Knowledge, Attitudes and Practices of Parents related to Antibiotic Use and Misuse among Children with Upper Respiratory Tract Infections

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Abstract

Upper respiratory tract infections (URTIs) are common in children and represent a significant cause of antibiotic misuse which contributes to the development of antibiotic resistance**. Aim of the study**: was to assess knowledge, attitudes and practices of parents related to antibiotic use and misuse among children with upper respiratory tract infections Descriptive research design was used to conduct the study at the pediatric Out-patient Chest Clinic in Assiut University Children's Hospital. Convenience sample was selected that included 420 parents with their children suffering from URTIs from December 2014 till February 2015. A questionnaire sheet was used to collect the data. **Results** of the present study revealed that 72.9% of the parents were females; the mean age was 35.4±9.3, 34.5% of the parents were having poor knowledge about the antibiotic use and misuse. Thirty percent think that antibiotics are safe, 48.1% of them reported that are a little informed about judicious antibiotic used. 41.5% pay a little attention to the possible side effects of antibiotics. **Conclusion**: More than one third of parents were having poor knowledge about the antibiotic use and misuse; and nearly half of them were having little information about judicious use of antibiotic which reflected on their self reported attitude and practice. **Recommendation**: An educational intervention for parents include educational materials about judicious use of antibiotic is needed.

Keywords: Knowledge, Attitudes, Practices, Parents, Children, Upper respiratory tract infections, Judicious use, and Antibiotic; Misuse & Bacterial Resistance.

Introduction

Globally, young children consume considerable amounts of antibiotics. This is likely caused by their susceptibility to infections, particularly upper respiratory tract infections (URTI) **(Dong et al., 2008).** Upper respiratory tract infections (URTIs) are common in children and represent a significant cause of antibiotic abuse which contributes to the development of antibiotic resistance (**Rouusounides et al., 2011 & Talsania et al., 2012).** The URTIs are usually viral in nature and using antibiotics to treat them is considered inappropriate, except for cases where bacterial infections are obvious. The URTIs are usually self-limiting and resolve in the same amount of time regardless of antibiotic consumption **(Wutzke et al., 2007).**

Clinically and economically, inappropriate use of antibiotics for acute URTI is a major worldwide problem, which has received comparatively little attention. The consequences include preventable mortality and morbidity from treatment failure, unnecessary adverse effects of the antibiotics, waste of health care resources and an increased emergence of bacterial resistance **(Chan & Tang, 2006).**

Problems associated with the overuse of antibiotics include development of antibacterial resistance, increasing the burden of chronic disease, raising costs of health services, and the development of side effects (e.g. adverse gastrointestinal effects) **(Alumran et al., 2011).** In addition, antibiotics may reduce the duration of fever in children with influenza which could reflect an increased risk of secondary bacterial infection for such children **(Harnden et al., 2007).**

Several factors have been suggested to explain the inappropriate use of antibiotics in children: over-prescription by physicians, easy access to antibiotics for self-medication, and parents' limited knowledge about antibiotics **(Cho et al., 2004 & Currie et al., 2011).** Parents' perceptions and practices of how to use medicines have important effects on the management of childhood illness (**Togoobaatar et al., 2010).**

Lack of health education is one of the major contributing factors in the overuse of antibiotics (**Cebotarenco & Bush, 2007).** The pediatricians believe that educating parents is necessary to promote the judicious use of antimicrobial agents **(Elan, 2001)** Further education should focus on improving patients' understanding of antibiotic regimens. To initiate any sort of effective intervention, it is necessary to attain an understanding of the beliefs, knowledge and behavior pertaining to the use of antibiotics in a

specific population **(McNulty et al., 2007 & Pechère et al., 2007).**

Nurses have an important role in managing children with respiratory tract infections, one of the most common illnesses in childhood, both in the community and in the hospital environment. However, this role changes depending on the health infrastructure **(Paul et al., 2014)**. Nurses can assure that cultures are performed before starting antibiotics. In addition, nurses review medications as part of their routine duties and can prompt discussions of antibiotic treatment, indication, and duration **(Edwards et al., 2011 & Cheng et al., 2009).**

Significance of the study:

Upper respiratory tract infections (URTIs) in children are commonly encountered by physicians. Viruses cause most URTIs, but parents' attitudes often represent an important reason for antibiotic abuse, which leads to the development and spread of antimicrobial resistance (**Zyoud et al., 2015).** Resistance to antibiotics is becoming a major problem worldwide. Lack of knowledge and awareness of parents on the concept of resistance to antibiotics has contributed to the current health situation. In relation to this, injudicious use of antibiotics by parents in the treatment of their children with URTI may be a factor in the increased rates of antibiotic resistant bacteria **(Salonga, 2009).**

The Aim of the study:

This study aimed to assess knowledge, attitudes and practices of parents related to antibiotic use and misuse among children with upper respiratory tract infections.

Research questions

1-What are the parent's knowledge, attitude and practice (KAP) towards antibiotic use and misuse in their children with upper respiratory tract infections?

2-Does the parents of children with upper respiratory tract infections are informed about judicious use of antibiotics?

Subjects & Methods

Research design: Descriptive research design was utilized to meet the aim of the study.

Setting: This study was conducted at the Pediatric Outpatient Chest Clinic in Assiut University Children's Hospital from December 2014 till February 2015.

Subjects: The study subjects included a convenient sample that was selected to include all parents with their children suffering from upper respiratory tract infections (URTI), the total number was 420 parents who came to the previous mentioned setting within a three months period and participated in this study:

Inclusion and exclusion criteria

Parents having children, aged from 0 to 12 years, both gender and presenting with URTI symptoms (nasal congestion, cough, fever, and sore throat) were included in this study. Children having fever lasting more than 7 days, or chronic diseases, or symptoms such as ear ache, or those who came without one of their parents and children with symptoms of lower respiratory tract symptoms such as wheezing, stridor and breathing difficulty were excluded.

-To calculate the sample size needed for this study: The total number of parents attending the Outpatient Pediatric Chest Clinic with their children was 15-20 children per day. The daily average number of parents attending the Clinic with their children suffering from upper respiratory tract infections (URTI) symptoms aged from 0-12 years was about 5-6. This number was used as a guide to calculate the sample size (The weekly number of children was about 30-36 and the monthly average number was 120-144). The total number in three months from 9 Am to 1 Pm was 360-432 parents.

Tool of the study:

One tool was designed to collect the necessary data that was developed by the researchers based on the previous related studies as **Panagakou et al., (2011) & Roausounidis et al., (2011).** The tool included two parts as the following:

Part (1): Concerned with socio-demographic data of the parents about their age, sex, income, residence, educational status, and number of their children.

Part (2): It consisted of 27 questions and included three sections (A, B, C), parents' Knowledge (Section A), Attitudes (Section B) and Practices (Section C) regarding antibiotics use and misuse in upper respiratory tract infections (URTI) for their children.

- **Section (A)** Assessment of knowledge: This part was developed to assess parents' knowledge about antibiotic use and misuse for their children with upper respiratory tract infections. This part included eight questions. Parents were asked to mark antibiotic names out of ten commonly used medications and to answer questions relevant to antibiotics indications, side effects and their use in viral infections.
- **Section (B)** Assessment of attitudes: This part was developed to assess parents' attitudes. This part included ten questions, Parents where asked which symptoms and what duration would lead them to seek medical attention for their children, as well as their expectations regarding antibiotics prescription, the reasons for use antibiotic without medical advice, and use of leftover antibiotic from previous illness, etc.

- Finally, **section (C)** Assessment of reported practices: This included nine questions looked into parental reported practices, the parent-doctor relation as pay attention to the possible side-effects of antibiotics, dissatisfied if the pediatrician does not prescribe an antibiotic for their child's upper respiratory infection, ask directly the pediatrician to describe antibiotics, follow all the pediatrician's instructions and advices, and urge your pediatrician to prescribe antibiotic even when the diagnosis is not confirmed.
- We assessed the parental knowledge (K; what people know), attitudes (A; how they feel) and practices (P; how they behave) regarding the use of antibiotics according to the parents' self reports **(Panagakou et al., 2011).**

Pilot study: A pilot study was carried out before starting of data collection involving 10 % of expected sample (which included in the study) to test the clarity, completeness of data gathering tool, and to determine the time required to fill it.

- The tool was tested for its reliability by Alpha Cronbach's test (α=0.852).

The tool was tested for its validity by 5 experts in the pediatric field where its value was 92.3%.

Methods for data collection

- An official Permission was obtained from the director of the Pediatric Outpatient Chest Clinic – Assiut University children's hospital to carry out the study after explaining the aim of the study. Explanation of the aim and methodology of the study was done to them by the researcher. Written consent from the studied parents was obtained.
- After receiving permission from the parents, the participants were interviewed face to face by researcher.
- A total of 420 questionnaires were distributed within three months.
- The possible three answers of knowledge questions were 1=yes, 2=no, and 3=uncertain. The possible answers of attitude and reported practice questions were1= agree, 2=disagree, 3=uncertain or: 1= much – 2= a little – 3= none or: 1=always (95-100%) - 2=most of the time (70-95%) – 3=often (30-70%) – 4=sometimes (5-30%) – 5=never (0-5%) **(Panagakou et al., 2011).**
- The Participants were invited to complete the questionnaire in the presence of the researcher for each question to assess their knowledge, attitudes, and practices on antibiotic use and misuse for their children with upper respiratory tract Infections.

Scoring system: Answers of the questions related to parents' knowledge were graded, one point being given for the right answer and zero for the wrong answer. The levels of the parents' knowledge was considered good if the percent score was more than 75%, moderate (average) if the percent score was between 50 < 75% and poor if less than 50%.

- Pamphlets about the judicious use of antibiotic developed by the researchers after data collection and at the end of the study (leaved in the clinic). The Pamphlets were included knowledge about the risks of antibiotic misused, give a simple explanation about the means of antibiotics, bacterial and viral infections and bacterial resistance, and included advices to the parents about when antibiotics are and are not needed for children. Written in Arabic language and contain pictures.
- The outcome of the pamphlets and its effect on the parents are not assessed in this study.

Field of the study

Data collection was done by the researcher within three months period from December 2014 till February 2015. It was done during the routine work of the clinic (from 9 Am to 1 Pm every day). The researcher interviewed each parent individually to obtain the necessary information. The researcher firstly met the parents and introduced self to them and gave them a complete back ground about the study. The researcher gave parents (who can read and write), the sheet which was pre-designed in Arabic language and stay with them to clarify any question vague to them or to read the sheet if the parents unable to read it. The sheet required about 20-30 minutes for filling it; about 5-6 parents were collected per day (all parents with their children suffering from upper respiratory tract symptoms) about 420 parents within three months.

Amount of the pamphlets (as manual educational materials) was left to the nurses at the Pediatric Outpatient Chest Clinic at the end of the study to distribute it to parents at any time in the clinic.

Ethical consideration: The data collection was voluntary in nature and strict confidentiality was assured. Explanation of the aim and methodology of the study was done to children's parents by the researcher. The right to refuse to participate in the study was emphasized to the children's parents.

- In order to increase the compliance, all parents or caregivers were personally informed by the researcher about the study and its importance.

Statistical analysis: Categorical variables were described by number and percent (N, %), where continuous variables described by mean and standard deviation (Mean, SD). Chi-square test used to compare between categorical variables. A two-tailed $p < 0.05$ was considered statistically significant. All analyses were performed with the IBM SPSS 20.0 software.

Results

Table (1): Percentage distribution of the socio-demographic data related to the studied parents (N=420).

Socio-demographic data	No.	%
Age of the parents in years		
20<30	144	34.3
30<40	166	39.5
40 years and above	110	26.2
Mean age ± SD 35.4±9.3		
Sex of the parents		
Male	114	27.1
Female	306	72.9
Parents' educational status		
Illiterate	48	11.5
Basic education (primary and preparatory)	82	19.5
Secondary	208	49.5
University or more	82	19.5
Family income as prescribed by parents		
Low	119	28.3
Moderate	230	54.8
High	71	16.9
Residence		
Rural	252	60.0
Urban	168	40.0
No., of children		
1-2	142	33.8
3-4	148	35.2
More than 4	130	31.0

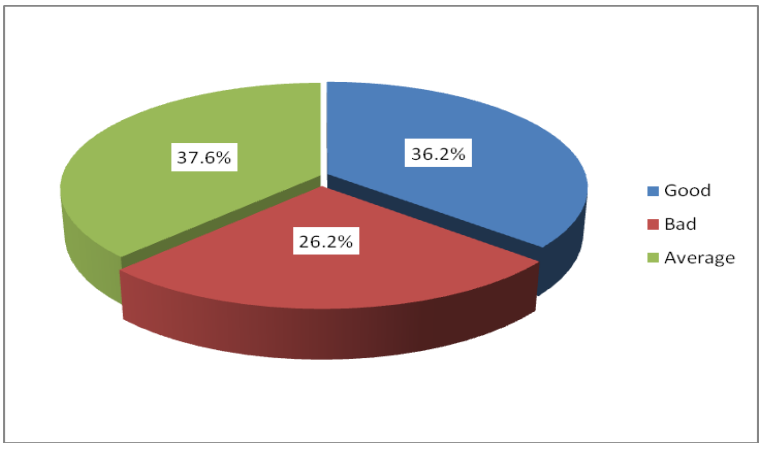

Fig., (1): Distribution of the studied parents according to their perceived access to health care system

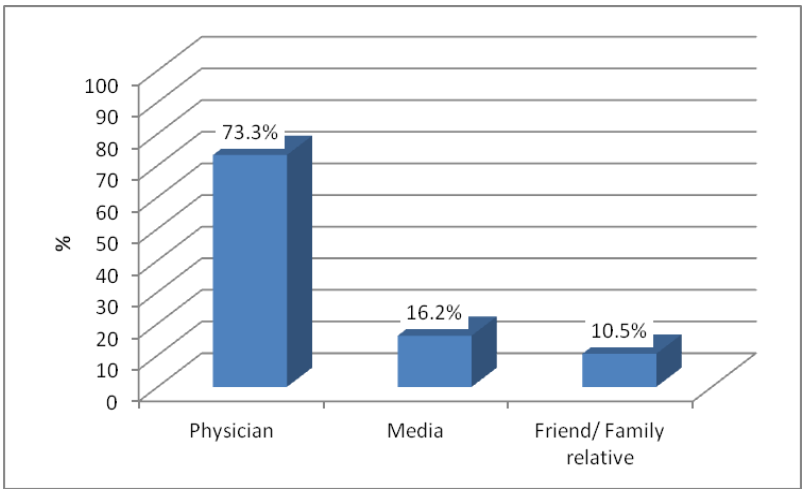

Fig., (2): Distribution of the studied parents according to their source of information about antibiotics

Section A: parents' knowledge

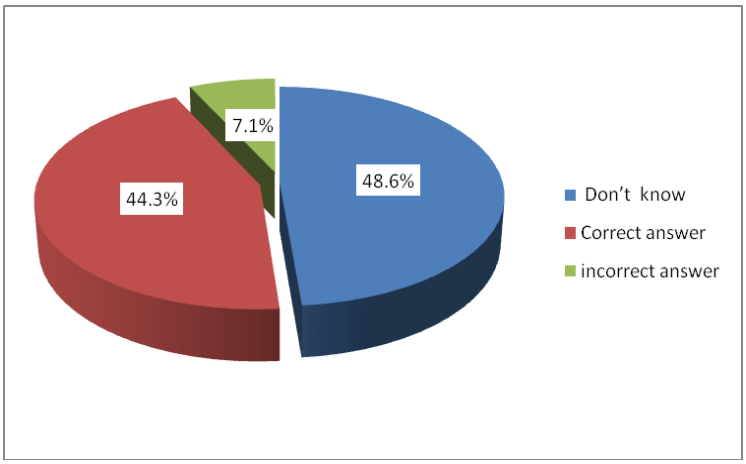

Fig., (3): Distribution of the studied parents regarding distinguish antibiotic from other drugs.

Table (2): Percentage distribution of the studied parents' knowledge about antibiotic use in URTIs (n=420).

Parents' knowledge	Yes		No		Uncertain	
	No.	%	No.	%	No.	%
Antibiotic must be administered in any case, once a child has fever.	174	41.4	134	32.0	112	26.7
Upper respiratory infections (like colds, flu, sore throats, and ear infections) are of viral cause, it must not be cured with antibiotics.	118	28.1	108	25.7	194	46.2
If a child suffers from flu or a cold, it will be quicker cured if he receives antibiotic on time	198	47.2	112	26.6	110	26.2
Scientists can always produce new antibiotics that are able to kill the resistant bacteria.	86	20.5	106	25.2	228	54.3
Antibiotics do not present side - effects.	106	25.2	160	38.1	154	36.7
When antibiotics are administered where there is no special reason, their efficacy is decreased and bacteria become more resistant.	104	24.7	132	31.4	184	43.8
Antibiotics decrease the complications of upper respiratory infection.	146	34.7	136	32.4	138	32.9

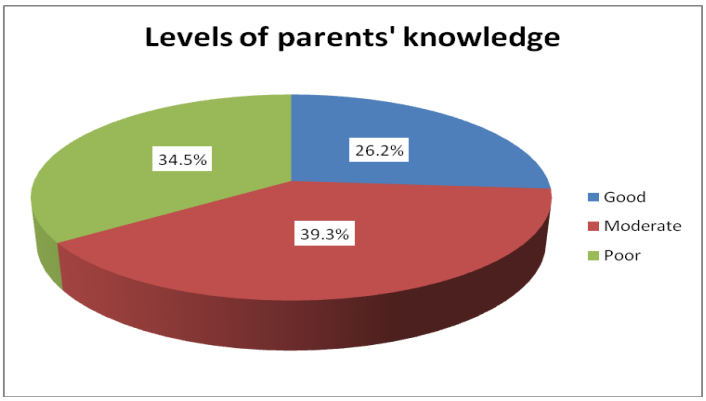

Fig., (4): Distribution of the parents regarding their levels of knowledge related to antibiotic use in URTIs.

Table (3): Relation between parents' socio-demographic characteristics and their level of knowledge about antibiotic use in URTIs.

parents' socio-demographic characteristics	The parents' level of knowledge						P-value
	Good (n=110)		Moderate(n=165)		Poor (n=145)		
	No	%	No	%	No	%	
Age of the parents in years							
20<30	22	20.0	47	28.5	75	51.7	**<0.001****
30<40	43	39.1	77	46.7	46	31.7	
40 years and above	45	40.9	41	24.8	24	16.6	
Sex of the parents							
Male	25	22.7	45	27.3	44	30.3	**0.398**
Female	85	77.3	120	72.7	101	69.7	
Parents' educational status							
Illiterate	3	2.7	10	6.1	34	23.4	**<0.001****
Basic education (primary and preparatory)	8	7.3	32	19.4	43	29.7	
Secondary	32	29.1	112	67.9	64	44.1	
University or more	67	60.9	11	6.7	4	2.8	
Family income as prescribed by parents							
Low	10	9.1	36	21.8	73	50.4	**<0.001****
Moderate	49	44.5	115	69.7	66	45.5	
High	51	46.4	14	8.5	6	4.1	
Residence							
Rural	35	31.8	78	47.3	129	89.0	**<0.001****
Urban	75	68.2	87	52.7	16	11.0	

* **Statistically significant differences*

Section B: parents' attitudes

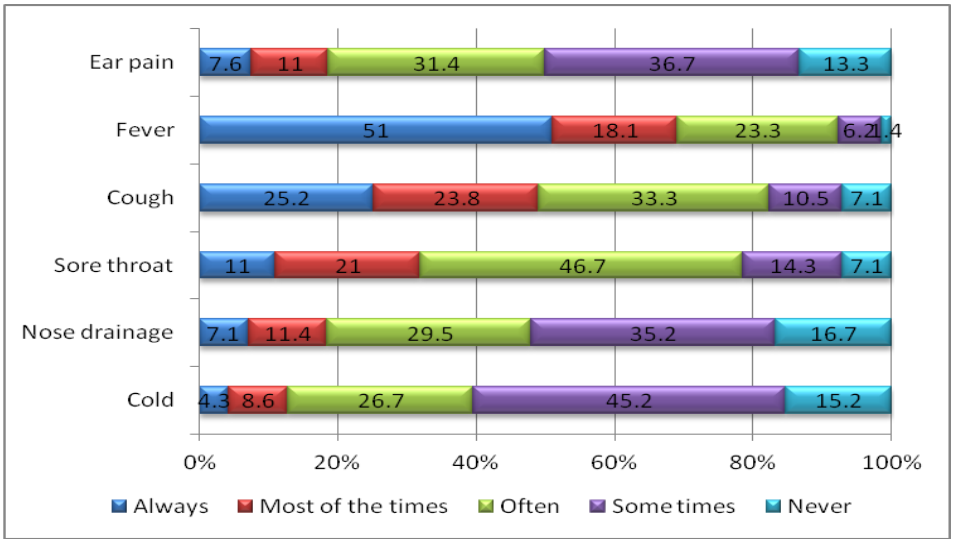

Fig., (5): Parents' expectations about various symptoms of URTI related to use the antibiotics.

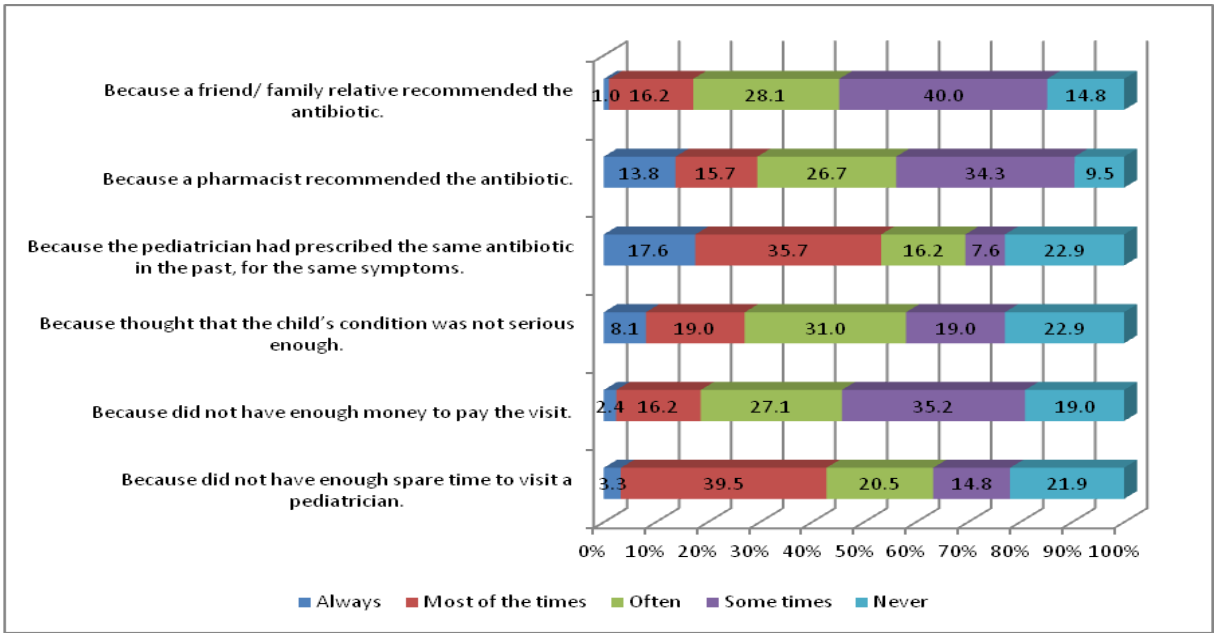

Fig., (6): Parental reasons for giving their children antibiotics without physician's prescription

Table (4): Percentage distribution of the parents' attitudes about antibiotic regarding URTIs (n=420).

Parents' attitudes	Agree		Disagree		Uncertain	
	No	%	No	%	No	%
Do you think that you are using the antibiotics too much?	138	32.8	132	31.4	150	35.7
Would you change your pediatrician because according to your opinion he/she does not prescribe antibiotics often enough for your child?	92	21.9	144	34.3	184	43.8
Do you think that the antibiotics cure all types of infections?	54	12.8	204	48.6	162	38.6
Would you reuse an antibiotic which you had used in the	200	47.7	70	16.6	150	35.7

Parents' attitudes	Agree		Disagree		Uncertain	
	No	%	No	%	No	%
past if your child presents the same symptoms?						
Do you think that parents and pediatricians should be informed about judicious antibiotic use?	192	45.7	84	20.0	144	34.3
Do you think that most of the upper respiratory infections will be self cured even without the use of antibiotics?	110	26.2	158	37.6	152	36.2
Do you think that antibiotics are safe?	126	30.0	130	31.0	164	39.0
Would you visit a pediatrician in order to avoid any complications of their child's infection?	220	52.4	60	14.3	140	33.3

Section C: parents' practices

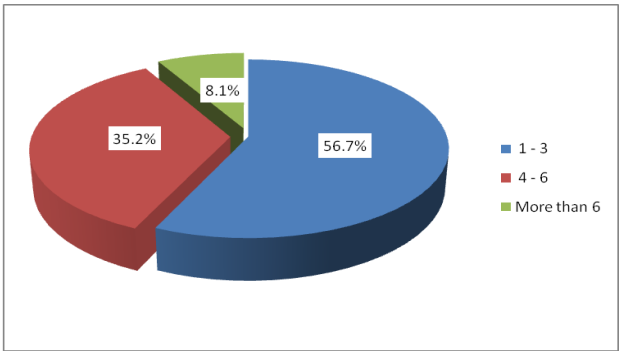

Fig., (7): Days of parents visit a pediatrician if their children suffer from URTI

Table (5): Percentage distribution of the parents' reported practices regarding URTI (n=420).

Items	1=Much		2=Little		3=None	
	No	%	No	%	No	%
Parents' informed about judicious antibiotic use.	158	37.6	202	48.1	60	14.3
Pay attention to the possible side – effects of antibiotics	126	30.0	174	41.5	120	28.6
Dissatisfied if the pediatrician does not prescribe an antibiotic for their child's upper respiratory infection.	134	31.9	168	40.0	118	28.1

Table (6): Frequency of parents' reported practices related to upper respiratory tract infections (n=420).

Parents' reported practices	Always (95-100%)		Most of times (70-95%)		Often (30-70%)		Some times (5-30%)		Never (0-5%)	
	No	%	No	%	No	%	No	%	No	%
Pediatrician recommends antibiotic therapy by phone	4	1.0	32	7.6	80	19.0	152	36.2	152	36.2
Ask directly the pediatrician to describe antibiotics	28	6.7	86	20.5	68	16.2	122	29.0	116	27.6
Follow all the pediatrician's instructions and advices	36	8.6	78	18.6	96	22.9	102	24.3	108	25.7
Pediatrician explain the child's condition and if it should or shouldn't receive antibiotics	10	2.4	86	20.5	102	24.3	98	23.3	124	29.5
Urge your pediatrician to prescribe antibiotic even when the diagnosis is not confirmed	10	2.4	110	26.2	68	16.2	136	32.4	96	22.9

Frequency of reported practical questions: always - most of the time - often - sometimes – never

Socio-demographic data of the parents:

The study illustrated the socio-demographic data of the studied parents, it was found that, more than two thirds of the parents (72.9%) were females; 39.5% of them their age was ranged between 30<40years, 34.5% of them were constituted in the age group 20 <30, while the rest of them (26.2%) were constituted in age group 40 years and above. Mean ± SD of age was 35.4+9.3. As regards the educational status of the parents only (11.5%) were illiterate, 19.5% have basic education, 49.5% of parents have secondary level of education and 19.5% of them have university or more education level of education. More than half of parents (54.8%) describe their family income as moderate level, 28.3% of them describe it as low level, while (16.9%) of them mentioned that they have high level income. More than half of parents (60.0%) are living in the rural areas. As well as 35.2% of them have 3-4 children and 31.0% of them have more than 4 children. **(Table1).**

Fig., (1): presented distribution of the parents according to their perceived access to health care facilities shown in this figure, Thirty seven point six of parents reported that they were having moderate access to health care facilities (average), 36.2% of them mentioned that they have good access, while 26.2% of them were bad access to health care facilities.

Fig., (2): described distribution of the parents according to their source of information about antibiotics, it was found that nearly three fourths of the parents (73.3%) reported that their source of antibiotic information were from the physician, while media and friends/relatives were reported by 16.2% and 10.5% of them respectively as the sources of antibiotic information.

Section (A): Parents' knowledge

As regarding to distribution of the parents regarding distinguish the antibiotic from other drugs, it was noticed that nearly half (48.6%) of the parents don't know the antibiotic from other drugs, 44.3% had corrected answer and 7.1% had incorrect answers **(Fig., 3).**

Table (2): illustrated distribution of the parents according to their knowledge about upper respiratory tract infections, it was noticed that, 41.4% of parents agreed that antibiotic must be administered in any case once a child has fever. 28.1% of parents agreed that most of the upper respiratory infections are of viral cause must not be cured with antibiotics, while 47.2% agreed that if a child suffers from a flu or a cold he will cure quicker if he receives antibiotic on time.

More than half of parents (54.3%) were uncertain that new antibiotics which kill resistant bacteria can be produced by scientists. 25.2% of them agreed that antibiotics do not present side-effects while 38.1% were disagree. 24.7% agree that when antibiotics are administered with no special reason their efficacy is decreased and bacteria become more resistant. 34.7% of parents agreed that antibiotics decrease the complications of an upper respiratory infection while 32.4% were disagree.

As regarding to the parents' level of knowledge related to antibiotics use and misuse, it was noticed that, more than one third of the parents (34.5%) had poor level of knowledge, 39.3% had a moderate level of knowledge, while the good knowledge were constituted in 26.2% of the parents **(Fig., 4).**

Table (3): presented relations between parents' socio-demographic characteristics and their levels of knowledge as shown in this table, no statically significant differences between the sex of the parents and their level of knowledge, while the knowledge level was statistically significant between the parents' age groups, educational status, the income, and residence. Poor level of knowledge was found in the generation between the age of 18 < 30 years, and in secondary educational status, low income families, and the parents from the rural areas. While the good level of knowledge was found between parent with age of 40 years and above, university or more educational status, high income families, and the parents from the urban areas P<0.001.

Section (B): Parents' attitudes

Fig., (5): indicated parents' expectations about various symptoms of URTI related to use the antibiotics. Fever and cough were the most common symptoms for which parents always expected to receive antibiotics (51.0%) and (25.2%) respectively, while symptoms of the common cold seldom led to a similar expectation (4.3%).

The parents' reasons for giving their children antibiotics without physician's prescription is described in **Fig., (6),** it was noticed that, 39.5% of parents said that most of the times they give their children antibiotics without the pediatricians' prescription because they did not have enough spare time to visit a pediatrician, 35.2% said that sometimes they did not have enough money to pay the visit fees, 31.0% said that they often thought their children conditions were not serious enough, 35.7% said that most of the times their pediatrician had prescribed the same antibiotics in the past, for the same symptoms, 34.3% said that sometimes a pharmacist recommended the antibiotics, and 40.0% said that sometimes a friend/ family relative recommended the antibiotics.

Table (4): showed distribution of the parents according to their attitudes regarding upper respiratory tract infections. 32.8% agree that they used antibiotics too much, and 31.4% were

disagreeing. 43.8% of parents were uncertain that they can change their pediatrician because according to their opinion he/she not prescribe antibiotics often enough for their children, while 21.9% of them were agreeing that, only 12.8% of the parents agreed that antibiotics cure all infections, while 48.6% and 38.6% were disagreeing and uncertain respectively. 47.7% of parents reuse the antibiotic which had used in the past if their child presents the same symptoms.

Also, it was found that, 45.7% of parents agreed that parents and pediatricians should be informed about judicious antibiotics use, 20.0% were disagreeing, and 34.3% were uncertain. 26.2% of parents agreed that most of the upper respiratory infections will be self-cured even without the use of antibiotics, and 37.6% were disagreeing. Thirty percent of the parents (30%) think that antibiotics are safe, while 31.0% and 39.0% were disagreeing and uncertain respectively. More than half of the parents (52.4%) visit a pediatrician in order to avoid any complications of their children from upper respiratory infection.

Section (C): Parents' practices

This study showed the days of parents visit a pediatrician if their children suffer from URTI (i.e. Nose drainage, sore throat, vomit, cough, fever) (n=420). It was showed that, more than half (56.7%) of the parents visit a pediatrician if their child presents some symptoms of upper respiratory tract infections within 1-3 days **(Fig., 7).**

Table (5): showed distribution of the parents according to their reported practices regarding upper respiratory tract infections, it was noticed that, 48.1% of parents reported that they are little informed about judicious antibiotic use and 14.3% were none informed. 41.5% of parents pay a little attention to the possible side – effects of antibiotics. 31.9% of parents were much dissatisfied if their pediatrician does not prescribe an antibiotic for their children with upper respiratory tract infection.

The study illustrated distribution of the parents according to their practices regarding upper respiratory tract infections; it was found that, 36.2% of parents reported that sometimes their pediatricians recommend antibiotics therapy by phone. 29.0% of parents sometimes ask for directly the pediatrician to describe antibiotics to their children, while only 6.7% of them always ask this. 25.7% of parents never follow the pediatrician's instructions and advices, while only 8.6% of them always follow the pediatrician's instructions and advices. Only 2.4% of pediatricians explain the child's condition and if it should or shouldn't receive antibiotics. Nearly one third (32.4%) of parents sometimes urge their pediatricians to prescribe antibiotics even when the diagnosis is not confirmed, while only 2.4% always urge their pediatricians in Assiut University Hospital **(table 6).**

Discussion

Antibiotics misuse/overuse may cause several problems, for instance: development of antibacterial resistance increasing the burden of chronic diseases and rising costs of health services, and the development of side effects (e.g. adverse gastrointestinal effects) **(Irshaid et al., 2004).** Antibiotics misuse may be due to reasons related to: patients, parents or guardians, or the medical practitioner. Several studies have discussed the reasons associated with antibiotics overuse. These include: attitudes, beliefs, knowledge of antibiotic use, behaviors (e.g. over-the -counter medication and self-medication), patients' perceptions regarding patient-doctor interaction, patient satisfaction, and patients' experience with antibiotics **(Awad et al., 2005 & Mitsi et al., 2005).** So the aim of this study was to assess knowledge, attitudes and practices of parents related to antibiotic use and misuse among children with upper respiratory tract infections

In the present study, more than two thirds of the parents were females; more than one third of them their age was ranged between 30<40years. More than half of them described their family income as moderate level and nearly half of them had secondary level education **(In table 1).** These findings were consistent with other studies done in Saudi Arabia by **Alumran et al., (2013)** and done in **Canada by Salonga, (2009)** stated that the majority of the respondents were females. This observations may be due to fathers may occupied in their work, so mothers company their children to seek health care services. Also study in **Boston by Siddiqui et al., (2014)** stated that, more than half of the study subjects reported their family income is considered moderate and 63.4% of them have university level of education.

This study revealed that, more than one third of the parents were considering moderate accesses to health care services and more than one quarter were bad access to health care services **(Fig., 1).** This result was opposite with other **studies by Al-Dossari, (2013)** in Soudia Arabia and **Siddiqui et al., (2014)** who mentioned that, the access to health care system was described as good by the parents 61.4% and 64% respectively. In our opinion the result of this study may be due to 60% of parents were from the rural area this make them difficult to access to health care services.

The current study results revealed that nearly three quarters of the parents reported that the physician was the source of their antibiotic information, and the rest

sources of antibiotic information were from the media and friends/relatives **(Fig., 2),** this finding was in congruence with **Al-Dossari, (2013) & Yu et al., (2014)** who stated that, more than two thirds of the parents reported doctors as their source of antibiotic information. Also these result consistent with other study in **Greece by Panagakou et al., (2011)** who stated that, ninety percent of parents obtained information on antibiotic use from pediatricians.

The finding of the present study showed, when the parents were asked to distinguish the antibiotics from other drugs, nearly half of them don't know which one of the drugs are antibiotics **(Fig., 3)**, this result was agreed with **Panagakou et al., (2011)** who revealed that, parents cannot distinguish antibiotic products from other drugs. This result may be due to 11.4% of the parents was illiterate and 19.5 have basic education so they may not be familiar with or not understand the medical terms.

In assessing parental knowledge of antibiotics in this study, nearly half of the parents agree that antibiotic must be administered in any case once a child has fever **(Table 2).** This finding was agreed to the findings of **Chan & Tang, (2006)** in Malaysia who stated that, 76% and 69% of the total parents were found to believe that antibiotics were needed for fever and cough symptoms respectively in a child with acute upper respiratory tract infection. Also study in India by **Agarwal et al., (2015)** mentioned that, majority of the parents gave antibiotic to the child for fever. Also this revealed 34.5% and 39.3% of the parents were poor and moderate level of knowledge respectively. This result was matched with the result of **Rahmin et al., (2014)** who stated that more than half (55%) of parents had a poor level of knowledge regarding the role of antibiotics, their indication and efficacy.

This study revealed that, one quarter of parents agreed that antibiotics do not present side-effects, nearly one third of them think that the antibiotics are safe, and less percent of parents agree that antibiotics cure all types of infections **(Table 2).** These results were supported with other study by **Salonga, (2009)** who stated that, more than two third of the respondents had the correct belief that antibiotics do not cure all types of infections. More than 80% were aware that antibiotics have side effects. Seventy one per cent believed that antibiotics were safe to use. **Also Agarwal et al., (2015)** reported that, 26.1% of parents incorrectly thought that they are used antibiotic against viruses and all types of infections.

In the present study no statically significant differences between the sex of the parents and their levels of knowledge, while the knowledge level was statistically significant between the parents' age groups, educational status, the income, and residence. Poor level of knowledge was found in the generation between the ages of 20< 30 years, secondary educational status, low income families, and the parents from the rural area. While the good level of knowledge was found between the ages of 40 years and above and in a university or more educational status, high income families, and the parents from the urban area **(Table 3).** These findings were in congruence with other study finding in **Granada by Alili-Idrizi et al., (2014)** who stated that, statically significant differences between the age, and educational level of the parents and their level of knowledge. Poor level of knowledge was found in the generation between the ages of 31 - 40 years, and who have secondary educational status.

The present study showed that, nearly one quarter of parents agree that when antibiotics are administered where there is no special reason, their efficacy is decreased and bacteria become more resistant **(Table 2).** This result was matched with other study in China by **Yu et al., (2014)** who reported that, 63% agreed that the excessive use of antibiotic increases the risk of antibiotic resistance. Also **Alili-Idrizi et al., (2014)** stated that, a comparable proportion of parents who agreed that overuse and inappropriate use of antibiotics reduce efficacy.

This study revealed that, nearly half of parents agree if children suffer from flu or a cold, they will be quicker cured if receives antibiotic **(Table 2).** This result was matched with **Panagakou et al., (2011)** who stated that, 24.7% of parents would still give antibiotics because they thought that recovery would be quicker.

According to the present study findings, more than half of parents were uncertain that new antibiotic that can kill resistant bacteria can be produced by scientists, while 20.5% were agreed **(Table 2)**. This finding was similar to the finding of **Al-Dossari, (2013)** who stated that, almost one-third of them (32.8%) agreed that new antibiotics that can kill resistant bacteria can be produced by scientists. This result may be due to the new prediction in the future sciences by parents.

This study indicated parents' expectations about various symptoms of URTI related to use the antibiotics **(Fig., 5).** Fever and cough was the most common symptoms for which parents always expected to receive antibiotics, while parents rarely expected to receive antibiotics in common cold symptoms. These findings were agreed with the findings of **Panagakou et al., (2011)** who stated that, ear ache was the most common symptom for which parents expected to receive antibiotics (45.4%), while symptoms of the common cold seldom led to a similar expectation (4.5%).

This study revealed the parental reasons for giving their children antibiotic without physician advice **(Fig., 6),** more than one third of parents said most of the times they give their children antibiotics without the pediatricians' advice because they did not have enough spare time to visit a pediatrician, sometimes they did not have enough money to pay the visit fees, they often thought that their child's condition was not serious enough to seek physician advice, most of the times their pediatrician had prescribed the same antibiotic in the past for the same symptoms, sometimes a pharmacist recommended the antibiotic, and sometimes a friend/ family relative recommended the antibiotics. These findings agreed with **Panagakou et al., (2011)** who stated that, ten percent of parents would consider giving their children antibiotics without previous medical advice. More precisely, a lack of money or time would lead to over the counter antibiotic consumption in just 1.2% of the participants, while 2.2% would administer antibiotics to their child because they thought that symptoms were not important enough to visit the pediatrician.

In this study, more than half of the parents said if their children present some symptoms of upper respiratory tract infections they visit a pediatrician within1-3 days **(Fig., 7).** This finding was in congruence with **Rouusounides et al., (2011)** who clarified that, most parents stated that they would seek medical advice for their children, after 2 days of upper respiratory tract infection symptoms. As well as **Siddiqui et al., (2014)** stated that, 53% of the parents took their children to pediatrician in less than 3 days after start of symptoms of acute respiratory infection.

This study revealed that nearly one third of parents agree that they used antibiotics to their children too much. Nearly one quarter of parents were agree that they can change their pediatrician because according to their opinion he/she not prescribes antibiotics for their child very often while more than one third of parents disagree with this **(Table 4).** These findings agreed with **Panagakou et al., (2011)** who stated that seventy eight percent of parents believed that antibiotics are used too much. Nevertheless, 7% would change pediatricians if he/she did not prescribe antibiotics often enough.

This study revealed that, nearly half of parents agree that can reuse an antibiotic which they had used in the past if their children or sibling present the same symptoms **(Table 4).** This finding was in congruence with Chan and **Tang, (2006)** who stated that, about 15% of parents gave their child "leftover" antibiotics that they had saved from a previous visit. 24% of parents had the experience of giving their child "shared" antibiotics prescribed previously for a child with similar symptoms of upper respiratory tract infection.

This study revealed that, nearly half of parents agree that parents and pediatricians should be informed about judicious antibiotic use. More than one quarter of parents agree that most of the upper respiratory tract infections will be self- cured even without the use of antibiotics **(Table 4),** these results were matched with **Panagakou et al., (2011)** who stated that, ninety-eight percent believed that further information should be given to both parents and pediatricians regarding judicious antibiotic use. Finally, 20% of the responders believed that URTIs are not self-limited. Also **Al-Dossari, (2013)** stated that, the majority of the parents (84%) agreed that parents and doctors should be informed about judicious antibiotic use.

This study revealed that, nearly one third of parents were much dissatisfied if their pediatrician does not prescribe an antibiotic for their children with_upper respiratory tract infection while the rest of parent were little or none dissatisfied **(Table 5).** This result was matched with other study by **Rahmin et al., (2014)** who stated that, a total of 68.2% of parents believed that they would be satisfied if the physician did not give a prescription for antibiotics.

This study revealed that, nearly half of parents they think that they are little informed about judicious antibiotic use and more than one quarter of them reported that their pediatricians never explain to them the child's condition and if it should or shouldn't receive antibiotics **(Table 5).** This result was opposite with **Rouusounides et al., (2011)** who stated that, a significant proportion of parents (90%) believe they have been well informed on the judicious use of antibiotics, admit their doctor has spent time explaining the child's disease. Also study in United Arab Emirates by **Rahmin et al., (2014)** stated that, most parents (82.2%) declared that physicians did not provide sufficient information regarding diagnosis and therapy of upper respiratory tract infections.

This study revealed that, nearly one third of parents sometimes urge their pediatricians to prescribe antibiotic even when the diagnosis is not confirmed, while less percent of parents always urge their pediatricians. Also more than one third of parents reported that often their pediatricians recommend antibiotic therapy by phone **(Table 6).** These results were similar with **Rahmin et al., (2014)** who stated that, 63% would request antibiotics if the physician did not prescribe them for frequent occurrences of URTIs.

This study revealed that more than one quarter of parents never follows all the pediatrician's instructions and advice, while less percent of parents always follow the pediatrician's instructions and

advice **(Table 6).** This finding was in congruence with **Rouusounides et al., (2011)** who stated that, 97% stated they precisely follow pediatricians' instructions.

This study revealed that, more than one quarter of the parents reported that they sometimes directly ask the pediatrician to describe antibiotics to their children **(Table 6).** This result was similar with the result of **Chan and Tang, (2006**) who stated that, 28% of parents admitted to have directly asked a doctor to prescribe antibiotics.

Conclusions

Based on the results of the present study, the study concluded that:

More than one third of parents were having poor knowledge about the antibiotic use and misuse; and nearly half of them were having little information about judicious use of antibiotic which reflected on their self reported attitude and practice as: Nearly half of the parents think that if the child suffers from flu or cold he/she will be quicker cured if receives antibiotic, think that antibiotic must be administered in any case once the child have fever, and nearly one third think that antibiotic are safe. Nearly one third of the parents were dissatisfied if their pediatrician does not prescribe an antibiotic for their children, and nearly half of the them store the antibiotic at home and reuse it if the child have upper respiratory tract infections.

Recommendations

Based on the results of the present study, the study recommended

- Educational intervention about antibiotic use and misuse among parents of children with upper respiratory tract infection are needed in Out-patient Pediatric Chest Clinics. The intervention should be includes educational materials such as pamphlets, or booklets.
- The intervention materials should be simple and includes pictures for illiterate parents.
- Explaining to parents the judicious use of antibiotic and the prudent of antibiotic resistance due to antibiotic misuse in upper respiratory tract infections.

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