Original Article

Community Pharmacists' Knowledge and Practice toward Upper Respiratory Tract Infections in Khartoum State: A Cross-Sectional Survey

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Abstract

Background: Upper respiratory tract infections (URTIs) are mainly viral in their etiologies but sometimes are complicated by secondary bacterial infections detected by the persistence of symptoms. This study aimed to evaluate community pharmacist's knowledge and practice regarding URTIs. **Methods:** A descriptive cross-sectional study was performed using self-administered questionnaire. The study targeted 338 community pharmacists selected randomly from community pharmacies in Khartoum state. The overall knowledge and practice scores were calculated, then the associations between these scores and demographic characteristics were evaluated using Chi-square test and analyzed by statistical package for social sciences. **Results:** Out of 327 pharmacists, 65.4% of them were females. Whereas pharmacists with B. Pharm. represented 79.1%. Regarding the knowledge, it was found that 59.7% of community pharmacists have sufficient knowledge toward URTIs, while 40.3% of them have insufficient knowledge. Community pharmacists exhibited varying degrees of practice, but most of them have a good practice. Furthermore, 52.6% of them reported patient's interest as barrier to counseling, while 38.9% reported pharmacy crowdedness as a barrier. Statistically, higher knowledge scores are associated mainly with female gender and educational levels. On the another hand, 64.4% of the participants relied on medical websites as a source of information. **Conclusion:** Community pharmacists have good knowledge about URTIs. The practice is diverse, but good practice is mainly linked to those with sufficient knowledge. Most of the community pharmacists relied on medical websites as a source of information.

Keywords: Community pharmacists, knowledge, practice, upper respiratory tract infection

Introduction

Upper respiratory tract infections (URTIs) are caused mainly by viruses and some bacteria, that's why it has a higher rate of infection than other infectious diseases.[1] In most of the URTIs, the mucocilliary apparatus is impaired with excessive mucosal production, which associated with a decrease in clearance that precipitates a secondary bacterial infection.[2] The most common URTIs are otitis media, rhinosinusitis, pharyngitis, cold, and tonsillitis.[1,3] In Otitis media, which is commonly caused by bacteria, the clinical presentation may differ among the different ages of the patients.[3,4] Bacterial sinusitis is accompanied by longer duration infection, higher fever and worsened symptoms than a viral infection. Pharyngitis is mainly viral disease, characterized by sudden onset of sore throat with fever, erythema of throat, redness of uvula and tongue, and also can be caused by Group A B-hemolytic streptococci.[3,5] Tonsillitis, the inflammation of the pharyngeal tonsils, usually extends to the adenoid and the lingual tonsils, is mainly caused by bacterial infection.[3]

Rhinovirus is the most common causative pathogen of the common cold, which is usually transmitted via inoculation into

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the eye or the nose from contact with the fingers that harbor the rhinovirus as it capable to survive on hands for hours.[6] While Rhinovirus infections are predominantly mild and self-limited, its presentation is age-related, and yet, its treatment is generally focused on symptomatic relief, rest, hydration, antihistamines, and decongestants.[6] The most common bacterial pathogens that cause URTIs are *Streptococcus pneumoniae*, *Streptococcus pyogenes*, *Haemophilus influenzae, Moraxella catarrhalis* and *Staphylococcus aureus*,[7] and yet the use of the antibiotics as a preventative measure against bacterial complications of URSIs might not be fulfilled, this may contribute to the development of microbial resistance and some indifference of the national health services and healthcare providers.[8] In addition, the low adherence to rational prescribing and dispensing of antibiotics by some healthcare providers may exacerbate this issue.[9,10] Thus, there is a strict need to follow evidence-based guidelines at the level of dispensing the antibiotics.[11,12] In the management of URTIs, penicillin V was found to be useful only in Group A Beta-hemolytic streptococci positive patients.[13] Furthermore, the addition of corticosteroids to antibiotics would increase the resolution and improvement of Sore throat pain.[14] On the other hand, Vitamin c found to reduce the duration of colds.[15]

As URTIs are considered as the most common reasons for physician's visits among all infectious disease,[3] this may be due to ease of infection transmission and the slight difficulty of prevention. Because untreatable URTIs might have really serious complications, this shows the role of management in the prevention or reduction of these complications. Furthermore, pharmacist's awareness gives a great benefits in overall improvement of management which is supplied by all health care providers. On the other hand, lack of pharmacist awareness might limit appropriate treatment, prevention and effective counseling. This is due to the fact that most patients, especially in developing countries, visit pharmacists instead of physicians in cases of URTIs mainly due to socioeconomic issues. According to that, our study aimed to evaluate the community pharmacist's knowledge and practice toward URTIs in Khartoum state. To the best of our knowledge, no recent published researches done to tackle this issue. Hence, this study is considered novel.

Methods

Study setting

The study was a descriptive cross-sectional survey; it was conducted from June to August 2018, in the community pharmacies of Khartoum State, Sudan. The study populations were the registered community pharmacists by the Ministry of Health in Khartoum state.

Inclusion and exclusion criteria

The registered pharmacists working in the community pharmacies located at Khartoum state and agreed to participate and fill the questionnaire were included in the study, while pharmacists who refused to fill the questionnaire were excluded from the study.

Sample size and sampling technique

According to the list provided by the ministry of health, there were 2194 pharmacies in the Khartoum state, and the sample size was determined using the equation of known population as follow:

$$n = \frac{N}{1+N(e)2} = n = \frac{2194}{1+2194(0.05)2} n = 338$$

Where N = total target population attending the center. n = sample size e = margin of error (0.05) at 95% confidence level. A systematic sampling method was applied for the selection of the pharmacists from the list of the pharmacies, which was obtained from the Federal Ministry of Health, Khartoum state. However, 11 community pharmacists were refused to participate in this study, and the sample size was 327. Thus, the response rate was 96.8%.

Data collection

Data collection was carried out using self-administrated questionnaire. The questionnaire design was focused on the most recent evidence-based information about URTIs and their treatment. It was consisted of three main parts, the first part was about socio-demographic characteristics. The second part composed of 24 questions to evaluate the knowledge of pharmacists toward URTIs. The third part was about pharmacists practice regarding URTIs. After preparation and approval of the questionnaire, a pilot study using 10 questionnaires was carried out to check the validity of the questionnaire, and these questionnaires were excluded from the study. The collected data were manually scored by comparing with the proper answer obtained from the literature and finally coded before the analysis. For each correct response, a score of one was given, whereas a zero score was given for an incorrect or false response. The total knowledge score was 24, and the median of knowledge score was 13; thus, the community pharmacists who achieved score of 13 and more were categorized as having sufficient knowledge while those who achieved score of <13 were categorized as having insufficient knowledge.

Data analysis

Data were entered and analyzed by using International Business Machines (IBM). Statistical Package for Social Sciences (SPSS) for Windows, Version 22.0 software (Armonk, NY, USA: IBM Corp.). The data were illustrated as tables for the descriptive statistics. A Chi-square test and logistic regression were applied to check the significant difference between various variables. $P < 0.05$ was considered statistically significant.

Ethical considerations

The study was approved by the Ethical Committee of Faculty of Pharmacy, Omdurman Islamic University. The verbal consent was obtained from the pharmacists who agreed to participate in the study. All questionnaires were coded with ensuring confidentiality throughout the study.

Results

A total of 327 pharmacists from different community pharmacies were enrolled in this study; the majority of them were female (65.4%), with a mean of age was 27.85 ± 5.99 years. Most of the participants had a bachelor degree (79.6%), and 70.3% of the respondents had with 1–5 years of experience [Table 1]. Moreover, 72.3% of the pharmacists who did not attend any workshops, seminars or courses about upper respiratory tract diseases [Table 1].

Regarding the pharmacists' knowledge about URTIs, questions include 24 statements focused on most common five upper respiratory diseases (Otitis media, pharyngitis, tonsillitis, sinusitis, and common cold); six of the 24 statements were about the upper respiratory diseases themselves, eight questions about their causative agents and the other ten questions were about their treatments. All knowledge questions are presented in Table 2. After calculation of the overall knowledge, we found that about 59.7% of the participants had sufficient knowledge, and 40.3% of them had insufficient knowledge about the respiratory tract infections.

The practice section has consisted of three main parts; the first and second parts were two cases to assess the practice of community pharmacists toward common cold and tonsillitis, while the third part was about counseling of patients with URTIs as exhibited in Table 3. Overall practice score indicated that 56.4% of the community pharmacists showed to have a good practice, and 38.3% of them had fair practice and only 5.2% had poor practice toward respiratory tract infection management. Regarding the barriers that hinder community pharmacists from effective counseling were mainly lack of

Table 1: Sociodemographic characteristics of the community pharmacists (*n*=327)

Sociodemographic characteristics	Frequency, *n* (%)
Gender	
Male	113 (34.6)
Female	214 (65.4)
Level of education	
Bachelor	261 (79.1)
Master	63 (19.2)
Ph.D.	4 (1.2)
Experience (years)	
<1	9 (2.7)
1-5	232 (70.3)
6-10	64 (19.4)
>10	22 (6.7)
Attendance of workshops	
Yes	91 (27.7)
No	238 (72.1)

Table 2: Knowledge of community pharmacists about upper respiratory tract infections (*n*=327)

Knowledge questions	Correct answer	*n* (%)
1. Upper respiratory disease		
Otitis media occurs mainly in adults	No	57.3%
The feature that differentiate between bacterial and viral tonsillitis is presence of pus	Yes	73.3%
Rheumatic fever is a complication of tonsillitis	Yes	77.9%
Sudden sore throat and swollen red uvula are symptoms of pharyngitis	Yes	74.5%
Bacterial sinusitis has longer duration than viral	Yes	54.5%
Sore throat, sneezing and stuffy nose are not symptoms of common cold	No	60%
2. Causative agents of upper respiratory diseases		
Tonsillitis is mainly viral	Yes	22.4%
The most common bacterial causative agent of Tonsillitis is B-hemolytic streptococci	Yes	36.7%
B-hemolytic streptococci is the most common bacterial causative agent of pharyngitis	Yes	43.9%
Sinusitis is mainly bacterial	No	49.7%
Otitis media is mainly bacterial	Yes	48.2%
The causative agent of common cold is viral	Yes	88.8%
Pharyngitis is mainly bacterial	No	38.2%
Causative agent of common cold is rhino virus	Yes	62.4%
3. Treatment of upper respiratory diseases		
The first line antibiotic therapy for treatment of pharyngitis is penicillin V	Yes	47.3%
The first line antibiotic therapy for treatment of otitis media is amoxicillin	Yes	33%
The first line antibiotic therapy for treatment of tonsillitis is erythromycin	No	84.6%
The first line antibiotic therapy for treatment of sinusitis is co-amoxicalv	Yes	44.2%
Decongestants are beneficial adjunctive therapy in otitis media	No	33.6%
Corticosteroids are beneficial adjunctive therapy for patients with tonsillitis	Yes	23.6%
Analgesics (e.g.: Acetaminophen and ibuprofen) are beneficial adjunctive therapy in treatment of sinusitis	Yes	69.1%
Antibiotics could be used for treatment of common cold	No	80.6%
Analgesics, decongestants and antihistamines could be used for symptomatic treatment of common cold	Yes	94.5%
The best treatment of viral pharyngitis is Symptomatic treatment and waiting until spontaneous disease resolution	Yes	77.9%

Table 3: Practice of community pharmacists toward upper respiratory tract infections management (*n*=327)

Practice questions	Correct answer	Number (%)
A patient comes to you in pharmacy complaining of common cold what will you do?	Give symptomatic treatment	60.4
A patient comes to you in pharmacy complaining of tonsillitis what will you do?	Give symptomatic treatment and refer to physician	27.3
Do you counsel patients with URTIs by		
The adverse effects of drugs used for treatment of UTIs	Yes	66.3
How and when he/she should take the drugs	Yes	93
The role of hand washing in prevention of common cold transmission	Yes	43.6
The role of vitamin C in management of common cold	Yes	87.2
Avoidance of contact with a healthy individuals in case of common cold and viral tonsillitis	Yes	54.6
To use warm salt water gargles in case of viral tonsillitis	Yes	73.2
Maintaining adequate hydration in acute tonsillitis	Yes	51.5
Do you usually check drug-drug interactions?	Yes	66.5

UTIs: Upper respiratory tract infections

Table 4: Predicting community pharmacists knowledge by using binary logistic regression test (*n*=327)

Variables	*P*	OR	95% CI for OR	
			Lower	Upper
Age	0.499	0.969	0.886	1.061
Gender	0.074	1.590	0.957	2.643
Educational level	0.005	2.588	1.337	5.008
Years of experience	0.329	1.056	0.947	1.178
Attending workshops, seminars or courses	0.570	0.861	0.514	1.443
Practice	0.439	2.079	0.325	13.294

OR: Odds ratio, CI: Confidence interval

patient interest (52.6%), pharmacy crowdedness (38.9%), lack of privacy (18.5%), and lack of knowledge (17.3%). Sources of information utilized by community pharmacists were mainly medical websites (64.4%), textbooks (50.2%), workshops (13.4%), and other sources (3%).

A Chi-square test was performed to determine the association between knowledge and socio-demographics characteristics; we found that there was statistically significant association between educational level and knowledge (P = 0.009). While the association of knowledge with years of practice, workshop attendance revealed statistically insignificant results. Furthermore, Pearson correlation test revealed that there was no correlation between age and knowledge (R = 0.04, P = 0.468). The association between practice and knowledge revealed statistically insignificant results (P = 0.795).

A logistic regression test was performed to assess community pharmacist's knowledge predictors [Table 4]. Females were more knowledgeable than males by 1.6 times despite the fact that the result was statistically insignificant (confidence interval [CI] = 0.957–2.643, P = 0.074). Furthermore, those with a master degree had sufficient knowledge by 2.6 times that those with bachelor degree (CI = 1.337–5.008, P = 0.005). Moreover, those with good practice were more knowledgeable than those with poor practice by 2 times despite the statistically insignificant results (CI = 0.325–13.294, P = 0.439).

Discussion

URTIs are one of the most common infectious diseases that affected people and made them seeking medical treatment.[3] Community pharmacists are often the first point of contact for people in the general community seeking advice regarding medications. As such, pharmacists need to have a good knowledge regarding these diseases, in order to manage it and minimize the serious complications. The current study has assessed the levels of knowledge, and practice among community pharmacists working in Khartoum state about URTIs. A total of 327 community pharmacists were involved, around two-thirds of them were females. Moreover, the majority of them have experience of 1–5 years because most of the fresh-graduated pharmacists start working in community pharmacies before seeking other jobs.[16,17]

Regarding the knowledge of the participants, around 60% of respondents scored sufficient knowledge level about the study subject. As shown in Table 1, many participants were unaware of the fact that the most common cause of URTIs is viral and not bacterial as stated by standard guidelines and some studies.[12,18] In this study, the majority of the community pharmacists were able to differentiate between bacterial and viral tonsillitis and knew the symptoms of the pharyngitis and common cold. These findings are in line with another study in Senegal that found that 70.3% of the community pharmacists were aware of the causative agents of tonsillitis.[19] Moreover, here we found that 57.3% of the community pharmacists stated that otitis media does not preferentially occurs in adults, and this is confirmed with another study.[20] According to which chronic otitis media occurs mainly among children of 2 years old, less prevalent in older children and rare in adults.[21] Regarding the management of URTs, only 33%, 44.2% of participants suggested amoxicillin for the otitis media as recommended by standard guidelines.[22,23] This might reflect that not many community pharmacists deal with otitis media. These similar to a study done in Turkey that found around 44.5% of participants suggested amoxicillin-clavulanate as first-line antibiotic therapy for the management of otitis media.[24]

Regarding the knowledge about tonsillitis, only 37% of the participants addressed the question about bacteria tonsillitis correctly. Nearly half of the participants said that Azithromycin is the first-line antibiotic therapy for tonsillitis, while guidelines recommended penicillin drugs.[3] Similar knowledge findings were obtained about pharyngitis, as only 47% stated the correct antibiotic (penicillin) for pharyngitis treatment as recommended by guidelines.[3,25] This might indicate insufficient reviewing of updated guidelines by community pharmacists. Although there was a study done by Bergeson *et al*. revealed that patients who received corticosteroids for pharyngitis and tonsillitis were three times more likely to report complete resolution of symptoms within 24 h.[26] Here, most pharmacists were unaware of the use of corticosteroids as adjunctive therapy for tonsillitis. Nevertheless, 77.9% of participants knew that rheumatic fever is a complication of recurrent tonsillitis.[27]

Furthermore, more than half of our participants stated that bacterial sinusitis takes a longer duration than viral. In other words, the majority of sinusitis is viral but sometimes is complicated by secondary bacterial infections which are detected by persistent symptoms.[28] Moreover, 60% of the participants reported that sore throat, sneezing, and stuffy nose are symptoms of common cold. This corresponds with a study carried out by Troullos *et al*., which mentioned these symptoms among the most prevalent symptoms of the common cold.[29] The majority of participated pharmacists stated that common cold is viral so 60.4% of them give only symptomatic treatments. This might be attributed to the high number of common cold cases who come to the community pharmacies. Interestingly, we found that 87.2% of participants counsel the patients about the role of vitamin C in the management of common cold. Because vitamin C shorten and alleviate symptoms of common cold in a dose-dependent manner.[15]

Regarding the practice, half of them properly council the patients about the role of the handwashing in prevention of the common cold transmission. In addition, most of them provide proper counseling points about tonsillitis management by advising the patients to use warm salt water gargles in case of viral tonsillitis and maintain adequate hydration in acute tonsillitis. Thus, the overall practice of the community pharmacists revealed that 56.4% of the community pharmacists showed to have a good practice. However, many barriers have been mentioned by the participants that affect their practice. Lack of the patient interest was considered as the main counseling barrier for around half of the participants, whereas 39% of them considered the pharmacy crowdedness as the main factor for Albekairy participants.[30] This might be attributed to the differences in health awareness between the two communities 18.5% of our participants considered the lack of privacy as barrier counseling which is consistent with Albekairy study. While 17.3% of our participants regarded lack of knowledge as a barrier which is also consistent with Albekairy study.[30] In a study done by Mohamed Alarifi 6.3% of pharmacists stated that their dispensing errors are very often due to the lack of privacy while 17.2% stated that their errors were very often due to the lack of time to talk with patient (this may be due to lack of patient interest or pharmacy crowdedness).[31]

The limitation of this study is the cross-sectional design to Khartoum state, which does not allow generalization of the findings to all community pharmacists in Sudan. Therefore, we recommend to carrying further studies to include a large number of community pharmacists in various states in Sudan. In addition, the limitation of the self-administered survey, when assessing knowledge, is the "social desirability bias." Despite these limitations, the study provided novel findings as it is the first report in Sudan to evaluate community pharmacists' knowledge and practice toward URTIs.

Conclusion

Community pharmacists have good knowledge toward URTIs. The majority of them are interested in patient counseling and have good practice toward URTIs. Females attained higher scores of knowledge than males; there was no statistically significant difference in score of knowledge between pharmacists workshops' attendance.

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Conflicts of interest

There are no conflicts of interest.

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