



## Acute bronchiolitis management in Tunisia: Impact of the national guidelines

### Prise en charge de la bronchiolite en Tunisie : Impact des recommandations nationales

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#### RÉSUMÉ

**Introduction:** La prise en charge de la bronchiolite implique tous les pédiatres et les médecins de première ligne. Les recommandations nationales pour le diagnostic et le traitement de la bronchiolite ont été publiées en Tunisie afin d'en unifier la prise en charge.

**Objectif:** Nous nous sommes proposé d'analyser l'impact des recommandations nationales sur la prise en charge de la bronchiolite en Tunisie.

**Méthodes:** Il s'agissait d'une étude transversale évaluative, menée au moyen d'un questionnaire anonyme distribué aléatoirement aux médecins prenant en charge la bronchiolite, au cours de la période allant du 1er mars 2014 au 30 novembre 2015.

**Résultats:** Nous avons colligé 140 questionnaires. Quarante-treize des médecins interrogés (66,4%) étaient informés des dernières recommandations nationales, la moitié d'entre eux (33,6%) ont déclarés ne pas les suivre. Une adhésion complète aux recommandations a été observée chez 1,4% des médecins interrogés. Pour le diagnostic positif de bronchiolite, une radiographie du thorax et des bilans biologiques ont été correctement indiqués par respectivement 57,8% et 59,3% des médecins interrogés. Concernant la prise en charge thérapeutique, les nébulisations de bronchodilatateurs et d'épinephrine n'ont pas été prescrites par respectivement 45,7% et 38,6% des médecins interrogés. Les antibiotiques ont été prescrits par 92,9% des médecins interrogés et la kinésithérapie respiratoire a été correctement prescrite par 47,8% d'entre eux.

**Conclusions:** Nous avons relevé un écart important entre les recommandations nationales et la pratique clinique dans la prise en charge de la bronchiolite. Des stratégies nationales sont à développer afin de réduire le recours excessif aux tests diagnostiques et aux thérapies non recommandées.

**Mots clés:** Nourrisson, Recommandations, Infections respiratoires

#### SUMMARY

**Background:** Acute bronchiolitis management involves all pediatricians and primary care physicians. The national guidelines for bronchiolitis diagnosis and treatment were published in Tunisia to reduce excessive use of diagnostic tests and unify bronchiolitis management.

**Objectives:** We aimed to assess the real impact of the national guidelines on acute bronchiolitis management in Tunisia.

**Methods:** We conducted an evaluative cross-sectional study. We randomly distributed anonymous questionnaires to physicians managing acute bronchiolitis during the period from 1st March 2014 to 30 November 2015.

**Results:** We analyzed 140 questionnaires. Ninety-three interviewed physicians (66.4%) were advised of the latest national guidelines, half of them (33.6%) declared they didn't follow these guidelines. Real and complete guidelines adherence was observed in only 1.4% of interviewed physicians. According to bronchiolitis diagnosis, appropriate Chest X-rays and blood tests were requested respectively by 57.8% and 59.3% of interviewed doctors. Regarding bronchiolitis therapeutic management, bronchodilators and epinephrine nebulization weren't prescribed by respectively 45.7% and 38.6% of them. Antibiotics were prescribed by 92.9% of interviewed doctors and chest physiotherapy was well indicated by 47.8% of them.

**Conclusions:** There is a disconnect between the bronchiolitis guidelines and clinical practice. National strategies have to be developed to reduce excessive use of diagnostic tests and unrecommended therapies.

**Keywords:** Infant, Practice Guidelines, Program Evaluation, Primary health care, Respiratory tract infection

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## INTRODUCTION

Acute bronchiolitis represents a public health problem all over the world and in Tunisia. It represented 10,5% of all the leading cause of infant consultation in tunisian first-line health structure in 2003 (1). Bronchiolitis management involves all pediatricians and primary care physicians. In order to unify this management, the Tunisian Pediatric Society (STP) published tunisian guidelines for bronchiolitis diagnosis and treatment in septembre 2013 (2). These recommendations redefined clinical criteria for bronchiolitis diagnosis, chest X-rays indications, reserved to severe forms and atypical clinical presentation, and blood tests indications limited to concurrent bacterial infection cases. These recommendations also reminded clinical criteria for hospitalization in pediatric and intensive care units. Therapeutic management of bronchiolitis is symptomatic, as highlighted in these recommendations, with oxygen therapy indicated in cases of oxygen saturation below 94%. It recommends against the routine use of bronchodilators and epinephrine nebulizations, corticosteroids, mucolytics and antitussives. Antibiotics are limited to concurrent bacterial infection cases. Chest physiotherapy is limited to airway fluid accumulation or atelectasis. However, in spite of these clear and accessible recommendations, attitudes have remained different between physicians, making difficult coordination between different players (general physician, pediatrician, intensive care physician, physiotherapist) and national control of bronchiolitis epidemy. In this study we evaluated acute bronchiolitis management by pediatricians and primary care physicians, to assess the real impact of the national guidelines.

## METHODS

We conducted an evaluative cross-sectional study. Anonymous questionnaires were randomly distributed to physicians managing acute bronchiolitis, including paediatricians practicing in public or private health structures. These questionnaires were distributed during different scientific events (medical congresses, medical meetings). The main judgement criterion was concordance of bronchiolitis management with STP guidelines concerning: chest X-ray and blood tests indications, prescribed treatments: oxygen therapy, bronchodilator or epinephrine nebulisations, corticoids, antibiotics, mucolytics, antitussives, chest physiotherapy. For each

treatment, indication, molecular name, dosage and way of administration have been specified. We also looked for possible causes of non-adherence to the national guidelines.

Five incomplected questionnaires were excluded. Thus 140 questionnaires were collected during the period from 1<sup>st</sup> March 2014 to 30 November 2015.

Questionnaire data were collected on an individual form and analyzed by the Statistical Package for the Social Sciences (SPSS) software. Simple frequencies and relative frequencies (percentages) were calculated for the qualitative variables. Comparison of percentages using the Chi-square test was carried out, considering  $p \leq 0.05$  as the significance threshold.

## RESULTS

Questionnaires analysis showed that 32.1% of interviewed doctors were practicing in university hospital (N=45), 37.1% in private health structure (N=52), 17.9% in first-line health structure (N=25) and 12.9% in regional hospital (N=18). Nearly three quarters of interviewed doctors (75.6%) were practicing in northern Tunisia, 17.3% in centre and 7.1% in south.

Ninety-three interviewed physicians (66.4%) were advised of the latest national guidelines. Been informed of national guidelines wasn't statistically different between physicians practicing in university hospital (35.5%), private structure (35.5%), first line (18.3%) and regional hospital (10.8%) ( $p=0.542$ ).

Half of guidelines informed physicians (33.6%) declared they didn't follow these guidelines, mainly because of parents' pressure to prescribe drugs. Guidelines were also considered too outdated or inefficient by these physicians. Among informed physicians (N=93), guidelines were more often respected by those practising in university hospital (72.7%) than those practising in private health structures (33.3%), in first line (35.3%) and in regional hospitals (50%) ( $p=0.008$ ).

Half of interviewed physicians declared respecting guidelines adherence, but this percentage was overestimated. In fact, the analysis of the different practices concluded that physician's adherence to drug and non-drug prescriptions were respectively only 5%

and 15.7%. Real and complete guidelines adherence was observed in only two of all interviewed physicians (1.4%) (Table 1).

No significant association was found between chest X-ray prescription and guidelines awareness ( $p=0.471$ ). Chest X-rays was prescribed by 87.1% of interviewed doctors, indicated for severe forms in 46.4% of cases and during hospitalization in 41.4% of cases. None of guidelines informed physicians did routinely request blood tests while four of uninformed ones did ( $p=0.004$ ). Blood tests were requested by 94.3% of interviewed doctors, indicated for all patients for 2.9% of these doctors, in severe forms for 59.3% of them and during hospitalization for 37.1% of them (Table 1 and 2).

Regarding bronchiolitis therapeutic management, 98.6% of interviewed doctors prescribed oxygen therapy, indicated according to oxygen saturation level by 57.8% of them. Statistically significant association was found between guidelines awareness and oxygen therapy guided by oxygen saturation level (75% of informed physicians vs 25% of uninformed physicians,  $p=0.013$ ). However bronchodilators and epinephrine prescription weren't statistically related to guidelines awareness (Bronchodilators prescription: 50.6% of informed physicians vs 61.7% of uninformed physicians,  $p=0.27$ ; Epinephrine prescription: 60.2% of informed physicians vs 63.8% of uninformed physicians,  $p=0.6$ ). Bronchodilators and epinephrine nebulization were prescribed by respectively 54.3% and 61.4% of interviewed doctors. These nebulizations were more frequently prescribed by physicians practicing in private sector compared to those practicing in public structures (for bronchodilators nebulizations 65.4% vs 47.7%,  $p=0.009$ ; for epinephrine nebulizations 76.9% vs 52.3%,  $p=0.001$ ). Corticosteroids prescription wasn't also related to guidelines awareness (17.2% of informed physicians vs. 19.1% of uninformed physicians,  $p=0.177$ ). Corticosteroids were prescribed by 82.1% of interviewed doctors, with systematic prescription for all patients for 4.3% of them. Physicians practising in public structure prescribed corticosteroids more frequently for severe forms (66.7% vs. 53.8%,  $p=0.02$ ) and used more often intravenous corticosteroids (76.9% vs. 12.8%,  $p=0.01$ ) compared to private structure physicians who administered more frequently oral corticosteroids (53.8% vs. 16.2%,  $p<0.01$ ) and inhaled way (53.8% vs. 17.6%,  $p=0.01$ ) (Table 1 and 2).

Antibiotics were prescribed by 92.9% of interviewed doctors, and no significant association was found between guidelines awareness and routine antibiotic prescription (39.8% informed physicians vs 38.3% uninformed physicians,  $p=0.865$ ). Antibiotics were indicated in severe forms by 33.6% of interviewed doctors and in suspected concurrent bacterial infection cases by 73.6% of them. First-line antibiotic therapy was more frequently the association amoxicillin-clavulanic acid for private physicians compared to physicians practising in university hospital (27.9%), in first line (6.6%) and in regional hospitals (14.8%) ( $p=0.003$ ). While amoxicillin and cephalosporin prescription was not statistically different among the different physicians interviewed (respectively  $p=0.091$  and  $p=0.089$ ) (Table 1 and 2).

Guidelines awareness didn't influence antitussives prescriptions ( $p=0.131$ ), while mucolytics were less prescribed by informed physicians compared to uninformed ones ( $p=0.027$ ). Antitussives prescription was statistically more frequent among physicians in private structures ( $N=19$ , 36.5%) compared to physicians practising in university hospital ( $N=4$ , 8.9%), in first line ( $N=6$ , 24%) and in regional hospitals ( $N=7$ , 38.9%) ( $p=0.015$ ) (Table 1 and 2).

Chest physiotherapy prescription wasn't statistically related to guidelines awareness ( $p=0.217$ ). Chest physiotherapy has been indicated by 96.4% of interviewed doctors, indicated for all patients by 10.7% of them and only in case of airway fluid accumulation by 47.9% of them. Chest physiotherapy was prescribed more frequently by doctors practising in university hospitals (44.8%) compared to doctors practising in private structure (31%), in first line (13.8%) and in regional hospitals (10.3%) ( $p=0.023$ ) (Table 1 and 2).

## DISCUSSION

This study was the first to evaluate bronchiolitis management in Tunisia after the release of the national guidelines. These guidelines are not consistently followed, with only 5% of adherence to pharmacological management, 15.7% to non-pharmacological management, and real and complete adherence by only 1.4% of interviewed physicians. There was also a large disparity between real guidelines adherence (1.4%) and physician's estimation

of their guidelines adherence (32.9%), this shows a poor knowledge of the guidelines. However, we noted a sample selection bias. In fact, by interviewing physicians who attended pediatric congresses, we selected motivated physicians updating their medical skills.

Bronchiolitis management in Tunisia was evaluated in 2007 by Menif et al. (3) and in 2013 by Gzara Zargouni A et al. (4). These two studies were conducted before the guidelines drawn up. We compared these two studies results with ours. We noted a clear decrease of 36% in bronchodilators prescription as well as a slight decrease of 6.6% in corticosteroids prescription. However, we noted an increase of 22.9% in antibiotic prescription (Table 3).

Weak guidelines compliance isn't specific to Tunisia, it is also observed in other countries that have developed guidelines and consensus for bronchiolitis management as in France (5,6), Spain (7), Switzerland (8) and Portugal (9). David M. et al. (10) analyzed assessment of the French Consensus Conference for acute viral bronchiolitis published in 2000 on outpatient management between 2003 and 2008. In this study, patient management by general practitioners was in accordance with the guidelines in only 6% in 2003 and up to 20% in 2008 ( $p \leq 0.001$ ). Fifty-four percent of these general practitioners reported knowing the guidelines, but only 57% of them declared that they modified their practice according to guidelines.

Despite that no guidelines recommended the routine use of bronchodilators (11), bronchodilators are still highly used. Our study showed a high rate of bronchodilators prescription of 54.3%. This rate is similar in France (55% in 2014 (12)), in Spain (61.4% in 2012 (13)), in Morocco (56% in 2009 (14)), in Switzerland (88.2% in 2008 (15)) and in Portugal in 2015 (72.3% (16)).

Whereas all forms of corticosteroids are not recommended (11), inhaled corticosteroids were highly prescribed in our study (82.1%). Inhaled corticosteroids prescription increased from 18.6% (17) to 26% (12) in french doctors between 2007 and 2014, so seven and 14 years after the french guidelines of 2000.

Antibiotic therapy was highly prescribed in Morocco (60%) (14) and in our study (92.9%), this rate was about 29.6% in Switzerland (15), 25.6% in France (17) and 26% in Portugal (16). In Spain antibiotics were prescribed by only 2.4% of spanish doctors. Although chest physiotherapy

use is not recommended by several guidelines (11), it has kept an important place in bronchiolitis management, with a high rate of prescription in France (92.9%), in Morocco (75%) and in our study (96.4%) (Table 4).

## CONCLUSIONS

Despite the national guidelines for bronchiolitis management nonrecommended therapies in bronchiolitis remain wide in Tunisia. Better adherence to clinical guidelines requires national strategy for better medical information and educational campaigns to explain bronchiolitis management and individual and public health risks of nonrecommended prescriptions.

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