

Parents Knowledge, attitudes and practice of use of antibiotics for upper respiratory tract infections in children: a cross-sectional study in Ras Al Khaimah, United Arab Emirates

Rasha A. Salama ⁽¹⁾, Kussai N.Bader ⁽²⁾, Abeer S. Rahman ⁽²⁾, Fatima Y. Hashmi ⁽²⁾

(1) Doctorate degree of Community Medicine Kaser Al Aini School of medicine Cairo University, Egypt, Department of Community Medicine, Ras Al Khaimah Medical and Health Science University, UAE & Kaser Al Aini School of medicine, Cairo University, Egypt

(2) Bachelor of Medicine and Surgery (MBBS), Ras Al Khaimah Medical and Health Science University, college of medicine, UAE

CORRESPONDING AUTHOR: Rasha Aziz Attia Salama, Doctorate degree of Community Medicine Kaser Al Aini School of medicine Cairo University, Egypt, Phone:00971501758367, Postal code: 11172, Email: rasha.aziz@rakhmsu.ac.ae

DOI: 10.2427/12969

Accepted on December 3, 2018

ABSTRACT

Background: Upper respiratory tract infections are common in children and represent a significant cause of antibiotic abuse. Parents' knowledge and attitudes often contribute to inappropriate prescription of antibiotics and promoting antibiotics resistance. The study aimed at exploring parental knowledge, attitudes and practices towards antibiotic use in children with URTI along with identifying the reasons behind self-medication and abuse of antibiotics

Methods: A cross sectional survey was conducted at pediatric outpatient clinics of Saqr Hospital in the emirate of Ras Al Khaimah, United Arab Emirates. A structured interview questionnaire was used to collect data from 239 parents of children aged less than 7 years, between February to March 2016

Results: More than half (54.4%) of the respondents had a poor level of knowledge. About (66.1%) were not aware that antibiotics are indicated to treat bacterial infection. However, 67.2% of the respondents incorrectly identified that antibiotics are used to treat viral infections. Nearly 44.5% of the respondents were aware of antibiotic resistance in relation to its overuse. With regard to attitude, 68.2% of the respondents believed that they would be satisfied if physicians did not prescribe antibiotics for common cold. Yet, 63% would request it if physicians did not prescribe for frequent URTIs. Nearly 43.5% of respondents gave self-medication to their children mostly because of repeated similar attacks and over the counter acquisition of antibiotics. Most (82.2%) of them declared that, physicians did not provide sufficient information regarding diagnosis and therapy. More than half (54.4%) of the respondents had a poor level of knowledge. About (66.1%) were not aware that antibiotics are indicated to treat bacterial infection. However, 67.2% of the respondents incorrectly identified that antibiotics are used to treat viral infections. Nearly 44.5% of the respondents were aware of antibiotic resistance in relation to its overuse. With regard to attitude, 68.2% of the respondents believed that they would be satisfied if physicians did not prescribe antibiotics for common cold. Yet, 63% would request it if physicians did not prescribe for frequent URTIs. Nearly 43.5% of respondents gave self-medication to their children mostly because of repeated similar attacks and over the counter acquisition of antibiotics. Most (82.2%) of them declared that, physicians did not provide sufficient information regarding diagnosis and therapy

Conclusions: Educational programs are needed to raise awareness and correct expectations about judicious use of antibiotics

Key words: antibiotic misuse, knowledge, attitude, behavior, Ras al Khaimah

INTRODUCTION

Over the past decades, anti-microbial resistance (AMR) has evolved to become a major public health problem [1]. It threatens most clinical and public health practices in both high-income countries and countries with limited resources. Many common infections today are becoming difficult or even impossible to treat, sometimes turning a common infection into a life-threatening one. New resistance mechanisms emerge and spread globally threatening the ability to treat common infectious diseases, resulting in prolonged illness, higher health care expenditures, and a greater risk of death [2, 3].

Antibiotic resistance is amplified many folds owing to overuse of them in developed nations and, paradoxically, both misusing and underusing them in developing nations. Mishandling of our precious arsenal of disease-fighting drugs with a dearth of new antibiotics coming to market and emergence of new resistant bacteria, halfhearted use of powerful antibiotics will eventually result in less effective drug later [2].

Prescription of antibiotics for upper respiratory tract infections (URTIs) is very common practice in pediatrics [4] although there is sufficient evidence to support the viral origin of most of those illnesses [5-7]. Several factors may enhance irrational antibiotics usage, which could be doctors' knowledge and experiences [8], patients' expectations, pharmaceutical marketing and antibiotic selling without a prescription [9, 10]. Many, if not most, of the Gulf Corporation Council (GCC) countries do not have clear guidelines for antimicrobial use and lack policies for restricting and auditing antimicrobial prescriptions [11]. In Saudi community, only one out of 88 pharmacists in eastern province refused to sell antibiotics without a prescription, and 77.6% of the pharmacies in Riyadh dispensed antibiotics without a prescription [12]. Studies in Jordan also, indicated inappropriate prescribing and dispensing patterns [13, 14]. Indeed, governmental regulations that prohibit selling of antibiotics without a prescription are not fully enforced [15]. In UAE, despite the Ministry of Health stating that "the licensed pharmacist should not give any medicine or medicinal preparation without a medical prescription in a clear hand-writing carrying the name of the licensed doctor who issued it, its stamp and date of issue" [16]. The dispensing of antibiotics without prescription is still a common practice [11]. Moreover, with the invent of technology and wide usage of internet, a considerable number of patients undergo vague self-treatment without the proper knowledge, especially when there is over-the-counter use of some non-prescribed medicines. Different actors are involved in the scenario of inappropriate and excessive use of antimicrobials, namely, physicians, patients, pharmacists and health authorities [17-19]. Therefore, the need for an action to avert a developing global crisis in health care is increasingly urgent.

Recognizing the public health crisis due to AMR, several nations, international agencies, and many other organizations worldwide have taken action to counteract it through strategies applied in the relevant sectors. Several World Health Assembly resolutions have called for action on specific health aspects related to AMR. In the year 2000, the World Health Organization (WHO) report titled overcoming antimicrobial resistance in its report on infectious diseases identified three key issues to slow the emergence and reduce the spread of antimicrobial resistant microorganisms. It recommended improving access to medical services, reducing unnecessary use of antimicrobial drugs and taking a full course of treatment; and not sharing medication with other people or keeping part of the course for another occasion [20]. In 2001, the WHO published its global strategy to contain AMR [21]. Consequently, on World Health Day 2011, WHO urged national commitment for a comprehensive and financed plan with accountability and civil society engagement [22].

It is necessary to understand patients' knowledge, attitude, and practices of use of antibiotics and also the prescribing behavior of physicians in order to develop interventions that will effectively improve the use of antibiotics [23]. This study aims to explore the parental knowledge, attitudes and practices (KAP) of antibiotic use for common URTIs for children less than 7 years old, and to identify the reasons behind self-medication and the abuse of antibiotics. Thereby, the results could provide further insight in planning and developing strategies for local health education purpose.

METHODS

Design and setting

A cross-sectional observational study was conducted was conducted during the period of February to March 2016 at the Pediatric outpatient clinics of Saqr Hospital in the emirate of Ras Al Khaimah (RAK), United Arab Emirates (UAE).

Saqr Hospital is the only governmental hospital in RAK that provides Pediatric health services with the highest flow of patients throughout the working days.

Participants

All Parents of children less than 7 years old who were present at the Pediatrics Outpatient Clinic of Saqr Hospital during the study period. Participants were eligible to be included in the study on the basis of the following three criteria: 1) they being aware of the term "antibiotics"; 2) they being 18 years of age or older; 3) they having at least one child less than 7 years old.

Sampling design

The sampling frame composed of the Parents of children less than 7 years old who are attending the study setting during the study period. Participants who did not meet the inclusion criteria and those who completed the pilot questionnaire were excluded. A convenient sample of 270 participants was calculated based on the margin of error (5%), confidence level (95%), monthly average number of patients attending the outpatient clinics (900) and response distribution (50%) [24].

Ethical consideration

Approval from the health authorities and the Local Institutional Ethics Committee was obtained before commencement of the study. The objective of the study was adequately explained to participants and their consent was obtained.

Data collection

An anonymous structured interview questionnaire was used to collect parental data. It was adopted from previous studies and properly revised to ensure validity and reliability of questions [25-27].

The questionnaire comprised 31 questions divided into five sections. The first section covered participants' demographic data such as age, gender, nationality, level of education, monthly income in dirhams and access to health insurance. The second was designed to assess recent antibiotic usage among participants during the last month. Respondents also requested to provide information regarding the source and reason of taking the antibiotics during that period. The third section assessed participants' knowledge on the role, indication and efficacy of antibiotics use in URTIs, dangers of antibiotics and completion of treatment course. The fourth section examined participants' attitude regarding antibiotics' use and level of self-medication. Finally, the fifth section enquired participants' practice and clinician-patient relationship/interaction in terms of antibiotic prescribing.

Respondents were requested to choose among three options provided: "Yes", "No", or "do not know" to determine the level of knowledge. Questions on participants' attitude, behavior and patient-clinician interaction were answered either with a yes/no response. The questionnaire was translated into Arabic and the required corrections and modification was carried out. A group of experts had tested the content validity.

Pilot study

A pilot study was undertaken to test the validity and

reliability of the data collection tool and to identify possible field problems. Modifications were made accordingly.

Data analysis

The data was entered in an IBM compatible computer, using the Statistical Package for Social Science (SPSS), version 18. A descriptive analysis using means with standard deviation, frequency counts and percentages was carried out. An arbitrary scoring system was used to assess the level of knowledge, based on the answers provided. One mark was awarded for each correct response and zero for each wrong or unsure response, with a maximum obtainable correct score of 11. The total knowledge score was categorized into three levels labelled as poor (0-3), moderate (4-7) and good (8-11). The influence of demographic characteristics on knowledge, attitude and practices was tested using Chi Square or Fishers Exact tests wherever appropriate. Spearman rank correlation was also applied to analyze the direction and degree of the relationship between knowledge and attitudes as relevant. The level of statistical significance was set at a P value less than 0.05.

RESULTS

Of the 270 participants purposively selected, 239 participants (88.5%) fulfilled the inclusion criteria and agreed to participate in the study. The mean age of the studied participants was 43.7 ± 10.32 years. Females constituted 70.7% of the sample and 64% of respondents were non-Emirati. More than half (51.5%) of them had completed secondary school. About 71.6% had a monthly family income between 5-10 thousand Emirati dirhams. Similarly, 70.7% of respondents were not covered under health insurance (table1).

The study results showed that, majority of respondents (97.1 %, n=232) reported using antibiotics over the last month which was mostly due to fever (35%) or respiratory illness (40.7%). Among those who used antibiotics, 70.2% (n=163) purchased them using a clinician's prescription, while the remaining 29.7% (n=69) reported antibiotics, either were bought without prescription from retail pharmacy (15.1%) or reused from the leftover antibiotics (14.7%) without consultation.

More than half (54.4%) of the respondents had a poor level of knowledge (score0-3) regarding the role, indication and efficacy of antibiotics use. The poor level of knowledge was significantly higher among age group 18-30 (68.2%), Arab nationality (65.1%) primary school or lower (72.2%) and families with monthly income less than 5000 Emirati dirhams (70.6%) ($p < 0.05$) (Table 2).

Assessment of respondents' knowledge regarding antibiotic role and indication showed 16.7% could

TABLE 1. Socio- demographic characteristics of the studied participants (n=239)

CHARACTERISTICS	NUMBER (%)
Age	
18-30	22(9.2)
31-40	70(29.3)
41-50	41(0)98
≥51	49(20.5)
Mean ± SD	43.7 ± 10.32
Gender	
Male	70(29.3)
Female	169(70.7)
Nationality	
Emirati	86(36)
Arab	66(27.6)
Non-Arab	87(36.4)
Highest Educational Level	
Primary or Less	18(7.5)
Preparatory	32(13.4)
Secondary	123(51.5)
College	66(27.6)
Monthly Income(UAE)	
<5,000	18(7.5)
5,000-10,000	171(71.6)
>10,000	50(20.9)
Access to health insurance	
Yes	70(29.3)

correctly identify antibiotics being indicated to treat bacterial infection. However, more than two third of the respondents (67.2 %) thought antibiotics are also used to treat viral infections. Income was the only significant predictor for the statement "Antibiotics can be used to treat viral infections" whereby the higher income group (> Dhs10, 000) responded mostly with an incorrect answer (24.2% versus. others < 8%, $p = 0.001$).

Forty five percent (44.4%) of the respondents were aware that antibiotics' overuse can cause antibiotic resistance. Nevertheless, one in every five 22.6% agreed that antibiotics would be given to children with fever less than three days. Similarly, 22% of the respondents agreed that antibiotics can be used for common cold (Table 3). Fewer respondents in the age group (31- 40 years old) (43% versus. others > 53%, $p < 0.001$) and among non-Arab (51.3% vs. others >56%, $p = 0.005$) correctly replied to the statement regarding antibiotic resistance. More than sixty of them agreed, antibiotics would be effective in treatment of the similar URTI (60.7%) and repeated frequent attacks (68.6%). About 62% of respondents recognized that antibiotics regimen course should be completed. Unfortunately, 63.6% of them agreed that they would stop antibiotics when the symptoms are improving (table 3). A feeble correlation was noted between knowledge (statement 14) and attitude (statement 24) in this area ($r = 0.276$, $n = 408$, $p < 0.001$).

As regard to respondents' attitude towards antibiotic usage, more than two third (68.2 %) responded they would be satisfied if physicians did not give prescription for antibiotics usage. Yet, 69.0% of respondents reported

that they would expect antibiotic prescription for common cold. Indeed, 62.0% of the participants incorrectly believed, giving antibiotics to their children when having a cold could help them recover faster. This negative attitude was followed by 63% of respondents who would request it for frequent URTIs. Forty percent of respondents reported keeping stock of antibiotics available at home to be used for similar symptoms. Ironically, 45.6% of respondents felt there is no need to comply with full course of antibiotics when the child's general condition improves. Consistent with the knowledge section, younger age (18-30 years old), Arabs, and primary school or lower were the most frequent groups significantly associated with negative attitudes towards antibiotic usage (Table 4).

The study results of respondents' behaviour towards antibiotics usage showed, more than one third (35.1%) requested an antibiotic from their clinicians for common cold. Moreover, 32.6% of respondents sought other clinicians to prescribe antibiotics when their primary clinician did not do so. About 43.5 % ($n=104$) of respondents gave their children antibiotics without medical consultation (table 5). Out of which 58.77% ($n=61$) of parents gave self-medication to their children mostly because of repeated similar attacks and over the counter acquisition of antibiotics. While, 33.7% ($n=35$) would administer left over antibiotics to their children. Almost eight percent (7.7%, $n= 8$) of respondents reported self-medication because of lack of money for consultation. About 62% of respondents knew that antibiotics regimen should be completed. Yet, 80.5% reported that they would stop antibiotics when the symptoms are improving. A weak correlation was noted between knowledge (statement 14) and behavior attitude (statement 29) in this area ($r = 0.45$, $p < 0.001$). Improper practice of antibiotic use was significantly common among low-income group, younger age (18-30 years old), and primary school (Table 5).

Regarding patient-physician interaction, the majority (82.4%) declared that, physician did not provide sufficient information regarding diagnosis and therapy. Furthermore, about three fourth (73.3%) of respondents had antibiotics prescribed to their children over the phone without being physically examined (Table 5).

DISCUSSION

A frequent misconception is that an antibiotic can be used to treat viral infections when, in essence, it is likely to do more harm than good. According to the US Centers for Disease Control and Prevention, where children are concerned, inappropriate use of antibiotics not only leads to increased resistance but also increases the financial burden on the health system because resistant infections are harder, take longer, and are more expensive to treat [28]. The misconceptions and confusion regarding the indications of antibiotics use, whether bacterial or viral

TABLE 2. Comparison of Level of Knowledge with the Socio-demographics of the respondents

CHARACTERISTICS	LEVEL OF KNOWLEDGE			P VALUE *
	Poor (0-3) No (%)	Moderate (4-7) No (%)	Good (8-11) No (%)	
Age in years				
18-30 (22)	15(68.2)	6(27.3)	1(4.5)	0.05
31-40 (70)	23(32.9)	40(57.1)	7(10.0)	
41-50 (98)	58(59.2)	36(36.7)	4(4.1)	
≥51 (49)	34(69.4)	15(30.63)	0	
Gender				
Male(70)	38(54.3)	28(40.0)	4(5.7)	0.9
Female (169)	92(54.5)	69(40.8)	8(4.7)	
NATIONALITY Emiratis(86)				
Arabs (66)	41(47.7)	37(43.02)	8(9.3)	0.02
Non Arabs(87)	43(65.1)	21(31.8)	2(3.03)	
	46(52.9)	39(44.8)	2(2.3)	
EDUCATION				
Primary or lower (18)	13(72.2)	4(22.2)	1(5.6)	0.0001
Preparatory(32)	28(65.0)	14(35.0)	0	
Secondary(123)	73(59.3)	46(37.4)	4(3.3)	
College(66)	26(39.4)	33(50.0)	7(10.6)	
MONTHLY INCOME (UAE)				
<5,000(17)	12(70.6)	5(29.4)	0	0.008
5-1,000(171)	92(53.8)	71(41.5)	8(4.7)	
>10,000(51)	27(52.9)	20(39.2)	4(7.8)	

P Value of Chi square, <0.05

TABLE 3. Comparison of Parents' Response to Knowledge statements with the sociodemographic characteristics

STATEMENTS	YES	NO	DON'T KNOW	P VALUE*				
				Age	Gender	Nationality	Education	Income
Role, indication of Antibiotics								
• Antibiotics act against bacterial microbe	40 (16.7%)	41 (17.2%)	158 (66.1%)	0.70	0.8	0.3	0.6	0.4
• Antibiotics can be used to treat viral infections	161 (67.3%)	32 (13.4%)	46 (19.3%)	0.79	0.9	0.8	0.05	0.001
• Antibiotics overuse cause antibiotic resistance	106 (44.4%)	133 (55.6%)	0.0	0.73	0.7	0.001	0.002	0.001
• Most URTIs like common cold, influenza, sore throat are self-limiting diseases	27 (11.3%)	49 (20.5%)	163 (68.2%)	0.53	0.03	0.03	0.5	0.6
• Antibiotics should be given to children with fever with <3 days	54 (22.6%)	183 (76.6%)	2 (0.8%)	0.07	0.4	0.001	0.3	0.03
• An antibiotic will always be effective in treatment of same URTI infection in the future	53 (22.2%)	186 (77.8%)	0.0	0.06	0.3	0.001	0.2	0.04
• An antibiotic should be given with repeated frequent attacks of URTIs	145 (60.7%)	41 (17.2%)	53 (22.1%)	0.5	0.8	0.6	0.3	0.5
	164 (68.6%)	31 (13.0%)	44 (18.4%)	0.6	0.3	0.7	0.4	0.001
Dangers of Antibiotics								
• Antibiotics overuse cause antibiotic resistance	106 (44.4%)	133 (55.6%)	0.0	0.05	0.3	0.03	0.2	0.7
• Antibiotics don't have any side effect	64 (26.8%)	79 (33.1%)	96 (40.1%)	0.12	0.4	0.05	0.13	0.02
Completion of Treatment Course								
• Would you stop giving your child a full course of antibiotic if his/her symptoms are improving?	152 (63.6%)	81 (33.9%)	6 (2.5%)	0.03	0.6	0.3	0.04	0.3
• The effectiveness of antibiotics is reduced if a full course of antibiotics is not completed	148 (62.0%)	53 (22.1%)	38 (15.9%)	0.04	0.3	0.06	0.03	0.6

P Value of Chi square, <0.05

TABLE 4. Comparison of parents' attitude towards antibiotic use with sociodemographic characteristics

STATEMENTS	AGREE	DISAGREE	P VALUE*				
			Age	Gender	Nationality	Education	Income
• I request for Antibiotics despite Pediatrician's advice	76 (31.8%)	163 (68.2%)	0.06	0.6	0.02	0.02	0.31
• I expect Antibiotics to be prescribed by physician if my child suffer from common cold symptoms	165 (69.0%)	74 (21.0%)	0.03	0.2	0.04	0.01	0.5
• When my child get a cold, antibiotics help him/her to get better more quickly from common cold	148 (62.0%)	91 (38.0%)	0.005	0.7	0.2	0.04	0.06
• I request for Antibiotics for frequent URTIs	151 (63.2%)	88 (33.8%)	0.4	0.2	0.1	0.3	0.07
• I keep Stocks of Antibiotics available at home	96 (40.2%)	143 (59.8%)	0.001	0.5	0.5	0.08	0.05
• I reusing the same Antibiotics for similar symptoms	103 (43.1%)	136 (56.9%)	0.02	0.4	0.6	0.2	0.3
• I stop Antibiotics when my child condition improves	109 (45.6%)	130 (52.7%)	0.3	0.2	0.4	0.6	0.2

P Value of Chi square, <0.0

TABLE 5. Comparison of parents' practices and sociodemographic characteristics

STATEMENTS	YES	NO	P VALUE *				
			Age	Gender	Nationality	Education	Income
Respondents practices							
• Request for antibiotics when child had cold	83 (35.1%)	156 (64.9%)	0.05	0.07	0.2	0.001	0.001
• Request for antibiotics when child got fever	46 (19.2%)	193 (80.8%)	0.001	0.04	0.06	0.05	0.3
• If the physician refused, had she visited another physician	78 (32.6%)	161 (67.4%)	0.07	0.5	0.2	0.002	0.001
• Ever had given the child antibiotics without medical advice	103 (43.5%)	136 (56.9%)	0.01	0.3	0.001	0.5	0.02
• Have you stopped the prescribed antibiotics when the symptoms improve without completing the full course	192 (80.5%)	47 (19.5%)	0.03	0.6	0.5	0.2	0.01
Patient-clinician interaction							
• Pediatrician provide sufficient information regarding diagnosis and therapy	42 (17.6%)	197 (82.4%)	-	-	-	-	-
• Received antibiotics recommendation from pediatrician over the phone	63 (26.4%)	176 (73.6%)					

P Value of Chi square, <0.05

infections seen in the current study conforms to other studies reported in the literature. Mckee et al. [29], Tenaiji et al. [30], and Mc Nutly et al. [25] mentioned that a majority of their study sample did not realize the difference between bacteria and viruses and believed that antibiotics worked against both. Hence, indications for use of antibiotics

should be among the objectives highlighted in patient education activities.

Interestingly, the current study sample mostly agreed that overuse of antibiotics decreased their efficacy and increased tendency for resistance. Nevertheless, the knowledge and attitude of the study respondents did not

necessarily reflect on their behavior. This was evident by the high rate of consumption of antibiotics among respondents, as well as their self-medication, and irregular patterns of antibiotic use. The high rate of antibiotic use and self-medication seen in this study could be partly explained by the respondents' desire to have a quick recovery of their children. However, it is worth mentioning that the high rate (43.5%) of self-medication observed in the current study was similar to that reported in other studies in Iran (43.7%) [31], Jordan (46.0%) [32] and Al Ain city UAE (29.3%) [30]. In fact, parents might find it convenient and cost effective to save the clinicians' fees and buy antibiotics over the counter especially when the health insurance did not cover 70.7% of the studied population. Moreover, the lack of enforcement of the UAE federal law of Ministry of Health [16], which prohibits the purchase of antibiotics without a prescription, is a crucial factor of their prevalent over and misuse of antibiotics. In contrast, a survey in Hong Kong [33] and Malaysia [34] demonstrated that 9% and 7.6% of the respondents respectively obtained antibiotics without prescription. The low responses of self-medication reported in these studies could be attributed to the fact that these surveys were conducted in governmental health care facilities where antibiotics would only be given when there is a prescription and the public who usually visit this setting may less likely to visit private health care clinics or pharmacies. Indeed, dispensing of antibiotics as "prescribed medicine was somehow related to lower rate of home stored antibiotics and subsequently low misuse of antibiotics [35].

Regarding compliance of full antibiotics course, higher percentage of the respondents (62.0%) gave a positive response. However, knowledge did not correlate well with their attitude and behavior; that is, those who knew the need for completing the full course did not necessarily practice it. Similar studies also showed this controversy between knowledge and attitude. In Malaysia (70 %) [34], Hong Kong (58 %) [33] and Taiwan (50.1 %) [36] of respondents had correct knowledge of the need to complete the course of antibiotics. Whereas, 59.8 % of respondents in Malaysia agreed to stop antibiotics after symptoms resolve without completing the full course of antibiotics. These results give impression that the public may not truly understand the reason and need to comply with the treatment course of the antibiotic regimen.

According to Buke et.al, 2005 [37], patients' perceptions of antibiotic effectiveness influence their interaction with health care professionals. In the current study, respondents requested antibiotic prescription from their clinicians and hunted for others practitioners, even in conditions that did not warrant the use, such as cold and fever. This behavior could be explained by their knowledge since they believed that antibiotics were of value in such cases. Furthermore, patient's expectation is an integral factor of antibiotic prescription and it is more likely to be prescribed under pressure. The current

study results showed that 69% of respondents would expect antibiotic prescription for common cold. 35% of participants requested for antibiotics prescription without medical advice and when the physician refused, 32.6% of them consulted another doctor. Similar response was reported by a study in Al Ain city, UAE [30] where 35% of respondents requested antibiotics without medical advice and 20% of them consulted another doctor when the physician refused. However, lower percentages of respondents who asked for antibiotics for cold symptom were reported in surveys from other studies [35, 36, 38].

Indeed, good physician- patient relationship could greatly influence patient satisfaction and meet their expectations when the prescriber feels antibiotics are unnecessary. Several studies have suggested that patients were satisfied with a better understanding of their illnesses even when antibiotics were not prescribed [5, 39].

Lack of patient-physician interaction as majority (82.4%) in the current study reported could be attributed to the inappropriate response in the behavior domain. Health care workers should be more responsible and be coherent over ill effects of antibiotics misuse or overuse. Prescribing antibiotics over the phone in the current study did not comply with good patient care. Not having patients physically examined would deprive the clinicians from valuable diagnostic clues and sound evaluation of the patients' conditions. In addition, frequent prescribing of antibiotics for viral respiratory infections, which could be self-limiting, has influenced public thought of effectiveness of antibiotics, in treating these illnesses [40]. It is clear that health-care professionals are sharing the responsibility of the misuse or overuse of antibiotics by the public. The inappropriate prescribing and selling of antibiotics in the community could be driven by both the patients demands and the profit interest of the health-care providers, which may endanger the health-care needs of the patients as well as their safety.

Our findings should be viewed in the context of additional limitations. First, the external validity of the study may be affected by the convenient sampling of the participants in the study. In addition, there are possibilities for sampling selection bias. Thus, findings might have some limitation in generalization of results. Given the non-probability nature of the sample, the use of statistical significance tests in this manuscript is for illustrative purposes only. Future research employing a nationally representative sample would allow generalization from the results of this study. Secondly, a cross-sectional design was employed and so the results obtained in this questionnaire survey were based on self-reported information, which depends on the honesty and recall ability of the respondents, as well as their understanding of the questionnaire. Finally, excluding all the respondents who had never heard about antibiotics might result in missing important information regarding this category of people.

In conclusion, respondents were generally found to

have insufficient knowledge and inappropriate perceptions about antibiotics. Easy access to antibiotics, habits of antibiotic storage at home and poor adherence to physician's advice are associated with self-medication and antibiotics misuse.

Educational Programs are needed to correct the deficit in knowledge and change the attitude and behavior to rationalize antibiotic use and limit self-medication and over use. Enforcement of the existing UAE federal law prohibiting over the counter availability of antibiotics without a prescription is essential to restrict self-medication. Finally, health care professionals should provide necessary counselling regarding the prescribed antibiotics, which makes patient expectations explicit without damaging clinician-patient relationship

References

- World Health Organization. The World Health report 2007- A safer future: global public health security in the 21st century. Available from: <http://www.who.int/whr/2007> [Accessed October 7, 2018].
- World Health Organization. The evolving threat of antimicrobial resistance: options for action. Available from: http://apps.who.int/iris/bitstream/10665/44812/1/9789241503181_eng.pdfnew [Accessed October 10, 2018].
- Morgan DJ, Okeke IN, Laxminarayan R, Perencevich EN, Weisenberg S. Non-prescription antimicrobial use worldwide: a systematic review. *Lancet Infect Dis* 2011; 11(9):692-701.
- Panagakou SG, Spyridis N, Papaevangelou V, et al. Antibiotic use for upper respiratory tract infections in children: A cross-sectional survey of knowledge, attitudes, and practices (KAP) of parents in Greece. *BMC Pediatr* 2011;11:60.
- Pechère JC. Patients' Interviews and Misuse of Antibiotics. *Clin Infect Dis* 2001; 33 Suppl 3:S170-173.
- Ochoa C, Eiros JM, Inglada L, Vallano A, Guerra L. Assessment of antibiotic prescription in acute respiratory infections in adults. *J Infect* 2000;41(1):73-83.
- Elan P, Katzenstein D, Frankish CJ, et al. Prescribing practices and attitudes toward giving children antibiotics. *Can Fam Physician* 2001;47:521-7.
- Cetinkaya S, Karatas Y, Antmen AB, Alhan SE. Knowledge and behavior of the pediatricians on rational use of antibiotics. *Afr J Pharm Pharmacol* 2010;4(11):783-792
- Orton P. Pressure to prescribe. In: *Souls by Swaffham PWR*, (ed.). *Antimicrobial Resistance*, 2001:139-143.
- Oyetunde OO, Olugbake OA, Famudehin KF. Evaluation of use of antibiotic without prescription among young adults. *Afr J Pharm Pharmacol* 2010;4(10):760-762.
- Adly M, Balkhy H. The prevalence of antimicrobial resistance in clinical isolates from Gulf Corporation Council countries, *Antimicrob Resist Infect Control*. 2012;1:26.
- Zowawi HM. Antimicrobial resistance in Saudi Arabia: An urgent call for an immediate action, *Saudi Med J* 2016; 37(9):935-40.
- Al-Azzam SI, Al-Husein BA, Alzoubi F, Masadeh MM, Al-Horani MA. Self-medication with antibiotics in Jordanian population. *Int J Occup Med Environ Health* 2007;20(4): 373-80.
- Sawair FA, Baqain ZH, Abu Karaky A, Abu Eid R. Assessment of self-medication of antibiotics in a Jordanian population. *Med Princ Pract* 2009;18(1):21-5.
- Albsoul-Younes A, Wazaify M, Yousef AM, Tahaineh L. Abuse and Misuse of Prescription and Nonprescription Drugs Sold in Community Pharmacies in Jordan. *Subst Use Misuse* 2010;45(9):1319-29.
- UAE federal law no: 4, 1983 - Ministry of Health Dubai UAE
- Kotwani A, Wattal C, Katewa S, Joshi PC, Holloway K. Antibiotic use in the community: what factors influence primary care physicians to prescribe antibiotics in Delhi, India?. *Fam Pract* 2010;27(6):684-90.
- Vazquez-Lago JM, Lopez-Vazquez P, López-Durán A, Taracido-Trunk M, Figueiras A. Attitudes of primary care physicians to the prescribing of antibiotics and antimicrobial resistance: a qualitative study from Spain. *Fam Pract* 2012;29(3):352-360.
- Butler CC, Rollnick S, Pill R, Maggs-Rapport F, Stott N. Understanding the culture of prescribing: qualitative study of general practitioners' and patients' perceptions of antibiotics for sore throats. *BMJ* 1998;317(7159):637-42.
- World Health Organization. Overcoming antimicrobial resistance. Available from: <http://www.who.int/iris/handle/10665/66672> [Accessed April 9, 2018].
- World Health Organization. Global Strategy for Containment of Antimicrobial Resistance. Geneva, 2001, WHO/CDS/CSR/DRS/2001.2. Available from: http://www.who.int/csr/resources/publications/drugresist/en/EGlobal_Strat.pdf [Accessed April 9, 2018].
- World Health Organization. World Health Day 2011: Policy briefs. Geneva, 2011 Available from: <http://www.who.int/world-health-day/2011/policybriefs/en/index.html>. [Accessed April 9, 2018].
- Kravitz RL, Callahan EJ, Paterniti D, Antonius D, Dunham M, Lewis CE. Prevalence and sources of patients' unmet expectations for care. *Ann Intern Med* 1996; 125(9):730-7.
- Sample size calculator. <http://www.raosoft.com/samplesize.html> [Accessed October 8, 2018].
- McNulty CA, Boyle P, Nichols T, Clappison P, Davey J. Don't wear me out - the public's knowledge of and attitudes to antibiotic use. *J Antimicrob Chemother* 2007;59(4):727-38.
- Ling Oh AL, Hassali MA, Al-Haddad MS, Syed Sulaiman SA, Shafie AA, Awaisu A. Public knowledge and attitudes towards antibiotic usage: a cross-sectional study among the general public in the state of Penang, Malaysia. *J Infect Dev Ctries* 2011;5(5):338-47.
- Suaifan G, Shehadeh M, Darwish D, Al-Hjel H, Yousef A, Darwish R. A cross-sectional study on knowledge, attitude and behavior related to antibiotic use and resistance among medical and non-medical university students in Jordan. *Afr J Pharm and Pharmacol* 2012;6(10):763-770.
- The Centers for Disease Control and Prevention (CDC) Be Antibiotics Aware: Smart Use, Best Care, 2107. <https://www.cdc.gov/features/antibioticuse>. [Accessed September 9, 2018].
- McKee MD, Mills L, Mainous AG 3rd. Antibiotic use for the treatment of upper respiratory infections in a diverse community. *J Fam Pract* 1999;48(12):993-6.
- Tenaiji A, Al Redha K, Khatri F, et al. Knowledge, Attitudes and Behavior Towards Antibiotic Use Among Parents in Al-Ain City, United Arab 13th International Congress on Infectious Diseases

- Abstracts, 2008; 12 Suppl 1:e434.
31. Askarian M, Maharlouie N. Irrational Antibiotic Use among Secondary School Teachers and University Faculty Members in Shiraz, Iran, *Int J Prev Med*, 2012;3(12):839-45.
 32. Al-Bakri AG, Bustanji Y, Yousef AM. Community consumption of antibacterial drugs within the Jordanian population: sources, patterns and appropriateness. *Int J Antimicrob Agents*, 2005; 26: 389-395.
 33. You JY, Yau B, Choi KC, Chau CT, Huang QR, Lee SS. Public Knowledge, Attitudes and Behavior on Antibiotic Use: A Telephone Survey in Hong Kong. *Infection* 2008; 36(2):153-7.
 34. Ling Oh A, Hassali MA, Al-Haddad MS, Syed Sulaiman SA, Shafie AA, Awaisu A. Public knowledge and attitudes towards antibiotic usage: a cross-sectional study among the general public in the state of Penang, Malaysia. *J Infect Dev Ctries*, 2011;5(5):338-47.
 35. Radosevic N, Vlahovic-Palcevski V, Benko R, et al. Attitudes towards antimicrobial drugs among general population in Croatia, Fyrom, Greece, Hungary, Serbia and Slovenia. *Pharmacoepidemiol Drug Saf*, 2009;18(8):691-6.
 36. Chen C, Chen YM, Hwang KL, et al. Behavior, attitudes and knowledge about antibiotic usage among residents of Changhua, Taiwan. *J Microbiol Immunol Infect*, 2005; 38(1): 53-9.
 37. Buke C, Hosgor-Limoncu M, Ermertcan S. Irrational use of antibiotics among university students. *J Infect*, 2005; 51(2): 135-9.
 38. Rousounudis A, Papaevangelou V, Hadjipanayis A, et al. Descriptive Study on Parents' Knowledge, Attitudes and Practices on Antibiotic Use and Misuse in Children with Upper Respiratory Tract Infections in Cyprus. *Int J Environ Res Public Health*, 2011; 8(8): 3246-62.
 39. Ong S, Nakase J, Moran GJ, Karras DJ, Kuehnert MJ, Talan DA. Antibiotic use for emergency department patients with upper respiratory infections: Prescribing practices, patient expectations, and patient satisfaction. *Ann Emerg Med*, 2007; 50(3): 213-20.
 40. Hamm RM, Hicks RJ, Bembien DA. Antibiotics and respiratory infections: are patients more satisfied when expectations are met?. *J Fam Pract*, 1996; 43(1): 56-62.

