

# Evaluation of Saudi and Egyptian Mothers' Therapeutic Regimen Adherence for their Children with Acute Pharyngitis

<sup>1</sup>Hoda Mohamed Nafee, <sup>2</sup>Boshra Attia Mohammed, <sup>3</sup>Doaa Abdelgawad Said, <sup>4</sup>Mariam Ali Tawfik

<sup>1,3</sup> lecturers of Pediatric Nursing, Faculty of Nursing, Mansoura University, Mansoura, Egypt

<sup>2</sup> Assistant Professor of Pediatric Nursing, Faculty of Nursing, Mansoura University, Mansoura, Egypt

<sup>4</sup> Registered Nurse, King Fahd University hospital, KSA.

\*Corresponding author: Hoda Mohamed Nafee, email ([honafee68@hotmail.com](mailto:honafee68@hotmail.com))

**Abstract:** Pharyngitis represented (28.4%) of upper respiratory tract infection of under-five years old children admitted to pediatric emergency departments worldwide and also 20–30% of all hospital admissions in the developing countries. So using unnecessary antibiotic to treat those children remains an important area of research focus. In addition to WHO has estimated that more 50% of these drugs were prescribed and given inappropriately, ineffectively, and inefficiently. Therefore, this study aims to evaluate mothers' knowledge, concerns, and practices about therapeutic regimen adherence of children with acute pharyngitis. A descriptive correlation design was used. Sample: A convenient sample of 400 of mothers for children their age above one and less than 5 years and having acute pharyngitis. Tools: three tools were used for data collection, namely; Nursing Outcomes Classifications Questionnaire sheet, survey Likert scale and medical interview satisfaction scale that assess therapeutic regimen adherence of mothers for children with acute pharyngitis. Results: Regarding mean and stander deviation of both Egyptian and Saudi mothers' total knowledge score about definition, uses and side effects were  $(3.59 \pm 1.72, 4.63 \pm 1.46)$  where  $P=0.00$ . The mean and stander deviation was lower in Egyptian mothers than in Saudi one regarding to acute pharyngitis therapeutic regimen adherence with statistically significant differences where  $P=0.00$ . There were statistically significant differences observed between the Egyptian and Saudi mothers' total medical interview satisfaction score where  $P=0.00$ . Conclusion: the majority of Saudi and Egyptian mothers had poor total knowledge score about antibiotic uses and side effects. In addition to there were a highly statistically significant differences between the mean scores of Egyptian and Saudi mothers' total medical interview satisfactory score and their therapeutic regimen adherence for children with acute pharyngitis. Recommendations: Educational Programs are needed to correct the deficit in knowledge and change the inappropriate attitude or practice of mothers about therapeutic regimen adherence of children with acute pharyngitis and also implement antibiotic sale regulations to restrict the unlimited access with applying penalties to the offenders

**Keywords:** *Therapeutic Regimen Adherence, behaviors, attitude, Mothers of Children, Acute Pharyngitis.*

## 1. INTRODUCTION

Pharyngitis or sore throat is an inflammation of the mucous membranes of the oropharynx. Annually Pharyngitis causes 11 million pediatric ambulatory care visits. From those visits, there are 692,000 were for children under the age of 15 years and majority of them under age of 5 years <sup>(1, 2)</sup>. Globally, the rates of pharyngitis are very high predominantly in countries where antibiotics are overprescribed. The commonest etiological cause is the infection which may be viral or bacterial. About 50% to 80% are viral in origin and include a variety of viral pathogens which are the commonly as rhinovirus, adenovirus, influenza and parainfluenza and coronavirus <sup>(2, 3)</sup>. The other cause is bacterial infection where 5% to 36% of cases of acute pharyngitis caused by Group A beta-hemolytic streptococci followed by other bacterial etiologies. Chemical, allergies and environmental exposures may also cause acute pharyngitis <sup>(4,5)</sup>. The symptoms

associated with viral infection are headache, rhinorrhea, conjunctivitis, coughing, and a rash while in pharyngitis caused by Group A streptococcus (GAS) has an acute onset and the child have fever, cervical adenopathy and tonsillar exudates. The majority of cases in viral infection recover spontaneously within 7-10 days but measures to reduce symptoms are rest and pain relievers. Antibiotic prescription for children having viral pharyngitis is ineffective, contributes to the growing problem of antimicrobial resistance, increase costs and exposing them to side effects of antibiotic without any benefit<sup>(6,7)</sup>. It is difficult to distinguish GAS pharyngitis clinically from viral pharyngitis. So the American Academy of Pediatrics (AAP) and the Infectious Diseases Society of America (IDSA) established a guidelines on diagnosis and management of GAS pharyngitis and recommended that the children whose clinical presentation is constant with GAS pharyngitis should be tested for streptococcal Rapid Antigen Detection Test (RADT) or throat culture and recommended if the result is positive, antibiotic treatment should be start<sup>(8,9)</sup>. Nonetheless, many studies results showed that management of pediatric pharyngitis among pediatric providers reflecting high rates of antibiotic prescribing even for children with negative(RADT) or throat culture<sup>(10,11)</sup>.The other side of management failures or complication development may occur if the cause is bacterial and antibiotics were either never prescribed leading to supportive and some non-supportive complications as peritonsillar abscesses ,acute glomerulonephritis and acute rheumatic fever , or presence of antibiotic resistance, and untreated close contacts there were a lack of therapeutic regimen adherence<sup>(7,12)</sup>. The term adherence has reflected a more active role for children and their families in consenting to and following prescribed treatments. Pediatric adherence issues are arguably more complex than with adults due to the influences of family members and peers<sup>(13)</sup>. Adherence is the extent to which someone follows an agreed set of actions. It is a voluntary process assuming an equal relationship between two people. In healthcare, it usually relates to, changing lifestyle; taking prescribed medication; seeking help if symptoms change and attendance for follow up. While non-adherence to medication means either not taking prescribed treatments or taking them incorrectly. It may be due to lack of understanding; lack of trust in the health professional; dislike of taking medication; experience or fear of side-effects; lack of motivation and forgetfulness<sup>(14)</sup>. There is wide variability in adherence rates depending on the patient sample; disease (acute or chronic), regimen component; how adherence is assessed, and the criteria sometimes used to classify patients as adherent or non-adherent<sup>(15)</sup>. Many studies revealed different problems ranging from misuse, abuse and errors of prescribed medications that increase children morbidity and mortality. Most drugs in children are used outside the health settings with or without prescription and self-medication is the first parents' responsibility toward some of their children health problems<sup>(16)</sup>. Other study revealed that physicians prescribes antibiotics for acute pharyngitis regardless the etiological factors due to their fear from disease complication, their wishes to relieve child pain or to satisfy patients<sup>(17)</sup>. Therefore, there is an urgent need to evaluate plan of the health care providers and therapeutic regimen of acute pharyngitis and develop intervention strategy to enhance parents awareness about disease as definition; causes; consequences antibiotics uses; adverse effects; the importance of adhering to antibiotic therapy, and prevention of antibiotics resistance<sup>(18)</sup>.So this study aims to evaluates therapeutic regimen adherence of mothers for children with acute pharyngitis.

## 2. RESEARCH QUESTIONS

- What are Saudi and Egyptian Mothers' knowledge, concerns and practices regard adherence of therapeutic regimen for their children with acute pharyngitis?
- If there is a difference between Saudi and Egyptian Mothers regarding their knowledge, practice and concerns of therapeutic regimen for their children with acute pharyngitis?
- If there is a difference between Saudi and Egyptian Mothers' sociodemographic characteristics and their medical interview satisfaction score of therapeutic regimen adherence for acute pharyngitis?

## 3. THE STUDY SIGNIFICANCE

Acute pharyngitis in children is mostly viral in origin and ineffective therapeutic regimen adherence for acute pharyngitis leads to negative outcomes as rheumatic fever in case of bacterial pharyngitis or missed children days school and high over counter drugs prescription of antibiotics in viral origin that developed and increased antimicrobial resistance and cost on both society and healthcare facilities. Adherence to physicians' instructions of medications administration as prescribed is essential for the proper treatment and it dependent on the physician, the patient, the illness, and the medication. Physicians and parents are both responsible for the growth of this serious problem.so this study evaluate Saudi and Egyptian Mothers' therapeutic regimen adherence for their children with acute Pharyngitis. .

#### 4. AIM OF THE STUDY

The aim of the present study is to:

- Evaluate Saudi and Egyptian Mothers' Therapeutic Regimen Adherence for their Children with Acute Pharyngitis.

#### 5. TOOLS AND METHODS

##### Subjects:

**Design:** A descriptive correlation design involves the measurement of two or more relevant variables and an assessment of the relationship between or among those variables in everyday life events and making of predictions <sup>(19)</sup>

##### Setting

The study was conducted in pediatric outpatient clinic in King Fahd University hospital, Al-Khobar city ,kingdom of Saudi Arabia(KSA), which provides health care services to children; eastern province in KSA and Mansoura university children hospital, Egypt, this hospital provides a wide spectrum of health services to children at Delta Region, Egypt.

##### Sample

A convenient sample of 206 from Saudi mothers and 212 from the Egyptian starting the study but 6 Saudi mothers and 12 of Egyptian were not completing the study, where whom completing the study were 400, each group had 200 mothers for children having acute pharyngitis and their children age had one and less or having 5 years old at both studied group in pediatric outpatient clinic and accepts participation in this study

##### Tools of data collection

Three tools were used for data collection, namely; Nursing Outcomes Classifications Questionnaire sheet, survey Likert scale and medical interview satisfaction scale

**1- Nursing Outcomes Classifications Interview Questionnaire Sheet.** This questionnaire divided into two parts: -

- **The first part** was used to identifying socio demographic data of children as age and gender and their mothers as age, level of education and occupation.
- **The second part:** It was developed by Moorhead et al <sup>(20)</sup> related to nursing outcomes scale classifications and aimed to asses mother's knowledge about antibiotic usage, its side effects and frequency of antibiotic usage for their children within the last year and their concerns about alternatives of antibiotic used to manage acute pharyngitis and actual personals responsible for antibiotic prescription;

**1- Survey Likert scale** to assess mothers' practice toward acute pharyngitis therapeutic regimen adherence and includes (6 items) adapted from Michael<sup>(15)</sup>

**2- Medical interview satisfaction scale** developed by Wolf and Stiles <sup>(21)</sup>. It aims is to assess only compliance intent subscale of mothers' satisfaction toward acute pharyngitis therapeutic regimen and includes (3 items).

##### **Methods:**

-Ethical approval was gained from the administrative authorities in the above mentioned settings after explanting the aim and the nature of the study.

Oral consent were taken from each mother accepting to participating in the study and they were informed about the purpose of the study and assured that their answers would be kept confidential and they have the right to withdraw at any time without reason.

-The validity of part one from first tool was ascertained by a jury of five experts in the pediatric nursing. The tool internal consistency and reliability was assessed by using coefficient alpha and it was 0.85.

-A pilot study was carried out of 20 mothers from each group (total 40) to evaluate the tools applicability, clarity and to estimates the length of the time needed to fill the questionnaire sheet.

-The data that collected by the first tool was completed by the mothers under supervision of the researchers in the outpatient waiting area .

-The data related to tools(number 2 and 3) were collected from mothers in both studied groups through follow up outpatient visit or by telephone / WhatsApp contact between the mothers and the researchers.

**Scoring system:**

The scoring system was applied for mothers' knowledge about therapy of sore throat, the score categorized in (0 to 4) according to Nursing Outcome Classification (NOC) Moorhead et al (2008) as follow: Extensive = 4 independently verbalize/demonstrates information without cues. Substantial= 3 independent with minimal cues.Moderate = 2 requires assistive resources. Limited/poor = 1 which means requires assistive person and resources. None = 0 which means dependent for all information

The scoring system for this tool is categorized as the following: Substantial & Extensive = 75 % to 100%. Moderate = 50 % > 75%. Limited/Poor = 30 % > 50% . None = > 30%

-The researchers added minor modifications in this tool as they merged categories named (Extensive and substantial) in one category and having a score .

-Mothers' satisfaction about outpatient medical visit was measured by Medical Interview Satisfaction Scale (MISS) . Where the researchers select only 3 items out of 21 items from this scale that measure only compliance intent subscale with the medical treatment. The MISS and survey Likert scale were scored using a 4-point with responses ranging from score 1 (“Strongly disagree”) 2 for (disagree), 3 for (“Agree”) and 4 (“Strongly agree”). Item scores were allotted to determine satisfaction of mothers' doctor-child consultations and mothers' practice toward pharyngitis therapeutic regimen adherence. Scores range from 1 to 4, with higher scores indicating higher satisfaction. The score which below 50% was poor and the above were good or satisfactory for each item and also for total mothers' satisfaction score.

**6. STATISTICAL ANALYSIS**

The collected data were coded and entered in a data-based file using the excel program for windows. Frequency analysis and manual revision were used to detect any error. After complete entry, data were transformed to the statistical package of social sciences (SPSS) version 20 by which the analysis was conducted applying frequency tables with percentages. Data were revised, coded and analyzed. Qualitative data was presented as number and percent. The Chi-Square and likelihood ratio chi-square test were used for comparison between groups as appropriate. Independent t-test was utilized for comparing between both groups means. All tests were performed at a level of significance (P-value) equal or less than 0.05 was considered to be statistically significant. Quantitative data were described as mean / SD or medians as appropriate. They were tested for normality by Kolmogorov-Smirnov test.

**Table (1): Distribution of socio-demographic characteristics of the Saudi and Egyptian mothers.**

mothers' Socio-demographic characteristics		Egyptian mothers No=200		Saudi mothers No=200	
		No.	%	No.	%
<b>Mothers' age/ year</b>	<20	6	3	30	15
	20-<30	110	55	55	27.5
	30-<40	79	39.5	69	34.5
	≥40	5	2.5	46	23
<b>Mothers' educational level</b>	Illiterate	16	8	145	72.5
	Preparatory	92	46	55	27.5
	Secondary education	25	12.5	0	0.00
	Bachelor Degree	42	21	0	0.00
	Higher studies	25	12.5	0	0.00
<b>Mothers' occupation</b>	House wife	128	64	137	68.5
	Governmental work	68	34	63	31.5
	Private (free) work	4	2	0	0.00

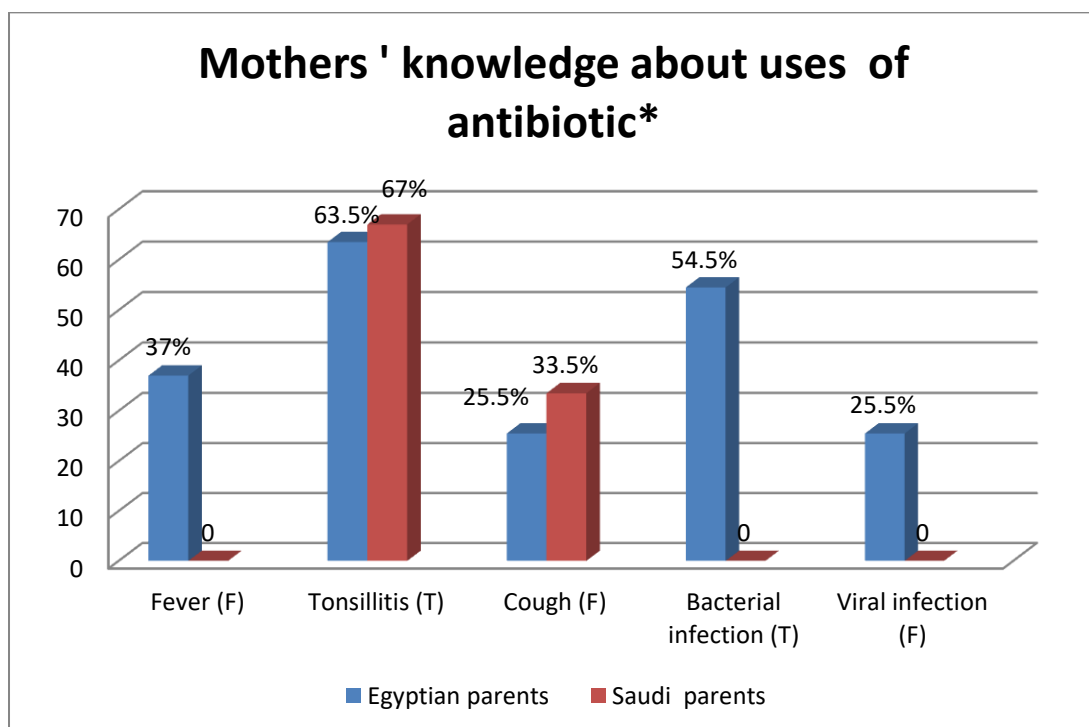
**Table (1)** showed the socio-demographic characteristics of the studied mothers. It was clear that more than half of them had 20-30years old, while 34% of Saudi mothers had 30-40 years old. About half (46 %) of the Egyptian mothers had preparatory school education, but the majority (72.5%) of Saudi mothers had illiterate. In addition, above half of both Egyptian and Saudi mothers (64% and 68.5%) were housewives.

**Table (2): frequency of antibiotic usage within the last year for children of both Saudi and Egyptian mothers**

Child characteristics		Egyptian children No=200		Saudi children No=200	
		No.	%	No.	%
Frequency of antibiotic use for treating of acute pharyngitis within the last year	Once	11	5.5	84	42
	Twice	54	27	38	19
	Three times	26	13	30	15
	Four times	47	23.5	46	23
	More than four times	62	31	2	1.0

**Table 2** shows frequency of antibiotic use for treating of acute pharyngitis within the last year, 42% of Saudi children use one time, while 31% of Egyptian used more than four times.

**Figure (1): Percentage of Mothers' knowledge about uses of antibiotic**



\*Multiple Responses T: answer is true. F: answer is false.

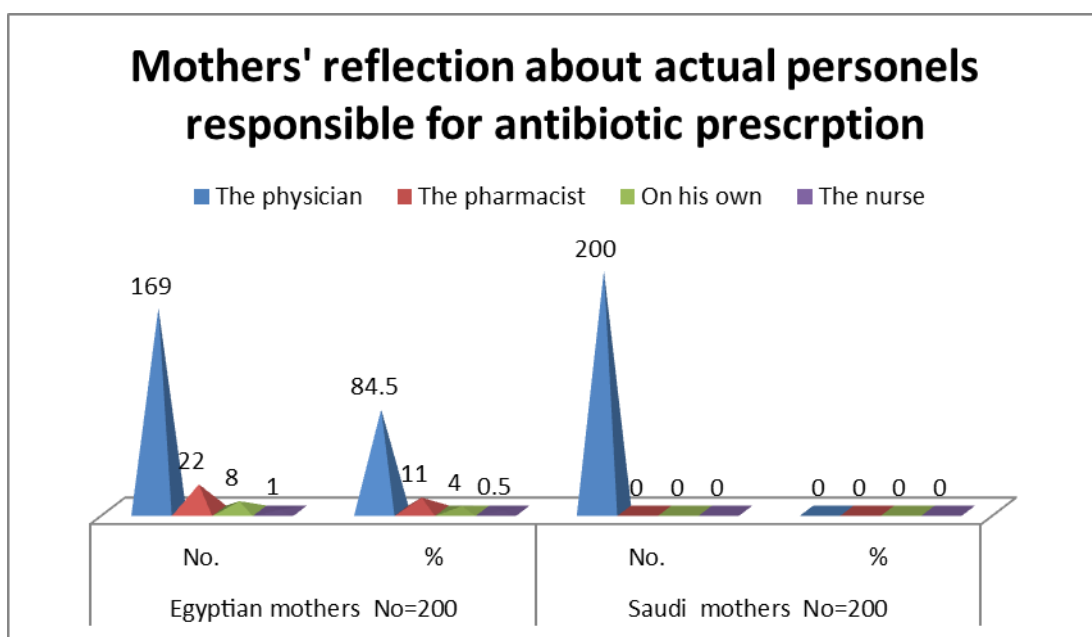
Table (3): Distribution of the mothers’ knowledge score about definition, uses and side effects of antibiotics.

Knowledge categories	Egyptian mothers No=200		Saudi mothers No=200		P value	
	No.	%	No.	%	t	P
<b>Definition of antibiotic</b>						
Limited/poor	100	50	31	15.5	-10.45	0.000*
Fair/moderate	64	32	38	19		
Substantial & Extensive	36	18	124	62		
<b>The conditions requesting prescription of antibiotics</b>						
Limited/poor	39	19.5	66	33	-6.04	0.00*
Fair/moderate	86	43	134	67		
Substantial & Extensive	75	37.5	0.00	0.00		
<b>The side effects of antibiotics</b>						
Limited/poor	185	92.5	200	100	4.77	0.37
Fair/moderate	9	4.5	0.00	0.00		
Substantial & Extensive	6	3	0.00	0.00		
<b>Total knowledge score</b>						
Limited/poor	178	89	187	93.5	8.26	0.00*
Fair/moderate	16	8	13	6.5		
Substantial & Extensive	6	3	0.00	0.00		

(\*) Statistically significant at  $p \leq 0.05$ , t: independent t test

Table 3 :shows a statistical significant relation between Saudi and egyptian mothers’ knowledge total score about definition, uses and side effects of antibiotics where T test = 8.26 and P =0.00

Figure (2): Mothers' reflection about actual persons responsible about antibiotic prescription for their children with sore throat.



**Figure (2)** : illustrates that the mothers' information about the actual personnel's responsible for antibiotic prescription for their children, all Saudi mothers (100%) pointed that was the physician responsibility compared to 84.5% in Egyptian one and the rest of Egyptian mothers was 22% returned it to the pharmacist and 5% to their own.

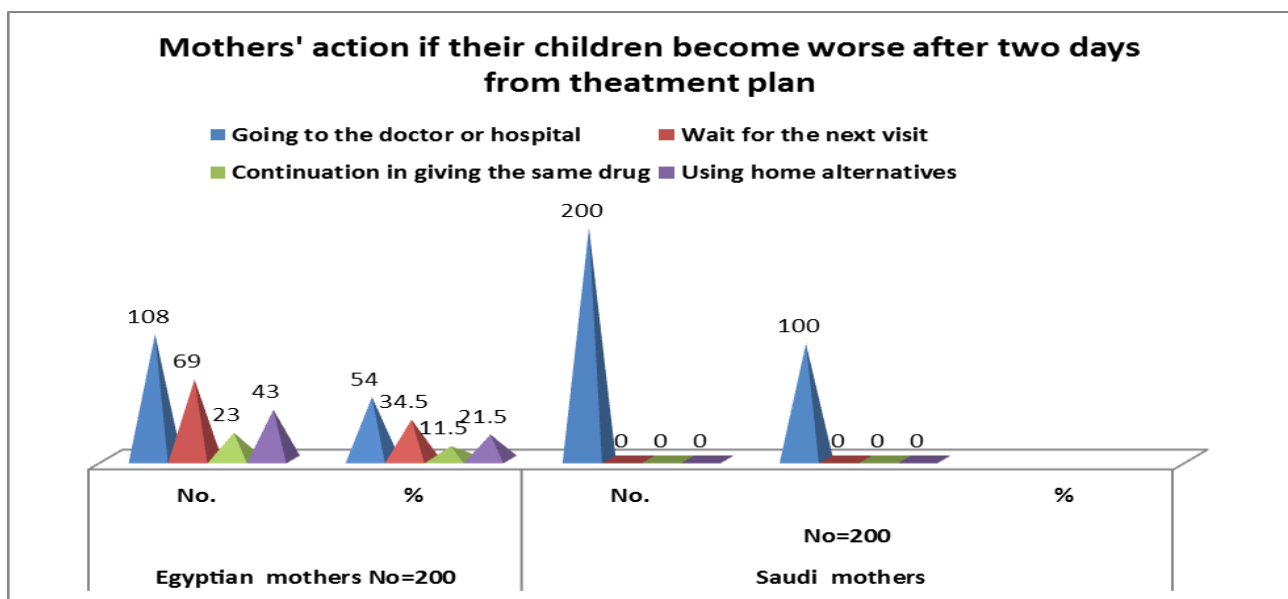
**Table (4):** Distribution of the mothers about alternatives of antibiotics used to manage acute pharyngitis in their children.

Items of General Knowledge	Egyptian mothers No=200		Saudi mothers No=200	
	No.	%	No.	%
Drinking warm liquids	88	44	0	0.00
Applying cold compresses	16	8	0	0.00
Bed rest	2	1	0	0.00
Wearing light clothes	1	0.5	0	0.00
Drinking Anise	68	34	0	0.00
Drinking Myrrh	0	0.00	139	69.5
Drinking Ginger	0	0.00	56	28
Eating garlic and onions	44	22	0	0.00
Drinking warm lemon	50	25	0	0.00
I don't know	59	29.5	5	2.5

\*Multiple responses.

**Table (4)** reveals that the distribution of the mothers about alternatives of antibiotics used to manage acute pharyngitis of their children. The Egyptian mothers' concerns that drinking warm liquids (anise and warm lemon); while in Saudi mothers were drinking Mara and Ginger as an alternatives of antibiotics.

**Figure (3):** Distribution of mothers' actions if their children not improved after two days from treatment plan



**Figure (3)** illustrates mothers' actions if their children being worse after two days from treatment plan. All Saudi mothers said that they will go to the physician or to hospital compared to 54.5 % in the Egyptian mothers and the rest of Egyptian mothers 34.5% waiting to the next physician visit and 21.5% using home remedies and 11.5% continue from their own on the same plain.

**Table (5): Mean, standard deviations differences and P values for the studied mothers' practice of acute pharyngitis therapeutic regimen adherence.**

Mothers' nationalities  Mother's practice	Egyptian mothers No=200	Saudi mothers No=200	P value
	Mean± SD	Mean± SD	P
I administer of antibiotics as a substitute for antipyretics to avoid increased illness symptoms.	1.87±0.89	2.73 ± 0.54	0.00*
I administer antipyretics and anti-inflammatory in case of viral pharyngitis that mentioned by the physician	1.81±0.83	2.72± 0.56	0.00*
I do exactly what the doctor told to me to do	2.37±0.68	2.78± 0.44	0.23
I accelerate giving of child antibiotics in case of fever, common colds without prescription.	1.88±1.09	2.79 ± 0.45	0.00*
I stop antibiotic in case of child improvement without attention to physician instructions.	1.38±1.05	2.80 ± 0.42	0.00*
I repeat antibiotics without prescription for treating the same disease on another time.	1.31±1.05	1.67±1.08	0.00*

(\*) Statistically significant at  $p \leq 0.05$ , t: independent t test

Table (5) reveals that mean and stander deviation was lower in in all items of acute pharyngitis therapeutic regimen adherence in Egyptian mothers than in Saudi one except (I do exactly what the doctor told to me to do ) and a statistically significant differences observed where  $p= 0.00$ .

**Table (6): Mothers' medical interview total satisfactory score and their therapeutic regimen adherence to acute pharyngitis**

Mothers' nationalities  Total Satisfactory score	Egyptian mothers No=200		Saudi mothers No=200		Test of significance	
	No.	%	No.	%	t	p value
Satisfactory	93	46.5	168	84	33.25	0.000*
Unsatisfactory	107	53.5	32	16		
Mean ± SD	16.77 ± 3.59		23.40 ± 3.08			

(\*) Statistically significant at  $p \leq 0.05$ , t: independent t test

Table (6) shows that there were highly statistically significant differences observed between the mean scores of Egyptian and Saudi mothers' total medical interview satisfactory score for their therapeutic regimen adherence for children with acute pharyngitis where  $p=0.000$ .



**Table (7): Association (bivariate analysis) of the socio-demographic characteristics of the studied mothers and their medical interview satisfaction score for pharyngitis therapeutic regimen adherence.**

Mothers' Satisfaction  mothers' socio-demographic characteristics		Satisfaction of Egyptian mothers No=200				Satisfaction of Saudi mothers No=200				Test of significance Chi square / fisher exact test	
		Unsatisfactory N=107		Satisfactory N=93		Unsatisfactory N=32		Satisfactory N=186		Egyptian parents	Saudi parents
		No.	%	No.	%	No.	%	No.	%	$\chi^2$ & p	$\chi^2$ & p
Mothers' age	<20ys	6	3	----	----	4	2	26	13	13.23 & 0.004*	10.52 & &0.015*
	20-<30ys	48	24	62	31	4	2	51	25.5		
	30-<40ys	49	24.5	30	15	10	5	59	29.5		
	≥40ys	4	2	1	0.5	14	7	32	16		
Mothers' educational Level	Illiterate	0	0	16	8	28	14	117	58.5	30.17 & 0.000*	4.29 & 0.38
	Preparatory	57	28.5	35	17.5	4	2	51	25.5		
	Secondary education	11	5.5	14	7	0	0.00	0	0.00		
	Bachelor Degree	19	9.5	23	11.5	0	0.00	0	0.00		
	Higher studies	20	10	5	2.5	0	0.00	0	0.00		
Mothers' occupation	House wife	61	30.5	67	33.5	18	9	119	59.5	7.455 & 0.24	2.64 & &0.145
	Governmental work	45	22.5	23	11.5	14	7	49	24.5		
	Private (free) work	1	0.5	3	1.5	0	0.00	0	0.00		

(\*) Statistically significant at  $p \leq 0.05$ ,  $\chi^2$  = chi square

Table (7): reveals there were a statistical significant relation between age and total medical interview satisfaction score in Egyptian and Saudi mothers where  $P= 0.004$  and  $0.015$  respectively about therapeutic regimen adherence for their children with acute pharyngitis while only the level of education had statistical significant relation in the Egyptian where  $p=0.000$

### 7. DISCUSSION

In pediatric emergency departments pharyngitis or sore throat represented (28.4%) of upper respiratory tract infection of under-five years old children and represented 30–60% practitioner visits and 20–30% of all hospital admissions in the developing countries<sup>(22)</sup>. The etiology in 85% from children is a viral infection, which is a self-limiting disease and no need for antibiotics. While 5% to 40% of them caused by bacteria and need antibiotic to avoid complications as rheumatic fever. But antibiotics were unnecessarily prescribed to 32.6% of viral pharyngitis which raises antimicrobial resistant<sup>(23,24)</sup>. On the national scale, unnecessary antibiotic use for pharyngitis in pediatric outpatient settings remains an important area of focus. Use of medicines without a prescription and self-medication are quite common in pediatrics posing a great risk of inappropriate use and increasing the risk for adverse effects and mistreatment<sup>(25, 26)</sup>. The WHO has estimated that more 50% of drugs were prescribed and given inappropriately, ineffectively, and inefficiently<sup>(27)</sup>. There are a variability in adherence rates to medications for acute diseases depending on when and how adherence for therapeutic regimen was assessed. It was varied according to the criterion set by the health care providers (adherent and non-adherent criteria)<sup>(15)</sup>. Several strategies were used to minimize use of antibiotics in children with pharyngitis or sore throat including delayed prescription of antibiotics and patient education that shows a reduction of up to half in the latter<sup>(28)</sup>. The decision of drug administration that carried by caretakers primarily influenced by parents' knowledge, believes, and attitude toward self-medication<sup>(26)</sup>. Therefore the aim of the current study was to analysis and evaluation of mothers' knowledge, concerns, behavior and attitude about therapeutic regimen adherence of children with acute pharyngitis.

Regarding uses of antibiotic this study found that above 50% of Egyptian of mothers believes were true where antibiotic can treat bacterial infection. While the rest of them had false one in addition to all Saudi mothers mentioned it treat fever, viral ,cough and tonsillitis whatever the causative agents and this results in agreement with (Andre et al., 2010; Togoobaatar et al., 2010; Panagakou et al., 2011 ;Ivanovska et al 2018 )<sup>(29,30,31,32)</sup> whom found that mothers believes about antibiotic uses were treat fever, cough and viral pharyngitis. Poor knowledge and bad believes regarding antibiotic use and side effects which contribute to poor practice and misuse of antibiotics, in the present study all mothers in both groups were not familiar with the term “resistance” and this result similar with Ebrahim et al (2014)<sup>(33)</sup> and Alsuhaibani et al (2019)<sup>(34)</sup> but in contrary with Aris Widayati et al. (2012)<sup>(35)</sup> and Neeta Parimi et al., (2004)<sup>(36)</sup> whom found that the most participants in Yogyakarta City, Indonesia were aware with antimicrobial resistance and possible side effects and most of them know that antibiotics are effective for bacterial infections .

In the present study the majority of both Egyptian and Saudi mothers (92% and 100% ) their knowledge about side effects of inappropriate use of antibiotic were limited and this result in contrast with Ivanovska et al(2018)<sup>(32)</sup> who found that more than 80% of parents knew that inappropriate use of antibiotics could lead to their inefficacy or side effects.

Regarding prescription of antibiotic the present study found that 84.4% of Egyptian mothers said that the antibiotic prescribed by the physician followed by pharmacist 11% and this in agreement with Al-Ayed (2019)<sup>(36)</sup> who stated that 83% of the respondents reported that their physician was the most common source of information regarding antibiotics, followed by pharmacists (63%), but in our study all Saudi mothers 100% sales antibiotic according to physician prescription and this result in contradiction with Zahreddine et al (2018)<sup>(37)</sup> and Elbur(2016)<sup>(38)</sup> whom found that 66.7% of parents trusted the pharmacist in the antibiotic prescription according to recent survey conducted in Lebanon and Saudi Arabia and the rational for this contradiction returned to restricted rules and regulations from ministry of health in eastern region from KSA that prevent purchase antibiotics without a medical prescription.

Our study highlighted concerns of mothers about the alternatives of antibiotics in management of pharyngitis, 69.5% from Saudi mothers used Myrrh as a liquid for dinking and their concerns in the same line of Alhussaini et al (2015) and Mrina (2020)<sup>(39, 40)</sup> who recommended Myrrh as potential source of biological antimicrobial, since it showed a high activity against wide spectrum of bacteria and also can kill persister cells. While 44 % and 34% from the Egyptian mothers used warm liquids and Anise as an alternatives of antibiotics and this result in agreement with Sanu and Eccles (2008)<sup>(41)</sup> whom support the folklore that a hot tasty drink is a beneficial treatment for relief of most symptoms of common cold and pharyngitis. In addition to Wenli et al (2019)<sup>(42)</sup> shown that anise seeds and essential oil have antibacterial, antifungal, anti-inflammatory, analgesic and antiviral activities.

Wenli and Shahrajabian (2019) and Mohan et at (2004) have reported low levels of parental knowledge and practice about antibiotic<sup>(43, 44)</sup> and this results matching with our results where the majority of Saudi and Egyptian mothers had poor total knowledge score about antibiotic uses and side effects. Finding of the present study revealed that 25% of Egyptian mothers disagree and strongly disagree to adherence to the doctors' plan of treatment and this result in the same line with Alkhaldi et al (2015)<sup>(45)</sup> , Chan and Tang (2016)<sup>(47)</sup>;while all Saudi mothers follow the doctors' plan of treatment but this result is inconsistency with Al- Ayed(2019)<sup>(37)</sup> who found that only 1.3% of parents adhered to their doctor's advice and treatment plan of pharyngitis. The current study results showed that the all Saudi mothers adhered to physician treatment plan that reflected statistically significant differences between the mean scores of Egyptian and Saudi parents' satisfaction regarding their adherence score to treatment regimen for children with pharyngitis. This similar with the evidence from the study conducted by Kutrani, et al, (2019)<sup>(47)</sup> showed that parents who obtained guidance more frequently from physicians had a stronger adherence to physicians' advice. And the majority of parents had good adherence regarding antibiotic usage with a mean of 2.2 score, still needs more adherence to be corrected. Results of the present study reflected that ineffective therapeutic regimen adherence in egyptian mothers where they verbalized antibiotics can be repeated without physician prescription for treating the same disease on another time comparing to the majority of Saudi one who adhered to treatment plan of pharyngitis and the rational may be due to over counter antibiotic purchase is common practice in Egypt, because antibiotic prescribing regulations are not enforced and this in agreement with Alkhazil et (2018)<sup>(23)</sup> where the one third of parents drive to purchase antibiotic 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 upper respiratory tract infection.

Regarding ineffective adherence to administration of antibiotics for treatment of fever or common colds, our study found that 30% and 12% of Egyptian mothers agree and strongly agree accelerate giving their children antibiotics in case of fever, common colds without prescription compared to 81% ,17% disagree and strongly disagree Saudi one. This results were similar with Kutrani et al (2018)<sup>(47)</sup> ; Havens and Schwartz (2016 )<sup>(48)</sup> studies that found 34% of parents responded correctly to the answers for the statement "antibiotics are helpful in treating common colds among children". Moreover only 32% of parents did not believe that antibiotics have cured their child's cold symptoms. The current study reflected also 31% from Egyptian children taken antibiotic four times in last year compared to 1% of Saudi one. In addition, Egyptian mothers can sale antibiotic without medical prescription, stop antibiotic when the child's symptoms relieved whatever the physician instructions, and repeat using of antibiotics without physician prescription for treating the same disease on another time. And enforce the physician to prescribing antibiotic for their children whatever the causative agents. All these mistaken beliefs may have steered antibiotic abuse from self-treatment or over the counter demands at the pharmacy. Which are fostered from easy availability of these drugs at community pharmacies in Egypt while in our study setting Al-Khobar city, KSA by low not allowed to sale antibiotic without physician prescription so mostly Saudi mothers followed physician instructions and this result in agreement with Togoobaatar et al., 2010; Elmasry et al. 2013 ;Kutrani et al 2018 )<sup>(30,49,47)</sup>. Where the percentage of encounters with antibiotic prescription were higher in Egypt than in KSA.

There are many variables leads to ineffective therapeutic regimen adherence as an extensive literature review found that no studies have used a valid and reliable instrument to measure these variables which may related to parents as age ,level of education, monthly income, employment status, numbers of children, parents level of awareness, believes and attitude toward importance of therapeutic regimen adherence while the other variables related to the physicians as their awareness and application of therapeutic regimen adherence guidelines, their Workload and their level of communication with children's' parents and the last variable was policymakers intervention strategies toward inappropriate and appropriate use of antibiotics Alkhalidi et al (2015)<sup>(46)</sup>.

## 8. CONCLUSION

The current study results concluded that the majority of Saudi and Egyptian mothers had poor total knowledge score about antibiotic uses and side effects. Mean and stander deviation to five from six items of acute pharyngitis therapeutic regimen adherence to physician treatment plan in Egyptian mothers were lower than in Saudi one .The majority of Saudi mothers(84%) their total medical interview satisfactory score related to therapeutic regimen adherence was satisfactory comparing to (46.5 %) in egyptian mothers with statistically significant .

## RECOMMENDATIONS

Based on the study findings highlight the following recommendations:

- Educational programs for parents are needed to correct the deficit in knowledge and change the attitude and practices about therapeutic regimen adherence of children with acute pharyngitis.
- Establishing antibiotic policies and regulations at the national level and this polices should be followed by all healthcare workers.
- Implementing antibiotic sale regulations to restrict the unlimited access with applying penalties to the offenders.

## REFERENCES

- [1] Dooling KL, Shapiro DJ, Van Beneden C, Hersh AL, Hicks LA. Overprescribing and inappropriate antibiotic selection for children with pharyngitis in the United States, 1997-2010. *JAMA Pediatr.*2017;168(11):1073–1074
- [2] Thea Brennan-Krohn , Al Ozonoff and Thomas J. Sandora . Adherence to guidelines for testing and treatment of children with pharyngitis: aretrospective study. *Pediatrics* (2018) 18:43
- [3] D, Huang CY, Gabriel E. Who really gets strep sore throat? Confounding and effect modification of a time-varying exposure on recurrent events. *Stat Med.* 2016 Oct 30;35(24):4398-4412
- [4] Alzahrani MS, Maneno MK, Daftary MN, Wingate L, Ettienne EB. Factors Associated with Prescribing Broad-Spectrum Antibiotics for Children with Upper Respiratory

**International Journal of Novel Research in Healthcare and Nursing**

 Vol. 7, Issue 2, pp: (84-97), Month: May - August 2020, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- [5] Gottlieb M, Long B, Koyfman A. Clinical Mimics: An Emergency Medicine-Focused Review of Streptococcal Pharyngitis Mimics. *J Emerg Med*. 2018 May;54(5):619-629.
- [6] Brennan-Krohn T, Ozonoff A, Sandora TJ. Adherence to guidelines for testing and treatment of children with pharyngitis: a retrospective study. *BMC Pediatr*. 2018 Feb 09;18(1):43.
- [7] Norton LE, Lee BR, Harte L, Mann K, Newland JG, Grimes RA, Myers AL. Improving Guideline-Based Streptococcal Pharyngitis Testing: A Quality Improvement Initiative. *Pediatrics*. 2018 Jul;142(1)
- [8] Shulman ST, Bisno AL, Clegg HW, Gerber MA, Kaplan EL, Lee G, et al. Clinical practice guideline for the diagnosis and management of group a streptococcal pharyngitis: 2012 update by the infectious diseases society of America. *Clin Infect Dis*. 2012;55(10):1279–82.
- [9] American Academy of Pediatrics. Group A streptococcal infections. In: Pickering LK, Baker CJ, Kimberlin DW, Long SS, eds. *Red Book: 2012 Report of the Committee on Infectious Diseases*. Elk Grove Village: American Academy of Pediatrics; 2012:668–80
- [10] Wald, E. R. (2019). Patient education: Sore throat in children (Beyond the Basics). <https://www.uptodate.com/contents/sore-throat-in-children-beyond-the-basics>
- [11] Benin AL, Vitkauskas G, Thornquist E, Shiffman RN, Concato J, Krumholz HM, et al. Improving diagnostic testing and reducing overuse of antibiotics for children with pharyngitis: a useful role for the electronic medical record. *Pediatr Infect Dis J*. 2003;22:1043–7.
- [12] Sadeghirad B, Siemieniuk RAC, Brignardello-Petersen R, Papola D, Lytvyn L, Vandvik PO, Merglen A, Guyatt GH, Agoritsas T. Corticosteroids for treatment of sore throat: systematic review and meta-analysis of randomised trials. *BMJ*. 2017 Sep 20;358:j3887.
- [13] Centers for Disease Control and Prevention (2019). Sore Throat. <https://www.cdc.gov/antibiotic-use/community/for-patients/common-illnesses/sore-throat.html>
- [14] Chapman H (2018) Nursing theories 4: adherence and concordance. *Nursing Times* [online]; 114, 2, 50.
- [15] Michael A. Rapoff .(2010) Adherence to Pediatric Medical Regimens; Second Edition; Springer Science+Business Media.pp6-8.
- [16] Eldalo AS, El-Hadiyah TM, Yousif MA. Sudanese parents' knowledge, attitudes and practice about self-medication to their children: Qualitative study. *Saudi J Health Sci* 2013;2:103-7.
- [17] Pelucchi, L. Grigoryan, C. Galeone S. et al . Guideline for the management of acute sore throat ESCMID Sore Throat Guideline Group , *Clin Microbiol Infect* 2012; 18 (Suppl. 1): 1–27.
- [18] Irawati, L., Alrasheedy, A. A., Hassali, M. A., & Saleem, F. (2019). Low-income community knowledge, attitudes and perceptions regarding antibiotics and antibiotic resistance in Jelutong District, Penang, Malaysia: a qualitative study. *BMC public health*, 19(1), 1-15.
- [19] Baltes, P. B., Reese, H. W., & Nesselroade, J. R. (2014). *Life-span developmental psychology: Introduction to research methods*. Psychology Press.
- [20] Moorhead Sue, Johnson Marion, Maas Meridean, Swanson Elizabeth. *Nursing outcome classification (NOC)*. 4th edition. United State America: Mosby Elsevier; 2008.
- [21] Wolf MH, Stiles WB. Further development of the medical interview satisfaction scale. Los Angeles: American Psychological Association Convention; 1981
- [22] Yousif TK, Khaleq BA. Epidemiology of acute respiratory tract infections (ARI) among children under five years old attending Tikirit general teaching hospital. *Middle East J Fam Med* 2006;4:4-23.
- [23] Alkhazi et al. *International Journal of Emergency Medicine* (2018) 11:49 <https://doi.org/10.1186/s12245-018-0209-4>

**International Journal of Novel Research in Healthcare and Nursing**

 Vol. 7, Issue 2, pp: (84-97), Month: May - August 2020, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- [24] Tanz R. Acute Pharyngitis. In: Nelson Textbook of Pediatrics, Twentieth Edition. Philadelphia: Elsevier, Inc., 2015. P. 2017-21.
- [25] Hernandez-Juyol M, Job-Quesada JR. Dentistry and self-medication: A current challenge. *Med Oral* 2012;7:344-7.
- [26] Cruz MJ, Dourado LF, Bodevan EC, Andrade RA, Santos DF. Medication use among children 0-14 years old: Population baseline study. *J Pediatr (Rio J)* 2015;90:608-15.
- [27] Cindra T. Yuniar, , Kusnandar Anggadiredja and Alfi N. Islamiyah . Evaluation of Rational Drug Use for Acute Pharyngitis Associated with the Incidence and Prevalence of the Disease at Two Community Health Centers in Indonesia. *Sci. Pharm.* 2017, 85, 22; doi:10.3390/scipharm85020022.
- [28] Aalbers J, O'Brien KK, and Chan W-S, et al. Predicting streptococcal pharyngitis in adults in primary care: a systematic review of the diagnostic accuracy of symptoms and signs and validation of the Centor score. *BMC Med.* 2016; 9:67. <https://doi.org/10.1186/1741-7015-9-67>.
- [29] Andre M, et al. 2010. A survey of public knowledge and awareness related to antibiotic use and resistance in Sweden. *J Antimicrob Chemother*, 65(6):1292-1296.
- [30] Togoobaatar G, et al. 2010. Survey of non-antibiotics for children in an urban community in Mongolia. *Bull World Health Organ* WHO 2001: Global strategy for containment of antimicrobial resistance. Switzerland: World Health Organization.
- [31] Panagakou SG, et al. 2011. Antibiotic respiratory tract infections in children: a cross survey of knowledge, attitudes, and practices (KAP) of parents in Greece. *BMC Pediatr.*
- [32] Ivanovska V, Angelovska B, van Dijk L, Zdravkovska M et al. 2018. Change in parental knowledge, attitudes and practice of antibiotic use after a national intervention programme. *The European Journal of Public Health*, Vol. 28, No. 4, 724–729
- [33] Ebrahim H A, Lulah A., Hassan and Samia E., Khaton.2014. Knowledge, Believes, and Practices Regarding Antibiotic Use and Misuse among Rural mothers in Gharbia Governorate . *International Journal of Current Research* Vol. 6, Issue, 06, pp.7109-7116.
- [34] Alsuhaibani MA, Renad S. AlKheder, Jumanah O. Alwanin, Marwa M. et al. (2019). Parents' awareness toward antibiotics use in upper respiratory tract infection in children in Al-Qassim region, Saudi Arabia. *Journal of Family Medicine and Primary Care* | P ;8:583-9
- [35] Aris Widayati, et al. 2012. Knowledge and beliefs about antibiotics among people in Yogyakarta City Indonesia: a cross sectional population-based survey. *Resistance and Infection Control*, 1:38 doi:10.1186/2047.2994-1-38.
- [36] Neeta Parimi, et al. 2004. Caregivers' practices, knowledge and beliefs of antibiotics in paediatric upper respiratory tract infections in Trinidad and To cross-sectional study. *C Family Practice*, 5:28. doi:10.1186/1471-2296-5-
- [37] Al-Ayed MS. Parents' knowledge, attitudes and practices on antibiotic use by children. *Saudi J Med Med Sci* 2019;7:93-9.
- [38] Zahreddine L, Hallit S, Shakaroun S, Al-Hajje A, Awada S, Lahoud N. Knowledge of pharmacists and parents towards antibiotic use in pediatrics: a cross-sectional study in Lebanon. *Pharmacy Practice*. 2018 Jul-Sep;16(3):1194.
- [39] Elbur A, Albarraq A, Abdallah M. 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. *J Med Res.* 016;2(4):99-103.
- [40] Alhussaini, M S, Saadabi A.M, Alghonaim M and Ibrahim K E. An Evaluation of the Antimicrobial Activity of Commiphora myrrha Nees (Engl.) Oleo-gum Resins from Saudi Arabia; *Journal of Medical Sciences* .Volume 15 ;(4): 198-203, 2015.

**International Journal of Novel Research in Healthcare and Nursing**

 Vol. 7, Issue 2, pp: (84-97), Month: May - August 2020, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- [41] Mrinal K Bhattacharjee and Tahrir Alenezi. Antibiotic in myrrh from *Commiphora molmol* preferentially kills nongrowing bacteria. *FUTURE SCIENCE OAVOL.* 6, NO. 4. <https://doi.org/10.2144/fsoa-2019-0121>
- [42] Sanu . A and Eccles.R. The effects of a hot drink on nasal airflow and symptoms of common cold and flu; *Rhinology*, 46, 271-275, 2008.
- [43] Wenli S, Shahrajabian M H and Cheng Q . Anise (*Pimpinella anisum L.*), a dominant spice and traditional medicinal herb for both food and medicinal purposes *Ogent BiologyPlant Sciences*, Published: 30 September 2019 <https://doi.org/10.1080/23312025.2019.1673688>
- [44] Mohan S, Dharamraj K, Dindial R, Mathur D, Parmasad V, Ramdhanie J, et al. Physician behaviour for antimicrobial prescribing for paediatric upper respiratory tract infections: a survey in general practice in Trinidad, West Indies. *Ann Clin Microbiol Antimicrob.* 2004;3:11. doi:10.1186/1476-0711-3-11. [PubMed: 15196306.
- [45] Yu M, Zhao G, Stalsby Lundborg C, Zhu Y, Zhao Q, Xu B. Knowledge ,attitudes, and practices of parents in rural China on the use of antibiotics in children: a cross-sectional study. *BMC Infect Dis.* 2014;14:112.doi: 10.1186/1471-2334-14-112. [PubMed: 24576064].
- [46] Alkhalidi SM , Al-Mahmoud M S and Kanaan H. Antibiotic Use for Children in Jordan; *Med J* 2015; December: Vol. 49 (4) <http://journals.ju.edu.jo/jmj>.
- [47] Kutrani H , Elhashmi H M , Adam HM and Atiyah A A . Assessment of Parents Perception concerning children's Antibiotic Use by PAPA Scale; *IOSR Journal Of Pharmacy And Biological Sciences (IOSR-JPBS)* e-ISSN:2278-3008, p-ISSN:2319-7676. Volume 14, Issue 2 Ser. II (Mar – Apr 2019), PP 20-26.
- [48] Havens L, Schwartz M. Identification of Parents' Perceptions of Antibiotic Use for Individualized Community Education. [online]. *Global Pediatric Health.* 2016; 3:1-7. Available from: <https://us.sagepub.com/en-us/nam/open-access-at-sage> [Accessed 20 January 2018].
- [49] Elmasry A G *et al.* 2013. Pattern of antibiotic abuse – a population based study in Cairo, Chest Department, Ain Shams University, Faculty of Medicine, Cairo, Egypt. *Egyptian Journal of Chest Diseases and Tuberculosis*, 62, 189–195.