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KNOWLEDGE OF PHARMACISTS AND PARENTS TOWARDS ANTIBIOTIC USE IN PEDIATRICS: A Cross-sectional Study in Lebanon

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Disclosure

I declare to meeting attendees that there are no financial relationships with any for-profit companies that are directly or indirectly related to the subject of this presentation.



Learning Objectives

- Describe the results of a cross-sectional study conducted to evaluate the knowledge of both community pharmacists and parents towards antibiotics use and resistance among pediatrics in Lebanon.
- Interaction with the pharmacists through two case scenarios.
- Presentation of the American Academy of Pediatrics guidelines.
- Take home messages.



Introduction

- Children are major consumers of antibiotics, with findings showing a higher intake among children aged 1 to 5 years (65%), in comparison with teenagers (38%) [1,2].
- “Antibiotics misuse”, referring to the irrational use or overuse of antibiotics, might threaten any patient from all age groups and might concern any antibiotic [3-5].
- It is increasingly contributing to antibiotic resistance, and is currently considered a serious public health concern globally, with a particular focus on developing countries [6].
- Self-medication with antibiotics, considered a major driver of antibiotics misuse, is highly prevalent in developing countries, where awareness and regulations often lack reinforcement [7].



Introduction

- In Lebanon, similarly to other developing countries, although by law antibiotics are prescription drugs only, they are being dispensed by community pharmacists as over-the-counter drugs [8,9].
- People frequently tend to self-medicate due to misconceptions or difficulties to afford a medical visit [10,11].
- The number of community pharmacies is continuously increasing, inversely to the price of medicines, making the situation even worse [10,11].
- Around 40% of the population self-medicate with antibiotics [10,11].



Introduction

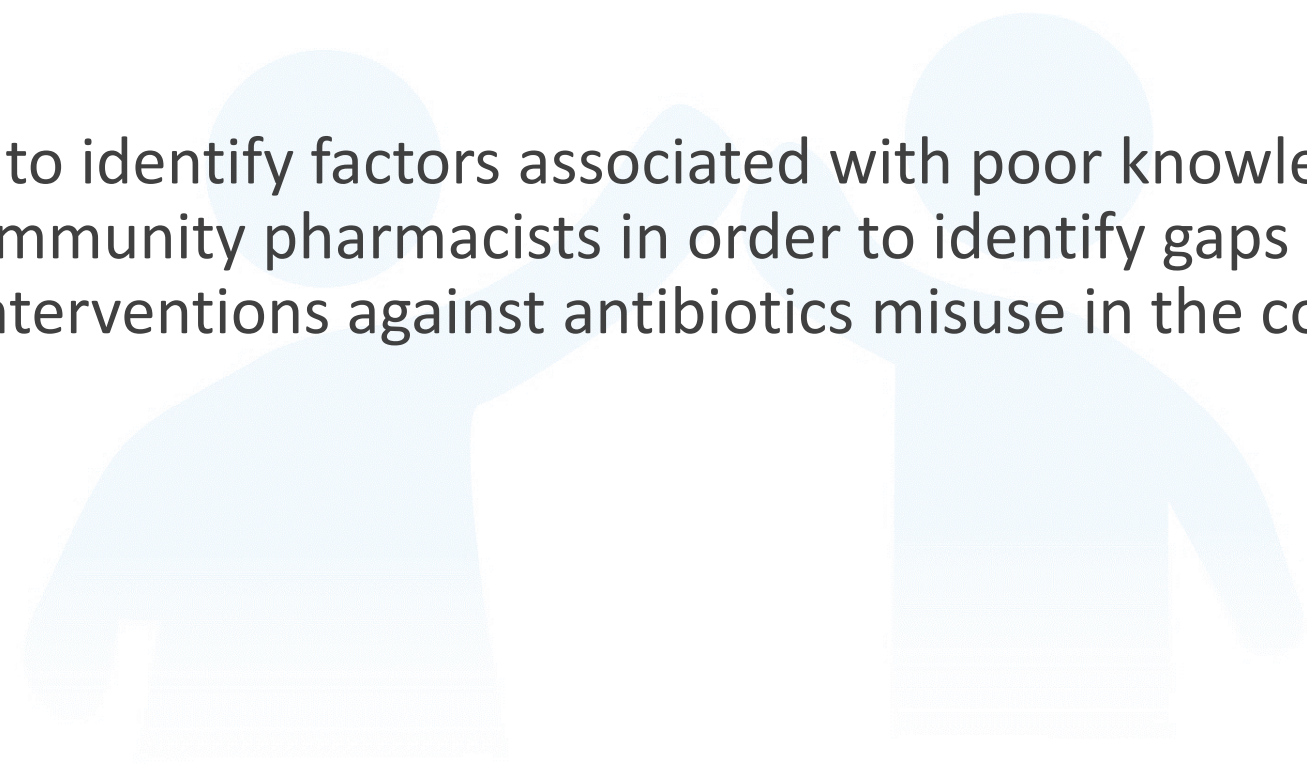
Antibiotic misuse in pediatrics could be related to several factors:

- The medication itself (e.g. taste acceptability, dilution and conservation)
- The treating pediatrician (e.g. watchful waiting approach)
- The pharmacist (e.g. referral to pediatricians).
- Parents or caregivers
 - Poor compliance to treatment
 - Lack of knowledge
 - General negative attitudes towards the disease and treatment



Objectives

- In this context, we conducted the present study to evaluate the knowledge of both community pharmacists and parents towards antibiotics use and resistance among pediatrics in Lebanon.
- We also aimed to identify factors associated with poor knowledge among parents and community pharmacists in order to identify gaps and priorities in public health interventions against antibiotics misuse in the country.





Methods

Study Design

- A cross-sectional study was carried out between June and August 2017 in a representative sample of Lebanese community pharmacies distributed all over the country (Beirut, Mount Lebanon, North, South and Bekaa).
- We aimed to recruit one pharmacist (i.e. owner or employee) and one parent (i.e. first eligible participant) from each selected pharmacy.
- Eligible parents are mothers or fathers of at least one child aged 12 years or less, and having administered an oral antibiotic to their child at least once in the last 12 months.
- Excluded were those not completing the questionnaire, and parents who only had children aged more than 12 years.



Methods

Face-to-Face Interview

- A face-to-face interview was conducted with the participants by two well-trained Pharm.D candidates, after explaining the study objectives to them.
- Separate questionnaires were used to evaluate knowledge in parents and pharmacists respectively.
- A mean duration of ten minutes was needed to fill the questionnaire.
- The European Centre for Disease Prevention and Control (ECDC) definition was used to evaluate antibiotics misuse [12].
 - (1) the unnecessary prescription of antibiotics for viral infections, against which they have no effect
 - (2) the too frequent prescription of broad-spectrum antibiotics, in place of a better targeted antibiotic, through more precise diagnosis
 - (3) the inadequate use by the patient, not respecting either dosage or duration of the treatment



Methods

Community Pharmacists Questionnaire

- The pharmacists' questionnaire was prepared in French and English, the two languages used in Lebanese universities during pharmacy studies.
- Sociodemographic characteristics (sex, age, educational level, years of experience, pharmacy location).
- Four questions, which evaluated:
 - pharmacist's knowledge regarding antibiotics used in pediatrics
 - antibiotic resistance and the factors promoting it
 - duration of use of antibiotics after reconstitution and preservation
 - the reasons that would affect the proper use of antibiotics in children (inappropriate behavior of parents, doctors, pharmacists, lack of time to update the knowledge, socioeconomic problems of the country, the level of resistance to first choice molecules, etc.)
- Small case scenarios concerning ear infection and pharyngitis in pediatrics were set to assess their knowledge update, and the conformity to guidelines of the chosen antibiotic, dose, and duration of treatment.



Methods

Parents' Questionnaire

- The parents' questionnaire was prepared in Arabic, the native language in Lebanon.
- Sociodemographic characteristics (gender, age, region, marital status, educational level, profession, family income, number of children).
- Knowledge of parents regarding antibiotics use, spectrum of activity, side effects and risks, reconstitution and conservation, along with antibiotics misuse (definition, causes and consequences).
- Some opinion questions on giving an antibiotic without a medical prescription.



Questions

- In your opinion, which factor contributes the most to antibiotic resistance?
 - High dose and short duration
 - Low dose and long duration

- For how long are antibiotics used after reconstitution?
 - According to antibiotics/manufacturer
 - 10-14 days

- Should all antibiotics be placed in the refrigerator after reconstitution?
 - Yes
 - No



Questions

Case 1:

- A child <2 years presenting with severe painful earache and fever > 39°C, does he require an antibiotic in your opinion?
 - Yes
 - No
 - It depends on other factors
- First-choice antibiotic in this case?
 - Amoxicillin/Amoxicillin-clavulanic acid
 - Cephalosporins
- Dose of first-choice antibiotic?
 - 80-90 mg/kg/day
 - 120 mg/kg/day
- Duration of treatment?
 - 5-7 days
 - 10 days



Questions

Case 2:

- A child >2 years presenting with earache and fever > 39°C, does he require an antibiotic in your opinion?
 - Yes
 - No
 - It depends on other factors
- First-choice antibiotic in this case?
 - Amoxicillin/Amoxicillin-clavulanic acid
 - Cephalosporins
- Dose of first-choice antibiotic?
 - 80-90 mg/kg/day
 - 120 mg/kg/day
- Duration of treatment?
 - 5-7 days
 - 10 days



Questions

Case 3:

- A child presenting with pharyngitis (intense sudden onset) and fever $> 39^{\circ}\text{C}$, does he require an antibiotic in your opinion?
 - Yes
 - No
 - It depends on other factors
- First-choice antibiotic in this case?
 - Amoxicillin/Amoxicillin-clavulanic acid
 - Cephalosporins
- Dose of first-choice antibiotic?
 - 50 mg/kg/day
 - 80-90 mg/kg/day
- Duration of treatment?
 - 5-7 days
 - 10 days



Results

Community Pharmacists

Knowledge

- 52% of pharmacists declared that a low antibiotic dose would promote more antimicrobial resistance
- 37.1% reported the same for high doses
- 37.1% for longer treatment durations
- 39.6% for shorter durations
- 28.7% of pharmacists did not know which factors may contribute to antibiotic resistance.
- 39.6% of pharmacists declared that antibiotics should be discarded 14 days after reconstitution
- 48% that not all antibiotics need to be refrigerated after reconstitution.



Results

Community Pharmacists

- Causes of misuse
- Major causes of antibiotics misuse:
 - Inappropriate parental behavior (90.1%)
 - Inappropriate behavior of physicians (72.8%)
 - Inappropriate behavior of pharmacists (59.4%)
- Additional factors contributing to antibiotics resistance:
 - Socioeconomic problems of the country (86.1%)
 - Level of resistance to the molecule of choice (80.8%)
 - Lack of consultation time (71.2%)
 - Lack of national guidelines/recommendations (66.3%)



Results

Parents

Knowledge

- 19.2% of parents still believe that antibiotics are active against viruses
- 42.6% thought they act against both viruses and bacteria.
- 55.9% thought antibiotics were given to treat fever (55.9%), cold (26%), sore throat (49.5%) and diarrhea (29.4%).
- 95.1% confessed that antibiotics should be administered following a physician's prescription
- 51.5% following the pharmacist's advice.
- 38.2% knew that antibiotics could have the same side effects even when administered correctly
- 52.5% did not know the correct length of antibiotics storage after reconstitution.
- Only 21.6% knew that antibiotics should be kept in the fridge following the manufacturer recommendations.



Results

Parents

Misuse of antibiotics

- Half of parents declared that antibiotics misuse is due to a bad indication or bad choice
- 40.2% declared that it is due to a bad dose
- 39.7% due to lack of adherence
- 58.8% said that antibiotics misuse would lead to loss of immunity
- 38.7% to treatment failure
- 44.6% to recurrent infections
- 56.4% blamed parents for antibiotics misuse
- 52.5% blamed physicians
- 37.3% pharmacists

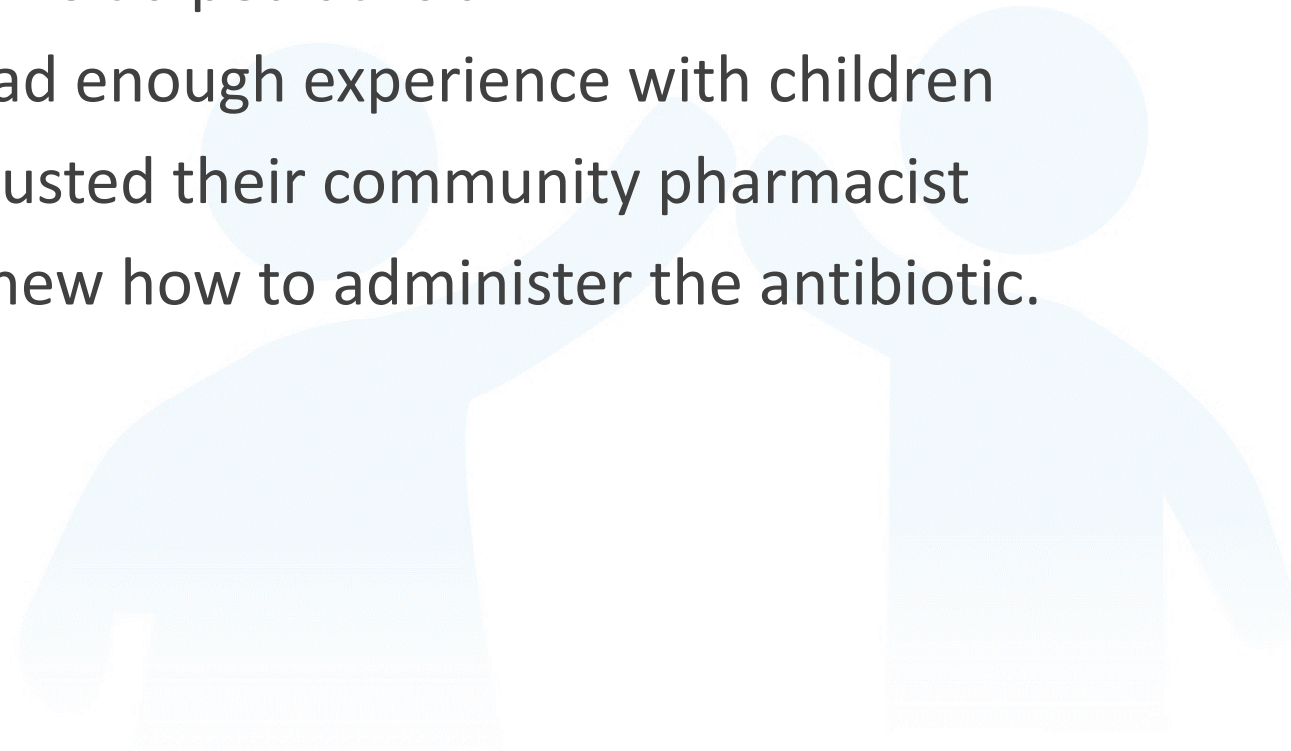


Results

Parents

Antibiotics administration without a prescription

- 58.4% reported that it is okay to give antibiotics without a prescription if they were unable to visit a pediatrician
- 23.6% if they had enough experience with children
- 66.7% if they trusted their community pharmacist
- 22.1% if they knew how to administer the antibiotic.





Discussion

- To our knowledge, this is the first study in Lebanon to evaluate the knowledge of both community pharmacists and parents towards antibiotics use and resistance in pediatrics.
- It sheds light on important issues that should be addressed in order to enhance antibiotics appropriate use in children.
- According to 52% of pharmacists, low doses play a major role in antibiotic resistance while little importance was given to the duration of treatment (37.1% longer and 39.6% shorter durations).
- What is true for the dose is wrong for the duration of treatment:
 - Lower doses allow low-resistant bacteria to multiply and increase their chances of being resistant
 - A long treatment duration (10 days or more) has a more negative effect by exposing bacteria to antibiotics for longer periods, thus, promoting the survival of more resistant bacteria [12]



Discussion

- For the otitis case scenario:
 - Our findings showed that the majority of pharmacists followed the AAP 2013 guidelines
 - Amoxicillin/clavulanic acid remaining the first choice of prescription for the majority of pharmacists
 - for a period of 10 days for children <2 years old and 5 to 7 days for those > 2 years old
 - However, only half of pharmacists knew and followed the right dose.
- For the pharyngitis case scenario:
 - A very small percentage of pharmacists followed the 2013 IDSA guidelines.
 - It is plausible that they follow other guidelines or lack knowledge on recent guidelines.



Discussion

- Parents are still confused about antibiotics spectrum of activity
- Only 42% knew that they were used for bacterial infection.
- In agreement with another Indian study where more than 45.9% of parents believed that antibiotics can be used to treat both bacterial and viral infections [13]
- Physicians usually use the term ‘germs’ with antibiotics, rather than specifying bacteria [14]
- Pharmacists don’t have enough time to counsel patients because of the decreased number of staff and the financial situation of community pharmacists in Lebanon [15]
- 52.5% of parents blamed physicians for the misuse; the latter questioning the physician-parent relationship.

An ineffective physician-parent communication is found to be incriminated in the unnecessary prescription of antibiotics.



Discussion

- A high percentage of parents (55.9%) still believe that the presence of fever requires the administration of an antibiotic, a result consistent with another study [16].
- Only 21.6% of parents were aware that not all antibiotics need fridge after dissolution.
The storage conditions are considered important manufacturing instructions and should be strictly followed.
- This study showed that half of parents didn't know the consequences of antibiotics misuse (adverse effects, recurrent infection, emergence of resistant bacteria...).
- 58.4% of parents declared that it was okay to give their child antibiotics without a physician's advice and/or based on a pharmacist's recommendation.
- This finding raises the issue of over-the-counter sale of antibiotics for children in Lebanon.
- Strong and urgent policies are needed to reduce this practice.



Guidelines

TABLE 1 Application of Judicious Antibiotic Principles for Pediatric URIs

Principles	AOM	Acute Bacterial Sinusitis	Acute Pharyngitis
Principle 1: Determine the likelihood of a bacterial infection	<p>Requires middle ear effusion and signs of inflammation:</p> <ul style="list-style-type: none"> • moderate or severe bulging of TM; or • otorrhea not due to otitis externa; or • mild bulging of TM with ear pain or erythema of TM 	<p>URI symptoms that are either worsening, severe, or persistent</p> <ul style="list-style-type: none"> • Worsening symptoms: worsening or new onset fever, daytime cough, or nasal discharge after improvement of viral URI • Severe symptoms: fever $\geq 39^{\circ}\text{C}$, purulent nasal discharge • Persistent symptoms without improvement: nasal discharge or daytime cough > 10 d <p>No role for routine imaging</p>	<p>Diagnosis of GAS pharyngitis requires confirmation by rapid testing or culture</p> <ul style="list-style-type: none"> • Only test if 2 of the following are present: fever, tonsillar exudate/swelling, swollen/tender anterior cervical nodes, absence of cough • Do not treat empirically
Principle 2: Weigh benefits versus harms of antibiotics	<p>Benefits: for strictly defined AOM, NNT of as few as 4 patients to achieve improvements in symptoms</p> <ul style="list-style-type: none"> • no significant benefits in preventing complications such as mastoiditis 	<p>Benefits: for strictly defined bacterial sinusitis, antibiotics improve symptoms at 3 and 14 d</p> <ul style="list-style-type: none"> • no evidence that antibiotic therapy prevents complications such as brain abscess 	<p>Benefits: for confirmed GAS, antibiotics shorten symptom duration, prevent rheumatic fever and may limit secondary transmission.</p> <ul style="list-style-type: none"> • Limited evidence that therapy prevents complications such as PTA
First-line therapy	<p>Amoxicillin with or without clavulanate</p> <p>Harms: for all conditions, no benefits to therapy when bacterial infection is not likely. Increased risk of adverse events including diarrhea, dermatitis, <i>C difficile</i> colitis, antibiotic resistance</p>	<p>Amoxicillin with or without clavulanate</p>	<p>Amoxicillin or penicillin</p> <p>Increased risk of adverse events including</p>
Principle 3: Implement judicious prescribing strategies	<ul style="list-style-type: none"> • Consider watchful waiting for older patients (> 2 y), those with unilateral disease and without severe symptoms • Shorter-duration therapy (7 d) <p>Not recommended: azithromycin and oral third-generation cephalosporins are generally not recommended for these conditions attributable to <i>S pneumoniae</i> resistance.</p>	<ul style="list-style-type: none"> • Consider watchful waiting for patients with persistent symptoms only 	<ul style="list-style-type: none"> • Once daily dosing of amoxicillin



Conclusion

- Results revealed gaps in knowledge among community pharmacists and parents on antibiotics misuse and resistance.
- A high percentage of parents still believe antibiotics work on viruses and find giving antibiotics to their child acceptable without a medical prescription.
- Higher educational levels among parents and lower years of experience among pharmacists were associated with a better overall knowledge in our study.
- Practice and patient simulated surveys should be conducted in community pharmacies to assess rates of antibiotics self-medication and misuse in pediatrics.
- Continuous education and awareness campaigns should mainly target older pharmacists and parents of low educational levels.



Key Takeaways

- Determine the likelihood of a bacterial infection.
- Weigh benefits versus harms of antibiotics.
- First-line therapy, right dose, right duration of treatment.
 - **NOT RECOMMENDED**: azithromycin and oral third-generation cephalosporins are generally not recommended for these conditions attributable to Strep. pneumoniae resistance.
 - Risk of side effects: diarrhea, dermatitis, Clostridium difficile colitis, antibiotic resistance.
- Implement judicious prescribing strategies.
- Counseling of the parents.



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THANK YOU

