



## Antibiotic prescription patterns for management of acute otitis media in Lebanon



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### ABSTRACT

**Objectives:** The high incidence of Acute Otitis Media (AOM) along with low antibiotic efficacy in the treatment of AOM is particularly favorable for the emergence of antimicrobial resistance. The promotion of more conservative antibiotic prescription habits has become an important focus of governments and academic societies. Little is known about the awareness and use of AOM practice guidelines by physicians in the Middle East. Our aim is to characterize AOM management in Lebanon by using an anonymous survey instrument to uncover potential disparities in treatment trends and evaluate differences in clinical guideline adherence patterns.

**Methods:** A total of 75 practicing physicians were anonymously surveyed in Beirut, Saida, Nabatieh, Bekaa and Tripoli, Lebanon. The survey tool used was previously used in Amman, Jordan by our colleagues at the University of Michigan. The survey we used assessed awareness of and adherence to practice guidelines by prompting responses to hypothetical AOM cases. Differences in performance between various physician groups were noted.

**Results:** Overall, physician participants answered 67% of the survey questions correctly. Trainees did better overall in terms of AOM management (62% correct responses as compared to 48% in attending physicians,  $p = 0.0175$ ). Trainees also performed better in terms of their ability to manage cases of potential AOM in two-year old children and their ability to choose the appropriate medications (79% correct response rate compared to 71% in attending physicians,  $p = 0.0278$ ). Participants who reported guideline adherence most or all of the time had a 67% correct response rate in regards to their ability to diagnosis AOM, compared to a 57% correct response rate in those who reported adhering sometimes or rarely to the guidelines ( $p = 0.0489$ ). In the cases requiring antibiotic treatment for body temp of over 39C with/without otalgia, only 47–57% of participants identified the appropriate antibiotic regimen.

**Conclusion:** There are areas of potential improvement in adherence to clinical guidelines in the management, diagnosis, and treatment of AOM by Lebanese physicians. Conducting interventions among physicians to improve awareness of clinical guidelines and current treatment recommendations in Lebanon will likely improve adherence to guidelines, enhance clinical outcomes, and may help advance the fight against antimicrobial resistance.

### 1. Introduction

Acute Otitis Media (AOM) is one of the most common types of infections in pediatric populations throughout the world affecting up to 80% of children by the age of three [1]. In the United States alone, the diagnosis and management of AOM accounts for more than 30 million clinic visits annually, a large proportion of which results in the prescription of empiric antibiotics [1,2]. With the rising prevalence of

multidrug resistant strains of bacteria, antibiotic prescription strategies have become a major concern for governments and academic societies and an important focus of numerous global public health initiatives. In an effort to combat antibacterial resistance, many countries utilize local or national antibiotic resistance surveillance data to create specific clinical practice guidelines for their physicians [3,4]. The promotion of more conservative antibiotic prescription habits is especially important in the management of AOM as the high incidence and low antibiotic

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efficacy of this condition is particularly favorable for the emergence of drug resistance [3].

In 2004, the American Academy of Pediatrics (AAP) and the American Academy of Family Physicians (AAFP) outlined numerous AOM clinical scenarios that should lead to observation as initial management without empiric antibiotic prescription [5]. Based on these recommendations, non-severe and unilateral cases of AOM would be managed initially with symptom relief with the understanding that rescue antimicrobial therapy would be given only if symptoms worsened after two to three days of observation [5]. Despite this effort, however, the proportion of AOM visits in the United States that result in antibiotic prescription is about 80% even as numerous studies reveal that empiric treatment does not lead to better outcomes or fewer complications as compared to more conservative management options [2,3,6–8]. Adherence to clinical practice guidelines will vary depending on the healthcare setting, education of the provider, availability of resources, and the country of practice. Some of the factors that lead to higher rates of empiric antibiotic prescription include lack of familiarity with published guidelines, lack of appropriate incentives by the healthcare system, greater requirement for follow-up visits with observation, uncertainty of the diagnosis, pressure from the parents, and concerns about potential complications that may arise with more conservative management options [3,9,10].

A study published by Mustafa et al. in the *Journal of Epidemiology and Global Health* reports that the incidence of AOM in children five years and younger in Turkey, Oman, and Saudi Arabia ranges from 99 to 207 per 1000 person-years, suggesting that AOM causes a substantial burden to public health in these three Middle Eastern countries [11]. While some data exists on the incidence of AOM in the Middle East, little is known about the awareness and use of clinical practice guidelines by healthcare providers in the region. Our aim is to further characterize AOM practice patterns in the region by using an anonymous survey instrument similar to the one used in Iran by Kamrava et al. and in Jordan by Khreesha et al. [9,12]. By conducting this study in Lebanon, we can better uncover potential disparities in treatment trends and evaluate differences in clinical guideline adherence patterns. This knowledge can increase awareness around clinical guidelines and combat the emergence of multidrug resistant strains that would lead to our inability to fight serious bacterial infections.

## 2. Methods

This study was determined to be exempt from Institutional Review Board (IRB) review at the University of Michigan in accordance with federal regulations. From January to February 2018, an anonymous survey was conducted to assess both clinicians' awareness and knowledge of the internationally utilized AAP/AAFP practice guidelines and to characterize the clinicians' AOM practice patterns in Lebanon. The study participants included pediatricians, internal medicine practitioners, family medicine practitioners, and otolaryngologists at various public and private institutions in Beirut, Nabatieh, Saida, Bekaa, and Tripoli, Lebanon. Responses were collected via an anonymous online survey instrument and administration of the survey in person for most of the physicians. After explaining the scope of the study, informed consent was obtained from all study participants. The survey was provided to us by our colleagues at the University of Michigan who utilized it in a similar study in Amman, Jordan. The questions aimed to characterize the clinicians' AOM practice patterns through questions focused on demographics, knowledge and attitudes towards AOM guidelines, as well as questions on hypothetical AOM cases. The first set of cases assessed the clinicians' abilities to diagnose AOM, the second set assessed the clinicians' abilities to properly select observation vs medical treatment, and the third set of cases assessed the clinicians' understanding of appropriate antibiotic therapy.

**Table 1**  
**Demographic Characteristics of Participants.** Demographic characteristics of the 75 physicians that participated in the survey.

		Participants (n = 75)
Gender	Males	36 (48.0)
	Females	39 (52.0)
Specialty	Family Medicine	7 (9.3)
	Internal Medicine	6 (8.0)
	Pediatrics	57 (76.0)
	Otolaryngology	4 (6.7)
Training Country	Lebanon	53 (74.7)
	Russia	8 (11.3)
	France	3 (4.2)
	Syria	2 (2.8)
	Others	5 (7.0)
Practice Location	Beirut	49 (65.3)
	Saida	16 (21.3)
	Nabatieh	8 (10.7)
	Bekaa	1 (1.3)
Current Level	Tripoli	1 (1.3)
	Physician	40 (53.3)
	Trainee	35 (46.7)
Health Sector	Private	27 (36.0)
	Public	12 (16.0)
	Both	36 (48.0)
Primarily Practice Setting	Inpatient	16 (21.3)
	Outpatient	2 (2.7)
	Both	57 (76.0)
Year of Training Completion	2004 or Prior	22 (34.4)
	After 2004	42 (65.6)
Year of Training Completion	2013 or Prior	26 (40.6)
	After 2013	38 (59.4)

Data is n (%).

Denominators may vary as a result of missing data.

### 2.1. Statistical analysis

Analysis was performed using SAS 9.4. All continuous variables were evaluated for normality using the Shapiro-Wilk statistic, histograms and Q-Q plots. Continuous variables were described as mean  $\pm$  standard deviation and compared using *t*-test. Categorical data were described as absolute numbers and percentages and compared using the chi-squared test.

## 3. Results

A total of 75 physicians participated in this study between December 2017 and February 2018 at multiple hospitals in Lebanon. Characteristics of study participants are summarized in [Table 1](#). 76% were pediatricians. 75% had their medical training in Lebanon, 65% practiced in Beirut, and 53% were attending physicians as compared to 47% who were trainees. 66% had completed (or will have completed) their training after 2004 while 59% had completed (or will have completed) their training after 2013. 2004 and 2013 correspond to the years in which the two most recent AAP/AAFP AOM guidelines have been released. [Table 2](#) highlights the participants' familiarity and adherence to AOM practice guidelines. 81% of participants reported being familiar with and had access to established AOM practice guidelines. 89% of participants who utilize the AOM practice guidelines reported using international sources. 81% of participants reported adhering with established guidelines when treating patients with AOM either most or all of the time.

[Table 3](#) highlights part A of the survey addressing the management of AOM. 85% of participants knew all the situations for when to refer a patient to ENT. 55% answered correctly for when to recommend tympanostomy tubes. Of all the diagnostic criteria used in the diagnosis of AOM, 56% of participants use symptomatology, 60% use stringent otoscopic criteria, 23% use pneumatic otoscopy and 1% use tympanometry. When comparing differences in the total correct responses for

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