0.019 | 14.1% | | 12.6% | 0.465 |

| | | | | | | |
|---|-------|-------|-------|--------------|-------|--------------|
| Has been informed by physician about AB resistance (Yes) | | | | | | |
| Yes | 26.5% | 0.231 | 15.3% | 0.720 | 14.4% | 0.013 |
| No | 33.7% | | 13.3% | | 3.1% | |
| Knowledge about ABs | | | | | | |
| 0-4 | | | 10.6% | | 10.6% | |
| 5-8 | | | 13.3% | 0.005 | 10.4% | 0.406 |
| 9-12 | | | 29.8% | | 17.0% | |
| AB practices | | | | | | |
| poor | | | 12.9% | | | |
| good | | | 26.7% | 0.017 | | |

Table 4. Factors that predict knowledge and practices of mothers regarding antibiotic use, results of logistic regression analysis for the antibiotic KAP study, Jordan 2011 (N= 401)

| Variable* | Knowledge [†] | | Attitudes [‡] | | Practices [§] | |
|--|------------------------|--------------|------------------------|--------------|------------------------|------------------|
| | OR | P-value | OR | P-value | OR | p-value |
| Father's education (< high school) | | | | | | |
| ≥ high school | 2.2 | 0.022 | ----- | ----- | ----- | ----- |
| Mother's occupation (non-medical field) | | | | | | |
| Medical field | 2.9 | 0.011 | 3.1 | 0.009 | ----- | ----- |
| Income (>500JD) | | | | | | |
| <250 JD | ----- | ----- | 3.5 | 0.016 | ----- | ----- |
| 250-500 JD | ----- | ----- | 1.6 | 0.193 | ----- | ----- |
| Informed by physician about AB resistance (No) | ----- | ----- | ----- | ----- | 5.1 | 0.012 |
| Yes | | | | | | |
| Knowledge about AB use (inadequate) | | | | | | |
| Adequate | ----- | ----- | 1.1 | 0.755 | 1.9 | 0.272 |
| Attitudes towards AB use (negative) | | | | | | |
| Positive | ----- | ----- | ----- | ----- | 6.3 | <0.001 |
| AB related practices (poor) | | | | | | |
| Good | ----- | ----- | ----- | ----- | ----- | ----- |

* Reference category in parenthesis.

[†] Model 1: Variables included in the model are: mother's education, father's education, mother's occupation, and monthly income.

[‡] Model 2: Variables included in the model are: mother's education, Father's education, mother's occupation, number of children, income and knowledge about AB use.

[§] Model 3: Variables included in the model are: number of children, being informed about AB resistance, knowledge about AB use, and attitude towards AB use.

Results of multivariate analysis are presented in table 4. Logistic regression results revealed that mothers demonstrating adequate AB knowledge were significantly more likely to have their spouses holding High School Diploma or higher (OR=2.2, p=.022), and to be working in the medical field (OR=2.9, p=0.011).

Mothers with positive attitude towards

proper AB use were significantly more likely to be working in the medical field (OR= 3.1, p= 0.009) and to have high income levels (OR= 3.5, p= 0.016). Logistic regression analysis also revealed that mothers who were informed by their physician about antibiotic resistance were more likely to report good antibiotic practices (OR= 5.1, p=0.012) and the same for women who had positive attitude

towards proper AB use (OR=6.3, $p < 0.001$).

Discussion

This is the first published cross-sectional study in Jordan that examines mothers' knowledge, attitudes, and practices related to antibiotic use for URTIs. This study shows that only one in four mothers in Irbid governorate have adequate knowledge about AB and their use, despite the fact that about two-thirds of the sample subjects hold undergraduate or postgraduate degrees. Forty percent of mothers know that most of URTIs are of viral origin, and should not be treated by antibiotics. This rate is higher than that reported in Malaysia⁽¹⁶⁾, but lower than that reported in Greece⁽¹⁸⁾, the US⁽¹⁵⁾, and Cyprus⁽¹⁹⁾.

Furthermore, one-third of mothers have never heard about antibiotic resistance, and the majority (88.8%) of mothers has the misconception that antibiotics do relieve URTI symptoms. This misconception about AB use was higher than that reported among mothers in Malaysia⁽¹⁶⁾. Although the physician was the main source of information about antibiotics for 82% of mothers, family and friends was the second source of information for mothers. This indicates the importance of the well-informed public in influencing mothers' knowledge regarding AB use.

Parents' expectation for antibiotic prescription has been frequently regarded as a driving force for antibiotic prescribing by physicians. Although two-thirds of mothers believe that their children with URTI should receive AB and that AB will make children get better faster, yet 45.6% of mothers expect their physician to prescribe AB for their child with URTI. This discrepancy between expectations and beliefs suggests that mothers do trust their physicians to prescribe AB when indicated.

This finding is consistent with results of another study which showed that patients exert very little influence on drug prescribing which is actually overestimated⁽²⁵⁾. However, the rate of mothers expecting AB prescribing for URTIs is higher than that reported in USA⁽¹⁵⁾, and Cyprus⁽¹⁹⁾, but lower than the that reported in Malaysia⁽¹⁶⁾ and Greece⁽¹⁸⁾.

The present study provides evidence that misuse of antibiotics is widely prevalent in Jordan. It is worth noting that most mothers know that antibiotics should be only started by a physician. Nevertheless, about one-half of them have previously started antibiotic treatment for their child with URTI without physician's advice, and one-third of mothers gave their children during the last episode of URTI an antibiotic without medical advice.

Financial and time constraints were the most prominent reasons for this practice. Being worried about the child's health and safety, may drive parents to purchase AB from any pharmacy thus saving time and cost rendered by seeking physicians' advice, especially if it has been prescribed before by a physician for a similar episode of URTI. This finding supports the 39.5%-57% rates of self-medication reported in Jordan and other Arab countries^(4,5,9). However, our study data contradict findings reported from Greece⁽¹⁸⁾, Cyprus⁽¹⁹⁾, and Australia⁽²⁶⁾ where parents rarely give their children AB without medical advice. Moreover, two-thirds of mothers in this study did not use AB as recommended by the physician. This is higher than the rates reported in antibiotic misuse in Malaysia⁽¹⁶⁾, where only 26% of children did not complete the entire course of AB.

Multivariate analysis suggests that maternal knowledge about ABs is independently associated with father's education followed by mother's occupation in the medical field. This

may be interpreted as the positive net effect of father's education on raising the level of awareness and knowledge for the mother of his children and consequently the family in general, regardless of the level of mother's education. This seems logical since the father is usually the head of the household, and his leadership role becomes more evident with a less educated mother.

As expected, mother's work in the medical field maintained a net effect on knowledge about AB, since her education and everyday work are the source of information about Abs. Unfortunately, mothers' knowledge was not translated into positive attitudes or good practices. This contradicts findings from other studies in Trinidad⁽¹⁷⁾ and in the USA⁽¹⁵⁾ where high level of parental knowledge about ABs was a strong predictor of positive attitudes toward proper AB use and of good AB practices.

This study shows that good AB use practices are strongly and independently associated with being informed by the physician about AB resistance, and with having positive attitudes towards AB use. This result has two major implications on both clinical and public health levels. Physicians should play an active role in complying with the recommended clinical guidelines for antibiotic prescribing, and in informing their patients about resistance and about judicious antibiotic use, taking advantage of the direct and trusting relationship with their patients. Physicians can also contain the problem of inappropriate AB use by prescribing AB only when indicated and necessary. On the public health level, this validates the critical role of positive attitudes as a key to promoting judicious AB practices among the population, and that it should be the pillar on which interventions are designed by health planners.

Interventions targeting physicians' AB prescribing behavior especially in the outpatient setting should be designed and implemented. National guidelines for the use of AB in URTIs should be disseminated to help clinicians with wise AB prescribing, including delayed antibiotic prescribing has proved effective in other countries⁽²⁷⁻²⁹⁾. National campaigns targeting the public in Jordan may have good potential to boost and reinforce positive attitude as the strongest driver for rational practices related to ABs^(30, 31).

This study, despite the effort employed to develop sound methodology, has some limitations. The sample was selected from two comprehensive health centers (CHCs) in Irbid governorate. However, there is no reason to believe that this sample of mother is different from mothers living Irbid, since both centers provide health and medical services to populations with a wide range of demographic and socio-economic backgrounds. Another limitation is that no data was collected about the level of utilization of antibiotics during the last year. That would have given the chance to study the relationship between knowledge, attitudes, and level of AB utilization as a practice dimension.

Results of this study can be useful for informing policy makers in Jordan in their effort to introduce policy level interventions to control antibiotic use. This study confirms results of previous research by showing that mothers' attitudes and beliefs about antibiotics strongly influence their antibiotic related practices. It also confirms that receiving information from the physician powerfully affects good AB practices among mothers. The other side of the coin in controlling AB overuse is the prescribing behavior of physicians, which was not investigated in this

study. Future studies on antibiotic use KAP might consider interviewing physicians and pediatricians to measure their knowledge, attitudes, and practices related to antibiotic prescribing, in order to uncover the association between patients' and physicians' AB related KAP. Regulations in Jordan clearly confirm that AB is prescription medicine. However, over the counter antibiotic purchase is common practice in Jordan, because these regulations are not enforced. This study indicates the immediate need for efforts to reinforce the AB prescribing regulations. Political will is essential for both starting and energizing such a comprehensive national program to maintain the momentum needed to achieve its goals. The use of health information system will be instrumental for the surveillance, control, and evaluation needed, and this has a long way to be well-established in Jordan.

The role of mass media in Jordan must be emphasized and better utilized as an effective tool for educating the public about judicious use of AB. It is crucial to build capacity to promote prudent use of AB in the Jordanian society, based on the notion of the dangers of

AB resistance, the economic burden of the problem, and the scarcity of newly developed effective AB treatments.

Conclusions

The majority of Jordanian mothers lack the basic knowledge about URTIs and the optimal use of ABs, complicated with negative attitudes towards AB use. Positive attitudes strongly predict good AB practices, and these attitudes have to be corrected in order to reduce AB misuse and overuse, to restraint AB resistance. In Jordan as a country with high antibiotic consumption and high rates of AB resistance, immediate action should take place on the medical educational and professional levels, in addition to the governmental and population levels, to reduce inappropriate use of antibiotics.

Funding: This research is supported by Jordan University of Science and Technology.

Ethical approval: This research was approved by the Institutional Review Board (IRB) in Jordan University of Science and Technology.

References

1. Del Mar CB, Glasziou PP, Spinks AB. Antibiotics for sore throat. *Cochrane Database Syst Rev.* 2006 (4): CD000023.
2. Dallas A, Magin P, Morgan S, Tapley A, Henderson K, Ball J, et al. Antibiotic prescribing for respiratory infections: a cross-sectional analysis of the ReCEnT study exploring the habits of early-career doctors in primary care. *Family practice.* 2014.
3. Spellberg B, Guidos R, Gilbert D, Bradley J, Boucher HW, Scheld WM, et al. The epidemic of antibiotic-resistant infections: a call to action for the medical community from the Infectious Diseases Society of America. *Clin Infect Dis.* 2008; 46 (2): 155-64.
4. 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.
5. Sawair FA, Baqain ZH, Abu Karaky A, Abu Eid R. Assessment of self-medication of antibiotics in a Jordanian population. *Med Princ Pract.* 2009; 18 (1): 21-5.
6. Shehadeh M, Suaifan, G, Darwish, RM, Wazaify, M, Zaru, L, Alja'fari, S. Knowledge, attitudes, and behaviors regarding antibiotics use and misuse among adults in the community of Jordan. A pilot study. . *Saudi Pharmaceutical Journal.* 2011; doi:10.1016/ J.Jsps. 2011.11.005
7. Albsoul-Younes A, Wazaify, M, Yousef, AM, Tahaine, L. Abuse and misuse of prescription

- and nonprescription drugs sold in community pharmacies in Jordan. *Subst Use Misuse*. 2010; 45 (9): 1319-29.
8. Barah F, Goncalves V. Antibiotic use and knowledge in the community in Kalamoon, Syrian Arab Republic: a cross-sectional study. *Eastern Mediterranean health journal = La revue de sante de la Mediterranee orientale = al-Majallah al-sihhiyah li-sharq al-mutawassit*. 2010; 16 (5): 516-21.
 9. Abasaed 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.
 10. Roberts RR, Hota B, Ahmad I, Scott RD, 2nd, Foster SD, Abbasi F, et al. Hospital and societal costs of antimicrobial-resistant infections in a Chicago teaching hospital: implications for antibiotic stewardship. *Clin Infect Dis*. 2009; 49 (8): 1175-84.
 11. Maragakis LL, Perencevich EN, Cosgrove SE. Clinical and economic burden of antimicrobial resistance. *Expert Rev Anti Infect Ther*. 2008; 6 (5): 751-63.
 12. Abukaraky AE, Afifeh KA, Khatib AA, Khairi NO, Habarneh HM, Ahmad W, et al. Antibiotics prescribing practices in oral implantology among Jordanian dentists. A cross sectional, observational study. *BMC Res Notes*. 2011; 4: 266.
 13. Costelloe C, Metcalfe C, Lovering A, Mant D, Hay AD. Effect of antibiotic prescribing in primary care on antimicrobial resistance in individual patients: systematic review and meta-analysis. *Bmj*. 2010; 340: c2096.
 14. Borg MA, Zarb P, Ferech M, Goossens H, Group ARP. Antibiotic consumption in southern and eastern Mediterranean hospitals: results from the ARMed project. *The Journal of antimicrobial chemotherapy*. 2008; 62 (4): 830-6.
 15. 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.
 16. Chan GC, Tang SF. Parental knowledge, attitudes and antibiotic use for acute upper respiratory tract infection in children attending a primary healthcare clinic in Malaysia. *Singapore Med J*. 2006; 47 (4): 266-70.
 17. Parimi N, Pinto Pereira LM, Prabhakar P. Caregivers' practices, knowledge and beliefs of antibiotics in paediatric upper respiratory tract infections in Trinidad and Tobago: a cross-sectional study. *BMC Fam Pract*. 2004; 5:28.
 18. Panagakou SG, Spyridis N, Papaevangelou V, Theodoridou KM, Goutziana GP, Theodoridou MN, et al. Antibiotic use for upper respiratory tract infections in children: a cross-sectional survey of knowledge, attitudes, and practices (KAP) of parents in Greece. *BMC Pediatr*. 2011; 11: 60.
 19. Rousounidis A, Papaevangelou V, Hadjipanayis A, Panagakou S, Theodoridou M, Syrogiannopoulos G, et al. Descriptive study on parents' knowledge, attitudes and practices on antibiotic use and misuse in children with upper respiratory tract infections in Cyprus. *Int J Environ Res Public Health*. 2011; 8 (8): 3246-62.
 20. Coco AS, Horst MA, Gambler AS. Trends in broad-spectrum antibiotic prescribing for children with acute otitis media in the United States, 1998-2004. *BMC Pediatr*. 2009; 9: 41.
 21. Napolitano F, Izzo MT, Di Giuseppe G, Angelillo IF. Public knowledge, attitudes, and experience regarding the use of antibiotics in Italy. *PloS one*. 2013; 8 (12): e84177.
 22. Alzoubi K, Al-Azzam S, Alhusban A, Mukattash T, Al-Zubaidy S, Alomari N, et al. An audit on the knowledge, beliefs and attitudes about the uses and side-effects of antibiotics among outpatients attending 2 teaching hospitals in Jordan. *Eastern Mediterranean health journal = La revue de sante de la Mediterranee orientale = al-Majallah al-sihhiyah li-sharq al-mutawassit*. 2013; 19 (5): 478-84.
 23. Ajlouni MT. *Jordan Health System Profile*. 2011.
 24. Panagakou SG, Theodoridou MN, Papaevangelou V, Papastergiou P, Syrogiannopoulos GA, Goutziana GP et al. Development and assessment of a questionnaire for a descriptive cross-sectional study concerning parents' knowledge, attitudes and practises in antibiotic use in Greece. *BMC Infect Dis*. 2009; 9: 52.
 25. Lado E, Vacariza M, Fernandez-Gonzalez C, Gestal-Otero JJ, Figueiras A. Influence exerted on drug prescribing by patients' attitudes and expectations and by doctors' perception of such expectations: a cohort and nested case-control study. *J Eval Clin Pract*. 2008; 14 (3): 453-9.
 26. Ecker L, Ochoa TJ, Vargas M, Del Valle LJ, Ruiz J. Factors affecting caregivers' use of antibiotics available without a prescription in Peru. *Pediatrics*. 2013; 131 (6): e1771-9.
 27. Moore M, Little P, Rumsby K, Kelly J, Watson L, Warner G, et al. Effect of antibiotic prescribing strategies and an information leaflet

- on longer-term reconsultation for acute lower respiratory tract infection. Br J Gen Pract. 2009; 59 (567): 728-34.
28. Dommergues MA, Hentgen V. Decreased paediatric antibiotic consumption in France between 2000 and 2010. Scand J Infect Dis. 2012; 44 (7): 495-501.
29. Van Gastel E, Costers M, Peetermans WE, Struelens MJ. Nationwide implementation of antibiotic management teams in Belgian hospitals: a self-reporting survey. The Journal of antimicrobial chemotherapy. 2010; 65 (3): 576-80.
30. Huttner B, Goossens H, Verheij T, Harbarth S. Characteristics and outcomes of public campaigns aimed at improving the use of antibiotics in outpatients in high-income countries. Lancet Infect Dis. 2010; 10 (1): 17-31.
31. Wutzke SE, Artist MA, Kehoe LA, Fletcher M, Mackson JM, Weekes LM. Evaluation of a national programme to reduce inappropriate use of antibiotics for upper respiratory tract infections: effects on consumer awareness, beliefs, attitudes and behaviour in Australia. Health Promot Int. 2007; 22 (1): 53-64.

المعرفة والمواقف والممارسات المتعلقة باستخدام المضادات الحيوية عند

الأمهات في الأردن

سيرين الخالدي^{1*}، مسار المحمود²، هاشم كنعان³

1- الجامعة الأردنية، عمان، الأردن؛ 2- إربد، الأردن؛ 3- جامعة العلوم والتكنولوجيا، إربد، الأردن.

الملخص

الهدف: يراجع الأطفال الطبيب بشكل متكرر لعلاج التهابات الجهاز التنفسي العلوي. وعلى الرغم من أن المسبب فيروسي فإنه يتم وصف المضادات الحيوية، والتي غالباً ما تستخدم بشكل غير صحيح، مما يزيد من ظاهرة مقاومة الفيروسات للمضادات الحيوية. هذه الدراسة ستوضح العوامل التي تؤثر في المعرفة والمواقف والممارسات المتعلقة باستخدام المضادات الحيوية لدى الأمهات في محافظة إربد.

الأساليب: في هذه الدراسة المستعرضة، مجتمع الدراسة يتكون من 401 من الأمهات الذين لديهم أطفال أعمارهم بين الستة أشهر و12 سنة. استخدم إستبيان لجمع البيانات و تم ذلك في الفترة بين شهر يناير وابريل 2011. جمعت العينة من مركزين صحيين شاملين في محافظة إربد.

النتائج: تحليل البيانات يظهر أن نسبة قليلة من الأمهات (21.7%) يمتلكن المعرفة الكافية عن المضادات الحيوية، وبعضهم (14.5%) لديه مواقف إيجابية نحو استخدام المضاد الحيوي. في حين 11.2% من الأمهات فقط يستعملن المضاد الحيوي بالشكل الصحيح. تؤكد نتائج الانحدار اللوجستي أن أقوى عوامل التنبؤ للمعرفة الكافية باستخدام المضادات الحيوية هي: تعليم الأب (OR=2.2; p=0.02)، عمل الأم في المجال الطبي (OR=2.9; p=0.011)، والذي كان من أقوى عوامل التنبؤ بالمواقف الإيجابية نحو المضاد الحيوي (OR= 3.1; p=0.009). كذلك تبين وجود ارتباط قوي جدا بين للاستعمال الصحيح المضادات الحيوية والاتجاهات الصحيحة عند الأمهات (OR= 6.3; p<0.001). وكذلك مع حصول الأم على معلومات حول المقاومة للمضادات الحيوية. لم توجد أية علاقة بين المعرفة الكافية بالمضادات الحيوية والاتجاهات الإيجابية لاستخدامها.

الاستنتاجات: أغلبية الأمهات في محافظة إربد يفتقرن إلى المعلومات الصحيحة حول المضادات الحيوية، وكذلك يفتقر بشكل كبير إلى المواقف الإيجابية نحو استخدامها، بالإضافة إلى الدرجة العالية من سوء الاستعمال. الأردن بحاجة إلى حملة وطنية شاملة لتعزيز الاتجاهات الإيجابية نحو استخدام المضادات الحيوية.

الكلمات الدالة: المعرفة، المواقف، المضادات الحيوية، الأمهات، الأردن.