Challenges in Implementing Evidence-Based Guidelines for Acute Pediatric Dyspnea: The Experience of a District Hospital

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Abstract

Background: Acute dyspnea is a leading cause of pediatric emergency consultations. This study aims to describe the epidemiological, clinical, and therapeutic aspects of acute dyspnea in a Tunisian district hospital.

Methods: A descriptive cross-sectional study was conducted at El Alaa District Hospital in Kairouan, Tunisia, from January to June 2025, including 52 children under 15 years presenting with acute dyspnea.

Results: The mean age was 3.8 years, with a male predominance (75%). Asthma (50.9%), bronchiolitis (29.4%), and laryngitis (19.6%) were the primary diagnoses. Management included bronchodilators for all asthma cases and nebulized adrenaline for all laryngitis cases. Regarding bronchiolitis, management showed significant variations from national guidelines: while nasopharyngeal suctioning was performed only to 66.6% of cases, corticosteroids were administered to 46.7% of infants, and antibiotic therapy was initiated in 33.3%, despite the absence of documented bacterial coinfection. Bronchodilators were also used in 40% of bronchiolitis cases. Overall, clinical improvement was achieved in 73.1% of the total cohort, while 26.9% required transfer to a specialized pediatric ward. No deaths were recorded.

Conclusion: Acute dyspnea in this setting is mainly due to asthma and bronchiolitis. While most cases are managed successfully at the district level, standardized protocols and caregiver education remain essential.

Keywords: Acute Dyspnea; Pediatric emergency care; Management

Introduction

Acute dyspnea is defined as a subjective sensation of breathing discomfort resulting from complex respiratory and cardiovascular interactions (1). In the pediatric population, it represents one of the most frequent reasons for Emergency visits, accounting for up to one-third of all consultations (2). The etiologies are diverse and age-dependent, ranging from viral bronchiolitis in infants to asthma in older children (3,4). In district hospitals, the role of the primary care physician is vital for early recognition,

stabilization, and deciding on the need for referral to a specialized department. This study aims to evaluate the management and outcomes of acute dyspnea at El Alaa District Hospital in Kairouan, Tunisia, to optimize local pediatric care.

Methods

We conducted a descriptive cross-sectional study over six months (January–June 2025) at El Alaa District Hospital, Kairouan. The study included children presenting with acute dyspnea. Inclusion criteria were: any child under 15 presenting with respiratory distress, and Exclusion criteria included: Children presenting with dyspnea of psychogenic origin, or children with incomplete medical records or whose parents or legal guardians refused to allow participation in the study. The sample size was not calculated; we gathered all children in the study period.

Data were collected by multiple investigators using an anonymous physician-administered questionnaire covering sociodemographic data, clinical severity (using the Modified Wood Score: mild [1-3], moderate [4-7], severe [8-14]), therapeutic interventions, and patient outcomes. Statistical analysis was performed using SPSS software, with quantitative variables expressed as means and qualitative variables as frequencies.

To assess the appropriateness of medical care at El Alaa District Hospital, the therapeutic management of acute pediatric dyspnea was systematically compared with established evidence-based clinical guidelines. Specifically, the management of asthma exacerbations was evaluated according to the Global Initiative for Asthma (GINA) 2023 update(4), bronchiolitis care was reviewed based on the 2020 good practice recommendations of the Tunisian Society of Pediatrics (5), and laryngitis/croup management was evaluated against international emergency department consensus and Cochrane guidelines (6,7).

Management success was defined as patients who were safely discharged home without requiring a referral to a specialized department.

Results

Socio-demographic Characteristics

We enrolled 52 children responding to the defined criteria. The study population was characterized by a marked male predominance with a sex ratio of 3.0 and a mean age of 3.8 years. The 13-month to 5-year age group was the most represented (42.3%). Although all children were up to date with the national immunization program, significant environmental risk factors were identified, notably passive exposure to smoking in nearly half of the cases (46.2%). Regarding medical history, a family history of atopy was reported in 23.1% of patients, while a personal history of asthma was known in only 11.5% of the cohort (Table 1)

Table 1: Socio-demographic Characteristics

	Variable	Findings (n, %)
Age	Mean Age; years (mean± SD)	3.8 ± 3.1
	< 12 months; n(%)	11 (21)
	13 months – 5 years; n(%)	22 (42)
	> 5 years; n (%)	19 (36)
Sex	Male; n (%)	39 (75)
	Female; n (%)	13 (25)
	Sex ratio (M/F)	3
Medical History	Personal History of Asthma; n (%)	6 (11)
	Family History of Atopy; n (%)	12 (23)
	Recurrent Bronchiolitis; n (%)	5 (10)
Vaccination Status	Up to date (National Program); n (%)	52 (100)
Environmental Exposure	Passive Smoking; n (%)	24 (46)

Clinical Presentation, Diagnostic Distribution, and Severity

Regarding the clinical presentation, cough (78.8%) and wheezing (65.4%) were the most frequent symptoms, while more than half of the patients (59.6%) exhibited chest retractions. Most children maintained an initial oxygen saturation of 94% or higher (73.1%), although severe respiratory distress with SpO2 below 90% was observed in 5.8% of cases. Asthma was the leading etiology, accounting for 50.9% of diagnoses, followed by acute bronchiolitis (29.4%) and laryngitis (19.6%). According to the Modified Wood Score, most of the children were classified as moderate (59.6%), whereas 34.6% were mild and 5.8% required intensive stabilization for severe distress. (Table 2)

Table 2: Clinical Presentation, Diagnostic Distribution, and Severity

Variable		Findings (n, %)
Main Clinical Signs	Cough; n (%)	41 (79)
	Wheezing; n (%)	34 (65)
	Chest Retractions; n (%)	31 (60)
	Fever; n (%)	15 (29)
Initial Oxygen Saturation (SpO2)	>= 94%; n (%)	38 (73)
	90 – 94 %; n (%)	11 (21)
	< 90 %; n (%)	3 (6)
Principal Diagnoses	Asthma; n (%)	26 (51)
	Acute Bronchiolitis; n (%)	15 (29)
	Acute Laryngitis; n (%)	10 (20)
Severity (Modified Wood Score)	Mild; n (%)	18 (35)
	Moderate; n (%)	31 (60)
	Severe; n (%)	3 (6)

Management

All asthma patients received bronchodilators, and systemic corticosteroids were administered to 84.6% of them, showing strong adherence to protocols for moderate-to-severe attacks. Similarly, all children diagnosed with laryngitis received nebulized adrenaline, and 40% received dexamethasone. In contrast, a notable deviation from guidelines was observed in bronchiolitis care, where 53.3% of cases received bronchodilators and 33.3% received corticosteroids. Besides, for 33.3% of these cases, antibiotics were prescribed despite the highly suspected viral etiology, while nasopharyngeal suctioning was performed in only 66.6% of cases (Figure 1).

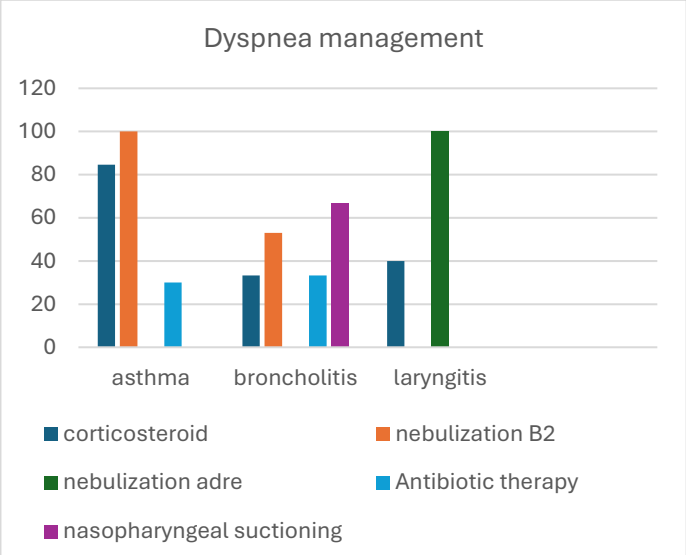

Figure 1: Dyspnea management

The alignment of the administered emergency treatments with international and national clinical guidelines, along with the specific application rates of the defined therapeutic criteria, is detailed in Table 3.

Overall, the clinical outcome was favorable, with a 73.1% success rate in local management, while the remaining 26.9% required transfer to a specialized pediatric unit such as the Pediatric Department at IBN Jazzar Hospital, Kairouan.

Table 3: Adherence to Management Guidelines and Rate of Application of Defined Therapeutic Criteria

Diagnosis & Clinical Presentation	Defined Therapeutic Criteria	Application Rate in Study Population (n, %)	Guideline Adherence
Bronchiolitis (n=15)	Nasopharyngeal suctioning (NPS) STP(5)	**10/15 (67)**	Appropriate use of foundational supportive clearance.
	Routine bronchodilators STP(5)	**8/15 (53)**	**Partial adherence** reflects continued reliance on beta-2 agonists in routine practice.
	Systemic / Parenteral Corticosteroids STP(5)	**5/15 (33)**	**Partial adherence**; strictly restricted to severe or refractory presentations. No oral forms used.
Asthma Exacerbation (n=26)	Short-acting beta-2 agonist bronchodilators GINA (4)	**26/26 (100)**	**Complete adherence (100%)** to first-line rescue recommendations.
	Intravenous Corticosteroids GINA (4)	**10/26 (38)**	**Appropriately** reserved for patients classified with moderate to severe distress.
Laryngitis / Croup (n=10)	Nebulized Epinephrine / Adrenaline Acute management of croup (6,7)	**10/10 (100)**	**Complete adherence (100%)** for rapid local airway stabilization.
	Systemic Corticosteroids Acute management of croup (6,7)	**4/10 (40)**	**Underutilization**; gaps identified in mild/moderate forms. Exclusively administered in severe presentations.

STP: Tunisian Society of Pediatrics

Discussion

Severity Distribution and Epidemiological Insights

Our study confirms that asthma exacerbations and acute bronchiolitis are the cornerstones of pediatric emergency activity. While most asthma cases were classified as moderate (65%), bronchiolitis cases were predominantly mild (60%).

This contrast is critical: it suggests that a significant number of infants are brought to emergency departments for symptoms that, according to international consensus, could be managed at home with supportive measures such as nasopharyngeal suctioning.

The Therapeutic Paradox: Guidelines vs. Clinical Reality

The most striking finding of this study is the persistence of non-compliant practices regarding evidence-based medicine (EBM).

Over-medicalization of Bronchiolitis: Although the 2020 guidelines from the Tunisian Society of Pediatrics (5) and international bodies (such as the AAP or HAS) emphasize the lack of benefit from

bronchodilators and corticosteroids in bronchiolitis, our study reports prescription rates of 53% and 33%, respectively. This tendency to "medicalize" a self-limiting viral pathology is a global phenomenon, mirroring observations in Senegal (8) and Spain (9), where systemic drug use remains high despite being discouraged.

Under-utilization in Croup Management: Conversely, for laryngitis (croup), we observed an under-use of corticosteroids (40%). While literature proves that a single dose of dexamethasone drastically reduces the risk of return visits and hospitalization, local practice appears to prioritize the immediate but transient effect of nebulized epinephrine.

Antibiotic Overuse and the Burden of Parental Expectations

The gap between consensus and practice is most evident in the prescription of antibiotics. Despite the predominantly viral etiology of bronchiolitis and asthma, antibiotic use remains alarmingly high in regional data (reaching 70% in similar cohorts).

Our analysis suggests that this non-compliance is largely driven by parental pressure, a decisive factor often underestimated in clinical audits:

1. Antibiotics as a "Safety Net": For many parents, an antibiotic prescription is perceived as a marker of medical competence and a guarantee of safety. Fever, even when isolated and viral in appearance, is often misinterpreted by caregivers as an absolute indication for antimicrobial therapy.
2. The Clinician's Dilemma: Faced with overcrowded waiting rooms and high parental anxiety, physicians may succumb to "complacency prescribing" to shorten consultation times or to provide psychological reassurance to the family.
3. Educational Complexity: Research by Ben Ameur et al. (10) highlights that guidelines like GINA are often perceived as too complex for rapid primary care. Explaining why an antibiotic is not necessary requires significantly more time and communication effort than simply writing a prescription.

Clinical Outcomes and Public Health Implications

Despite these deviations from established protocols, clinical outcomes remained favorable in 73% of cases, with zero mortality recorded. While this is a testament to the emergency department's stabilization efficacy, it masks a significant economic burden and a public health risk regarding antimicrobial resistance.

The stark difference in mortality compared to sub-Saharan African settings (e.g., 20.65% in Mali (11) highlights that our healthcare setting possesses the resources to compensate for management imprecision. However, true optimization of care must involve de-medicalizing mild respiratory cases and strictly adhering to pharmacological restrictive policies.

Finally, several limitations must be acknowledged when interpreting these results. First, the study is monocentric, reflecting the clinical reality of a single district hospital. Second, the sample size was relatively small and not statistically calculated prior to the study, as we included all consecutive pediatric patients presenting during the designated six-month period. Consequently, these findings should be interpreted with caution when generalizing them to other primary care settings in Tunisia.

Conclusion

This study highlights a significant gap between international guidelines and the management of acute pediatric dyspnea, particularly through the over-medicalization of bronchiolitis and the under-treatment of croup. While clinical outcomes remain favorable, therapeutic decisions are

frequently influenced by socio-professional pressures and parental expectations for prescriptions. These findings emphasize the urgent need for continuous medical education and simplified clinical algorithms to curb the irrational use of medications. By adopting "Choosing Wisely" principles, practitioners can transition toward more restrictive pharmacological management for viral etiologies. Ultimately, aligning local practices with evidence-based standards is essential to improve care quality and mitigate the risks associated with antimicrobial resistance.

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Conflicts of Interest: The authors declare no conflicts of interest.

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