



**Research Article**

JMR 2016; 2(4): 99-103  
July- August  
ISSN: 2395-7565  
© 2016, All rights reserved  
www.medicinarticle.com

## Saudi Parents' knowledge, Attitudes and Practices on Antibiotic Use for Upper Respiratory Tract Infections in Children: A population –based Survey; Taif, Kingdom of Saudi Arabia

Elbur AI\*<sup>1</sup>, Albarraq AA<sup>1</sup>, Abdallah MA<sup>1</sup>

<sup>1</sup> Pharmacy Practice Research Unit, College of Pharmacy, Taif University, Kingdom of Saudi Arabia Al-Haweeiah, P. O. Box 888, Taif, 21974, Kingdom of Saudi Arabia

### Abstract

**Background:** Upper respiratory tract infections (URTIs) occur most commonly among children and considered as a major cause of mild morbidity. **Aims and objectives:** This study was conducted to assess parental knowledge and to identify their attitudes and practices related to antibiotic use in the treatment of childhood upper respiratory tract infections (URTIs). **Study design:** A cross-sectional study. **Setting:** The study was conducted during the period of January-March 2014 in Taif City, Saudi Arabia. **Methods:** Adult (> 18 year) Saudi people residing the city were included. Convenience method of sampling was adopted. Data was collected by mean of a structured questionnaire. **Statistics:** Data was processed using the Statistical Package for Social Science (SPSS). Logistic regression analysis was performed. P value< 0.05 was considered statistically significant. **Results:** A total of 400 participants was included, of them 236 (59%) were males. Overall, 124 (31.0%) of all interviewed parents had satisfactory knowledge on antibiotic use. Multivariate analysis showed that higher education was found to be the only predictor of satisfactory knowledge, [OR 2.5 CL (1.7- 4.5), (P= 0.026)]. Of all the parents 206 (51.5%) often give the child antibiotic based on a pharmacist recommendation and 193 (48.3%) of them reuse the antibiotic previously given for the same symptoms. **Conclusion:** Parents in the study area had poor knowledge on antibiotic use, which is significantly dependent on parents' level of education. In addition, some misconceptions on parents attitudes and practices related to the use antibiotics for the treatment of URTIs among children were identified.

**Keywords:** Parents, Knowledge, Attitudes Practices, Antibiotic, Upper Respiratory Tract Infections.

### INTRODUCTION

Upper respiratory tract infections (URTIs) occur most commonly among children and considered as a major cause of mild morbidity<sup>[1]</sup>. In most cases these infections are of viral etiology<sup>[2-5]</sup> and have specific seasonal occurrences<sup>[5]</sup>. Infection with these viruses lead to symptoms of the common cold, with coryza, cough, and hoarseness. Rhinitis and pharyngitis are also found and in some cases, symptoms and signs of otitis media may also occur<sup>[6]</sup>. Most of these infections are self- limiting with a very low risk of complications and its management consist of self care and symptomatic treatment<sup>[7]</sup>.

Irrational use of antibiotic for conditions diagnosed as URTIs among children was documented in many studies<sup>[8-10]</sup> despite no clinical evidence to support this practice in most of the cases. Parents either directly or indirectly influence the physician's decision to prescribe antibiotics for their children suffering such infections. Among parents misconceptions about antibiotic use are widespread<sup>[11]</sup>. Parents' knowledge about the etiology of common respiratory tract infections and antibiotic therapy is often suboptimal<sup>[12]</sup>. Parents malpractices related to antibiotics use such as not completing the full course, stopping antibiotics when symptoms disappear and use of the "leftover" antibiotics was reported in the literature<sup>[13]</sup>. Furthermore, researchers found that not receiving antibiotics after initial physician consultation for URTIs symptoms was associated with parent dissatisfaction<sup>[14]</sup>. Another serious example of antibiotic misuse, the parents used to self-medicate their children with antibiotics to treat such infections<sup>[15]</sup>.

Assessment of parents' knowledge and identifying their attitudes and practices related antibiotic use in pediatric URTIs is of utmost importance to the development of educational interventions to raise their

**\*Corresponding author:**

**Dr. Abuabker Elbur**

Assistant Professor, Pharmacy Practice Research Unit, College of Pharmacy, Taif University, Kingdom of Saudi Arabia Al-Haweeiah, P. O. Box 888, Taif, 21974, Kingdom of Saudi Arabia

awareness. To the best of our knowledge, no study has been conducted in Saudi to identify parental knowledge, attitudes and practices related to the use of antibiotics in the management of URTIs in pediatric. Therefore, this research was designed to assess parental knowledge and to identify their attitudes and practices related to antibiotic use in the treatment of childhood URTIs.

## MATERIALS AND METHODS

### Study design

A cross-sectional study was conducted during the period of January – March 2014 in Taif City.

### Inclusion and exclusion criteria

Adult (> 18 year) Saudi people residing in Taif City were included. The study objectives were clearly stated for the participants before the commencement of the interview process. People who were unable to communicate verbally or with cognitive impairment and those who refused to participate in the study were immediately excluded.

### Sample size and sampling technique

Convenience method of sampling was adopted. Based on the last census conducted in the year 2010<sup>[16]</sup>, the total number of adults in the study area was estimated to be 1,200,000. The sample size based on that census was calculated to be 385. Sample calculation was conducted at a 95% confidence level with a margin of error 5%.

### Data collection

Data was collected by mean of a structured questionnaire, which was adapted from a previous study after obtaining permission from the authors<sup>[17]</sup>. The tool was translated into Arabic Language using forward-backward translation method. Data was collected by Pharm D students. Data collected in public places in the city (Malls, supermarkets, parks, schools, and restaurants). The average time to conduct the interview was estimated to be 15 minutes. The questionnaire was composed of four sections to collect data on: Basic and demographic data: gender, age in year, residence, educational level, level of monthly income, number of children < 12 years, does the child often suffers from upper respiratory tract infections, and sources of information about antibiotics. Knowledge of the antibiotic use section, whereby six questions were designed to measure this domain. The questions mainly focused on the use of antibiotic if the child suffers from fever, the use of these agents in the URTIs, side effects of antibiotics, unnecessary use of antibiotic and emergence of resistance, the use of antibiotic to reduce the complications of the URTIs and completion of the course of antibiotic even the symptoms disappeared. The responses in this section were recorded as "Yes", "No" and "Don't know". The correct responses were given scores =1 and the wrong ones was given scores= 0. The cutoff point for satisfactory knowledge on antibiotic was determined as the score of  $\geq 3$  points. The third section of the questionnaire was designed to assess participants' attitudes towards antibiotic use. This part started with general questions to identify the number of days that the parents let it pass if the child suffers from URTIs symptoms in order to visit the physician, the drug/s they expected to be prescribed in such cases, the most common symptoms that make the parents to visit the physician. Ten questions were designed to assess participants' attitudes towards general antibiotic use and specifically on their uses on URTIs. The responses in this section were recorded on a five point Likert scale "strongly agree, agree, uncertain, disagree, and strongly agree". The last part was composed of seven questions to assess participants' practices on antibiotics. The responses in this part were recorded on a five point Likert scale "always, most of the time, often, sometimes and never". The questionnaire was tested with a group of 10 people to ensure

applicability and to estimate the time frame needed to complete it. Minor suggestions were observed and adopted in the final version.

### Statistical analysis

Data was processed using the software SPSS (21.0 SPSS Inc., Chicago III, USA). Descriptive statistics were used to describe all variables. Logistic regression analysis was performed to determine the most significant demographic variables (independent) associated with total knowledge on antibiotics (dependent). Crude logistic regression analysis was performed as an initial step of qualifying covariates to be included in multivariate logistic regression analysis. The  $P$  value < 0.05 was considered statistically significant.

### Ethical approval

Ethical approval for the conduction of the research was obtained from the Pharmacy Practice Research Unit (PPRU), College of Pharmacy, Taif University, Saudi Arabia.

## RESULTS

### Basic and demographic data

A total of 400 participants was included, of them 236 (59%) were males. Nearly three quarters were living in the city. Slightly more than three quarters attained secondary and above education. Table (1) showed participants' basic and demographic data.

**Table 1:** Basic and demographic data

Background characteristics	Frequency	Percent
<b>Gender</b>		
Male	236	59.0
Female	164	41.0
<b>Age in year</b>		
$\leq 40$	289	72.2
$> 40$	111	27.8
<b>Residence</b>		
Town	301	75.2
Outside town	099	24.8
<b>Educational level</b>		
Secondary & above	305	76.2
Below secondary	095	23.8
<b>Monthly income in SR</b>		
$\leq 10000$	115	28.8
$> 10000$	285	71.2
<b>Number of children &lt;12 years old</b>		
1-3	268	67.0
$> 3$	132	33.0
<b>Does your child suffer often from Upper Respiratory Infections</b>		
Yes	324	81.0
No	076	19.0
<b>Total</b>	400	100

### Sources of information about antibiotics

The physician was ranked as a top source about antibiotics by 245 (61.3%) of the parents, followed by the pharmacist 175 (45.8%), 78 (19.5%) relatives and friends and media 47 (11.8%).

### Knowledge of antibiotics and its predictors

Correct responses to the items designed to assess participants' knowledge on antibiotic use were presented in table (2). Overall, 124 (31.0%) of all interviewed parents had satisfactory knowledge on antibiotic use. Univariate analysis showed that of all variables

secondary and above educational level, compared to education below secondary [ (35.4% vs. 16.8%), 2.7 (1.5- 4.9), ( $P= 0.001$ )] and high level of monthly income (10000 SR), compared to low income (<10000 SR); [39.1% vs.27.7%), 1.7(1.0- 2.6), ( $P= 0.026$ )]; were significantly associated with satisfactory level of knowledge. However, on multivariate analysis higher education was found to be the only predictor of satisfactory knowledge,[ 2.5 (1.7- 4.5),( $P= 0.026$ )].

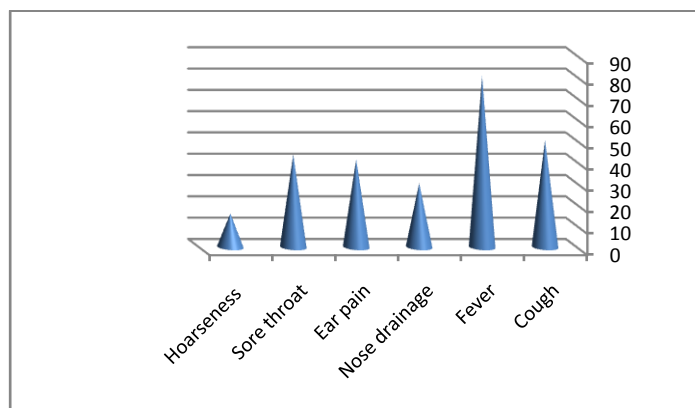
**Table 2:** Knowledge on antibiotic use (n=400)

Item	Frequency of correct response (%)
Antibiotic must be administered in any case, once a child has fever	313 (78.3%)
As most of the Upper Respiratory Infections (like colds, flu, sore throats, ear infections) are of viral cause, they must not be cured with antibiotics.	190 (47.5%)
Antibiotics do not present side – effects	236 (59.0%)
When antibiotics are administered where there is no special reason, their efficacy is decreased and bacteria become more resistant.	51(12.8%)
Antibiotics decrease the complications of an Upper Respiratory Infection.	363 (90.8%)
Full course of antibiotic should be completed even if the patient condition is improved	306 (76.5%)

#### Attitudes about antibiotic use

A considerable number 177( 44.3%) of the participants admitted that they just let  $\leq 1$  day pass in order to visit a physician, if the child presents some symptoms of URTI (ie. nose drainage, sore throat, vomit, cough, fever). More than 60% of the parents expect the physician to suggest an antibiotic for the child when it suffers from an upper respiratory infection, while 132 (33.0%) of them expect an

analgesic, 103 (25.8%) anti-tussive and 100 (25%) antihistamine medications. Fever was the most common symptom (80.5%) that the child suffers and makes the parents to visit a physician. Percentages of symptoms that the child suffers and make the parents to visit the physician were depicted in figure (1).



**Figure 1:** Percentages of symptoms that the child suffer and make the parents to visit the physician

Of all the parents 206 (51.5%) often give the child antibiotic based on a pharmacist recommendation and 193 (48.3%) of them reuse the antibiotic previously given for the same symptoms. Other reasons for giving the child antibiotic without physician advice were shown in table (3).

Responses to questions designed for assessing respondents' attitudes were presented in table (4). Nearly 70% of the interviewees believed that antibiotics are used too much and slightly above 80% of them thought that parents and physicians should be informed about the judicious antibiotic use.

**Table 3:** Reasons for giving the child antibiotic without the physician' advice as disclosed by parents

Reason	Always/ Most of the times	Often	Sometimes/ never
No time to visit a doctor	170 (42.5%)	91 (22.8%)	139 (34.7%)
Not have enough money	84 (21%)	75(18.8%)	241(60.2%)
The child's condition was not serious enough	158 (39.5%)	132 (33%)	110 (27.5%)
Use the previous antibiotic for the same symptoms	193 (48.3%)	99 (24.7%)	108 (27%)
Based on a pharmacist recommendation	206 (51.5%)	99 (24.8%)	95 (23.7%)
Based on a friend/ family relative recommendation	116 (29%)	90 (22.5%)	194 (48.5%)

**Table 4:** Attitudes on antibiotics use

Item	SA/A	Uncertain	D/ SD
Antibiotics are used too much	279 (69.7%)	55 (13.8%)	66 (16.5%)
Changing the physician because he/she does not prescribe antibiotics often enough for the child	136 (34%)	90 (22.5%)	174 (43.5%)
Changing the physician because he/she prescribes antibiotics for the child very often	179 (44.7%)	77(19.3%)	144(36.0%)
Reuse an antibiotic which had been used in the past if the child presents the same symptom - s	239 (59.7%)	64 (16%)	97 (24.3%)
Parents and physicians should be informed about judicious antibiotic use?	331 (82.7%)	37 (9.3%)	32 (8.0%)
Most of the URTI are self – cured even without the use of antibiotics	206 (51.5%)	143(35.7%)	51 (12.8%)
You press on the physician for antibiotic therapy if the child suffers from recurrent URTI	193 (48.2%)	78 (19.5%)	129 (32.3%)
Visiting a physician just because of nose drainage?	168 (42.0%)	68 (17%)	164 (41.0%)
You worry about your child more than other parents do for theirs	301 (75.3%)	54 (13.5%)	45 (11.3%)
Visiting a physician in order to avoid any complications of the child's infection?	311 (77.8%)	36 (9%)	53 (13.2%)

## Antibiotic practices

Nearly 70 % of the respondents admitted that they often do you ask the physician if he/ she prescribe antibiotic for the child about the

necessity of the use of this drug in the current child status. Slightly above 70% declared they always / most of the time follow the advices and physician instructions. Table (5) showed respondents' practices related to antibiotic use.

**Table 5:** Respondents practices on antibiotics

Question	Always/ Most of the time	Often	Sometimes/ Never
In case the physician prescribes an antibiotic, how often do you ask him – her if it is actually necessary?	279 (69.7%)	58 (14.5%)	63 (15.8%)
How often do you praise the physician if he/ she prefers not to prescribe antibiotic	192 (48.3%)	83( 20.8%)	125 (31.3%)
In case you strongly wish your child to receive antibiotic, how often do you ask for it directly to the physician?	222 (55.5%)	93 (23.3%)	85 (21.2%)
How often do you follow all the physician 's instructions and advice?	286 (71.5%)	76 (19.0%)	38 (9.5%)
How often do you urge the physician to prescribe antibiotic even when the diagnosis is not confirmed?	134 (33.5%)	55 (13.8%)	211 (52.7%)
How often does thephysician explain to you about your child's condition and if it should or shouldn't receive antibiotics?	194 (48.5%)	102 ( 25.5%)	104 ( 26.0%)
How often do you think that the physician prescribes antibiotic only because you asked him to?	103 (25.7%)	69 (17.3%)	228 (57%)

## DISCUSSION

This study was conducted in Taif City, which is located in the Western part of Saudi Arabia, with the objective of measuring parental knowledge and identifying their attitudes and practices on antibiotic use for URTIs among children.

Generally, the results identified very important gaps in the three studied domains that need to be discussed and further investigated to understand the reasons that lead to these misconceptions. The results showed that slightly above thirty percent of the parents had satisfactory knowledge about antibiotic use. This was a serious finding given the fact those three quarters of the included parents attained secondary and above educational level. Comparatively, other researchers reported high level of knowledge among 60% of caregivers interviewed to assess their KAP on the same topic <sup>[18]</sup>. An important identified misconception at the knowledge domain was related the use of antibiotics to treat viral URTIs. Generally, it should be emphasized for the parents at every level of care that there is a difference between viral and bacterial infection with regards to etiologies and response to antibiotic therapy. This finding was in agreement with the result of another recent survey conducted in the same geographical area, as above thirty percent of the people recruited in that survey had the belief that antibiotics can be used to treat viral infection and 35% thought it can be used to treat both bacterial and viral infections <sup>[19]</sup>. The results of this study showed that the parents had no idea about the adverse drug effects and the emergence of drug resistance associated with antibiotic use. Parents' poor knowledge about the harm of indiscriminate use of antibiotics is another finding that document that proper health education on antibiotics is lacking. Parents should be educated with the side effects or collateral damage associated with the use of antibiotics, so they may be cautious to use these agents as over-the –counter or press on the physician to prescribe these drugs. Parents were found to be receptive to any educational messages about proper antibiotic use, specifically those related to adverse drug reaction and these information can be better provided by the healthcare provider during the consultation <sup>[20]</sup>.

The results of Multivariable analysis revealed that higher educational level (secondary and above) was associated with satisfactory knowledge about antibiotics. Of no doubt, parent who are highly educated, unlike less educated ones, have many chances to come across considerable information about antibiotics from different sources. In addition, they have the capability to understand the educational

message readily and their communication with health care providers is expected to be better compared to less educated ones. This finding has important implications that help in the design of health education messages in an easy, simplified format to be understandable for less educated parents. The parents here in this study trusted both the physician and the pharmacist as top sources of information. This was a positive finding and can be utilized for the delivery of future health education. Beside the well- distributed primary health facilities, community pharmacy setting can also be excellent outlets for the provision of such education.

In this research, 60% of the parents frankly admitted that they expect the doctor to prescribe antibiotic for their children when they suffer from symptoms of URTIs. This expectation is a result of suboptimal knowledge and can be a strong factor that leads to parent demand of antibiotic. In addition, this expectation may result in their dissatisfaction with the physician visit if the consultation result is against their wishes. It is wise for the physician to provide a contingency plan to parents in case they demand or expect antibiotic if there is no clinical indication <sup>[21]</sup>. Furthermore, researchers found promoting communication behaviors of the parents may result in less demand of antibiotics, compared to the provision of mere educational intervention <sup>[22]</sup>.

Respondents in this survey ranked the fever as the most common symptom (80.5%) that the child suffers and make them to visit the doctors. In agreement with this result, other researchers reported that the main symptoms considered important and would drive parents to visit the doctor were earache (84%) and fever (81%) <sup>[23]</sup>. These findings may be highly attributed to the parents' fear of the complication associated with fever beside their lack of knowledge about fever. Parents in the same geographical area where the current study was conducted were interviewed about their knowledge about fever, which was found to be suboptimal and nearly 38% correctly determined the threshold for defining fever <sup>[24]</sup>.

Another important finding documented in this study, parents admitted that they give their child antibiotic without the physician's advice and based on a pharmacist recommendation. This finding raises the issue of over-the-counter sale of antibiotics. Despite the fact, antibiotics sale without prescription was not allowed by the health authorities, unfortunately it is available for sale without prescriptions. Strong and urgent policies are needed to reduce this practice. It is better to make these changes in collaboration with pharmacies owners to ensure their

commitment. Parents also admitted the use of previous antibiotic for the same previous symptoms. The consequences of this practice are serious and enormous as it can lead to the emergence of drug resistance and mask the symptoms of the current illness, which may endanger the life of the child.

Slightly more than half of the recruited parents had the belief that most URTIs are self-cured even without the use of antibiotics. Comparatively, in another study Shlomo the authors found that 37% of the parents participated in their study thought that antibiotics has no role in the treatment of URTIs and more than one quarter knew that these illnesses are self-limited ones<sup>[25]</sup>.

The parents recruited here in this study were residents of one city in the country. Therefore, the obtained results cannot be generalized to all Saudi parents. Future studies in order to in-depth investigate this topic should be conducted at the national level and recruit parents from all parts of the country.

## CONCLUSION

Parents in the study area had poor knowledge on antibiotic use, which is significantly dependent on parents' level of education. In addition, some misconceptions on parents attitudes and practices related to the use antibiotics for the treatment of URTIs among children were identified.

Substantial efforts are needed to raise the level of awareness of the parents with basic concepts about antibiotics and the harms associated with the indiscriminate use of these agents. Improving parents communication skills with physicians is mandatory and may help to reduce the demand for antibiotics in such cases. Importantly, the design of educational interventions should consider the low educated parents and to be tailored to the level of their understanding. Over-the-counter sale of antibiotics should be reduced through well designed policies, which should be implemented in collaboration with community pharmacies owners to ensure commitment.

## Conflict of interest

None to be declared.

## Acknowledgements

The authors would like to appreciate the great effort done in data collection by Fourth Year Students (Boys Section), College of Pharmacy; Taif University; Kingdom of Saudi Arabia.

## REFERENCES

1. Cotton M, Innes S, Jaspan H, Madide A, Rabie H. Management of upper respiratory tract infections in children. *S Afr Fam Pract* (2004). 2008;50(2):6-12.
2. Wang H, Zheng Y, Deng J, Wang W, Liu P, Yang F, *et al.* Prevalence of respiratory viruses among children hospitalized from respiratory infections in Shenzhen, China. *Virology*. 2016 Mar 8;13:39. doi: 10.1186/s12985-016-0493-7.
3. Ji W, Chen ZR, Zhou WF, Sun HM, Li BQ, Cai LH, *et al.* Etiology of acute respiratory tract infection in hospitalized children in Suzhou from 2005 to 2011. *Zhonghua Yu Fang Yi Xue Za Zhi*. 2013 Jun;47(6):497-503.
4. Bezerra PG, Britto MC, Correia JB, Duarte Mdo C, Fonseca AM, Rose K, *et al.* Viral and atypical bacterial detection in acute respiratory infection in children under five years. *PLoS One*. 2011 Apr 18;6(4):e18928. doi: 10.1371/journal.pone.0018928.
5. Denny FW Jr. The clinical impact of human respiratory virus infections. *Am J Respir Crit Care Med*. 1995 ;152(4 Pt 2):S4-12.
6. Tregoning JS, Schwarze J. Respiratory viral infections in infants: causes, clinical symptoms, virology, and immunology. *Clin Microbiol Rev*. 2010 ;23(1):74-98.
7. Thompson M, Vodicka TA, Blair PS, Buckley DI, Heneghan C, Hay AD; *et al.* Duration of symptoms of respiratory tract infections in children: systematic review. *BMJ*. 2013 Dec 11;347:f7027. doi: 10.1136/bmj.f7027.
8. Nyquist AC, Gonzales R, Steiner JF, Sande MA. Antibiotic prescribing for children with colds, upper respiratory tract infections, and bronchitis. *JAMA*. 1998 Mar 18;279(11):875-7.
9. Huang N, Morlock L, Lee CH, Chen LS, Chou YJ, Huang N, *et al.* Antibiotic prescribing for children with nasopharyngitis (common colds), upper respiratory infections, and bronchitis who have health-professional parents. *Pediatrics*. 2005 ;116(4):826-32.
10. Nash DR, Harman J, Wald ER, Kelleher KJ. Antibiotic prescribing by primary care physicians for children with upper respiratory tract infections. *Arch Pediatr Adolesc Med*. 2002 ;156(11):1114-9.
11. Alumran A, Hurst C, Hou X. Antibiotics Overuse in Children with Upper Respiratory Tract Infections in Saudi Arabia: Risk Factors and Potential Interventions. *Clinical Medicine and Diagnostics*. 2011; 1(1): 8-16.
12. Kuzujanakis M, Kleinman K, Rifas-Shiman S, Finkelstein JA. Correlates of parental antibiotic knowledge, demand, and reported use. *Ambul Pediatr*. 2003 Jul-Aug;3(4):203-10.
13. Collett CA, Pappas DE, Evans BA, Hayden GF. Parental knowledge about common respiratory infections and antibiotic therapy in children. *South Med J*. 1999 Oct;92(10):971-6.
14. 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 Apr;47(4):266-70.
15. Christakis DA, Wright JA, Taylor JA, Zimmerman FJ. Association between parental satisfaction and antibiotic prescription for children with cough and cold symptoms. *Pediatr Infect Dis J*. 2005 ;24(9):774-7.
16. Bi P, Tong S, Parton KA. Family self-medication and antibiotics abuse for children and juveniles in a Chinese city. *Soc Sci Med*. 2000 May;50(10):1445-50.
17. 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 practices in antibiotic use in Greece. *BMC Infect Dis*. 2009 May 4;9:52. doi: 10.1186/1471-2334-9-52.
18. 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 Dec 1;5:28.
19. Yousif MA, Abubaker IE. Prevalence, determinants and practices of self-medication with antibiotics – a population based survey in Taif, Kingdom of Saudi Arabia. *Int J Res Pharm Sci* 2015, 5(2) ; 51 – 56
20. Roberts RM, Albert AP, Johnson DD, Hicks LA. Can Improving Knowledge of Antibiotic Associated Adverse Drug Events Reduce Parent and Patient Demand for Antibiotics?. *Health Services Research and Managerial Epidemiology*. 2015 ; 2. doi: 10.1177/2333392814568345.
21. Mangione-Smith R, McGlynn EA, Elliott MN, McDonald L, Franz CE, Kravitz RL. Parent expectations for antibiotics, physician-parent communication, and satisfaction. *Arch Pediatr Adolesc Med*. 2001; 155(7):800-6.
22. Alder SC, Eric PT, George WL, Lyon Jr, Joseph L, James RP, *et al.* Reducing Parental Demand for Antibiotics by Promoting Communication Skills. *American Journal of Health Education*. 2005; 36 (3) :132-139.
23. 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 Aug;8(8):3246-62. doi: 10.3390/ijerph8083246. Epub 2011 Aug 5.
24. Abubaker Ibrahim Elbur. Childhood fever and its management: differences in knowledge and practices between mothers and fathers in Taif, Saudi Arabia. *World Journal of Pharmaceutical Research* 2014; 3(3): 4536-4548.
25. Shlomo V, Adi R, Eliezer K. The knowledge and expectations of parents about the role of antibiotic treatment in upper respiratory tract infection--a survey among parents attending the primary physician with their sick child. *BMC Fam Pract*. 2003 Dec 30;4:20.