

**ORIGINAL ARTICLE**

# Non-adherence of primary care pediatricians in Serbia to the latest guidelines for the management of acute and chronic cough in children

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**Competing interests:**

The authors have declared that no competing interests exist

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**Summary**

**Introduction:** Cough is the most frequent symptom in children and can indicate various pathological conditions. Several international guidelines have been published with a purpose of standardizing and improving the assessment and management of cough. Non-adherence to guidelines often leads to a suboptimal quality of patient care. Our aim was to investigate the adherence of Serbian primary care pediatricians to the latest international guidelines on cough diagnosis and management.

**Methods:** The study included pediatricians working in primary health care centers in Serbia. They were given a questionnaire designed by a team of pediatric pulmonologists which included questions about the choice of diagnostic and therapeutic approaches in acute and chronic cough.

**Results:** Most of primary care pediatricians assessed the value of international guidelines as fair. However, nearly 70% stated that they prescribed herbal syrup for acute cough. Chronic cough is treated mostly with ivy extract, bronchodilators and antihistamines. A majority of doctors declared positive opinion of herbal medicaments and negative opinion of alternative medicine. About 73% stated that they did not use the chest x-ray as a part of diagnostic procedure.

**Conclusion:** Serbian pediatricians do not adhere to international guidelines in relation to diagnosis and treatment of cough. The reasons for non-adherence to guidelines should be further investigated.

**Keywords:** cough, guidelines, children, primary health care

## INTRODUCTION

Cough is an important defense mechanism that helps to clear foreign materials and secretions from airways (1). There are two types of cough depending on duration: acute, which usually lasts for less than three weeks, and chronic, which can last for more than eight weeks (2). Cough is one of the most frequent symptoms in children and one of the most common reasons due to which parents require medical attention for their child (3, 4). Coughing has a major impact on child’s sleep, normal daily activities (eating and going to school) and ability to play (5, 6). It has relatively small impact on the child’s quality of life, but the members of the child’s family are affected by stress and tiredness (7). Annual costs for over-the-counter (OTC) medications for cough are over one billion dollars (8). However, these expenses are underestimation of the global cost of cough management considering the fact that they do not include the cost of the prescribed treatment, physician fees, radiographs, and laboratory testing (9).

Many international guidelines have been published with a purpose of standardizing and improving the assessment and management of cough (10). Since cough can be the indication of various pathological conditions that can progress and raise complications, finding and treating the underlying causes is very important (11). Primary care physicians treat a considerable number of pediatric patients with cough often relying on their established long-term practice rather than on the available guidelines. Insufficient attention has been given to studying the adherence of primary care physicians to guidelines for clinical management of cough.

The aim of this study was to investigate the adherence of Serbian primary care pediatricians to the latest international guidelines on cough diagnosis and management.

## METHODS

A multicenter, observational survey was conducted on 615 pediatricians working in primary health care centers

located in eight districts (out of 29) in Serbia. The centers were selected based on the pool of pediatricians and regional distribution. The survey was performed from May 2021 to April 2022. The adherence of primary care pediatricians to guidelines on cough diagnosis and management was estimated based on the questionnaire designed using a two-step Delphi method by a group of tertiary care pediatric pulmonologists (12). The study was an anonymous survey and did not require the consent of the Bioethical Committee. Pediatricians were asked to assess the value of four international guidelines related to the diagnosis and choice of therapy of cough in children (13-16). They were also asked which medications they prescribed most commonly for acute and chronic cough, if they used chest x-ray as part of diagnostic procedure, what their opinion was of herbal medicine, and if they advised the use of alternative medicine. The questionnaire consisted of seven questions (Table 1).

Data were analyzed with SPSS IBM Statistics v23 software and expressed as percent values. Distribution of frequencies in the predefined categories for each question were tested by  $\chi^2$  analysis. A p-value less than 0.05 was considered statistically significant.

## RESULTS

The study participation accounted for 615 pediatricians employed in primary health care centers located in eight districts (out of 29 in total) in Serbia. Of all distributed surveys, 491 (79,83%) were properly completed and returned.

The value of international guidelines for the diagnosis and treatment of cough was assessed as relevant, with 88.89% for treatment and 90.8% for diagnostic procedures, which represents a statistically significant difference compared to the group that rated the guidelines as poor ( $p < 0.05$ ). There were only small differences in the assessment of guidelines regarding the diagnosis and the choice of therapy (Figure 1). Most of the doctors (73%) stated that they did not use the chest x-ray as part of the

**Table 1.** Format of the questionnaire on cough diagnosis and management

QUESTION	OFFERED ANSWERS
assess the value of four international guidelines related to the diagnosis of cough in children	poor; fair; good; excellent
assess the value of four international guidelines related to the choice of therapy for cough in children	poor; fair; good; excellent
most prescribed medication type for acute cough	nasal decongestants and bronchodilators; antitussives; inhalation drugs; symptomatic drugs; anticholinergics; mucolytics; antibiotics; antihistamines; herbal syrup
most prescribed medication type for chronic cough	antitussives; corticosteroid; expectorants; bronchodilators and antihistamines; antacids; pastilles for sore throat; ivy extract; mucolytics; antibiotics; montelukast; inhalation drugs; beta agonists
the use of chest x-ray as a part of diagnostic procedure	yes; no
opinion about herbal medicaments	positive; negative
the use of alternative medicine	yes; no

diagnostic procedure by algorithms, so when compared with the recommended algorithm for that diagnostic procedure this was significantly lower ( $p$ -value  $<0.01$ ). The dominant medicine for acute cough was herbal syrup, which was prescribed by 68.33 % of pediatricians, and ivy leaves extract EA 757 was most commonly used (65%). Ivy extract was prescribed significantly more frequently compared to any other medication ( $p <0.05$ ). Each of the other drugs represented less than 10% - in total they participated with 31.67%.

Chronic cough in children was most often treated by ivy leaves extract EA 575 (34%), inhaled corticosteroids (31.4%) and bronchodilators beta 2 agonists (29%). Other drugs were prescribed by less than 15% of pediatricians, in 26.9% cases in total (Figure 3). Approximately 65% of pediatricians declared positive opinion of herbal medicaments. However, more than a half of all doctors (57%) stated that they did not use alternative medicine.

## DISCUSSION

This study was designed to determine general principles of managing acute and chronic cough by primary care pediatricians in Serbia with regard to the international guidelines for diagnosis and management of cough. The study showed that non-adherence to guidelines was quite common among Serbian primary care pediatricians, although the majority of them considered the value of international guidelines as fair, both for diagnosis and the choice of treatment. It is a well-known phenomenon that doctors adopt clinical practice guidelines to varying degrees (17). Several factors have been found to influence this. Physicians are concerned about economic motives in designing guidelines or if generalization in guidelines will affect individual patients' needs. Moreover, they usually do not have enough time for reading guidelines in detail. It is also time-consuming to test if new recommended drugs are working or have side effects (16). Most physicians included in this study shared positive opinion of herbal medicines and there was a widespread agreement among them that herbal syrup should be prescribed for acute cough. Although none of the guidelines used in this study mention acute cough, there are quite a few studies proving that herbal drugs are beneficial against it, leading to reduced frequency and severity of cough (13-15, 18,19). Herbal syrup was also found to reduce cough severity in upper respiratory tract infections, which often cause acute cough (20). A smaller number of physicians prescribe antibiotics for acute cough, which is in accordance with guidelines and some other studies (21). Ivy extract is the most prescribed drug for chronic cough.

International guidelines do not recommend the use of herbal medicines either for chronic or for acute cough. Despite this fact, ivy extract has already been shown to decrease chronic cough and to be safe for children (21). A significant proportion of pediatricians declared that they prescribed bronchodilators and antihistamines for chronic cough. Bronchodilators are recommended for children with chronic cough in asthma, and antihistamines are recommended for different types of chronic cough which can occur due to infection or allergic rhinitis (13,14). Regarding the use of chest x-ray as part of the examination procedure, about three quarters of physicians claimed that they did not use it. It should be noted that this attitude is present in both acute and chronic cough. A chest radiograph should be used in case of acute cough only under certain circumstances, for example when there is uncertainty about the diagnosis of pneumonia or if there is a possibility of inhaled foreign body, while it is recommended to be always used in chronic cough (23). More than a half of pediatricians included in the study stated that they did not recommend the use of alternative medicine. A few studies showed that many patients used alternative medicine against cough, but only a small number of doctors considered it effective (24,25).

## CONCLUSIONS

This study provides an insight into assessment and management of cough in children in primary health care of a developing country. Serbian pediatricians were found not to adhere to the international guidelines in relation to diagnosis and treatment of cough, although they assessed the value of guidelines as fair. The reasons for non-adherence to guidelines should be further investigated among Serbian pediatricians, in order to identify the obstacles to implementing the international guidelines for cough management.

## Authors' contributions

Study design: KM,SR. Acquisition: KM,DP,SR. Analysis:KM,SR. Data interpretation: KM,SR. Preparing the draft version of the manuscript: KM,DP,SR. Revising the manuscript: KM,DP,SR.

## Ethical approval

This research and publication were approved by the Ethical committee of the University children's hospital (approval number 026 10/02 ).

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## NEPRIDRŽAVANJE PEDIJATARA PRIMARNE ZDRAVSTVENE ZAŠTITE U SRBIJI NAJNOVIJIH UPUSTAVA ZA LEČENJE AKUTNOG I HRONIČNOG KAŠLJA KOD DECE

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### Sažetak

**Uvod:** Kašalj je najčešći simptom kod dece i može ukazivati na različita patološka stanja. Objavljeno je nekoliko međunarodnih smernica sa ciljem da standardizuju i poboljšaju procenu i lečenje kašlja. Nepoštovanje uputstava često dovodi do neoptimalnog kvaliteta nege pacijenata. Naš cilj je bio da istražimo pridržavanje srpskih pedijatara primarne zdravstvene zaštite najnovijim međunarodnim smernicama o dijagnostici i lečenju kašlja.

**Metode:** Istraživanjem su obuhvaćeni pedijatri koji rade u domovima primarne zdravstvene zaštite u Srbiji. Dobili su upitnik koji je osmislio tim dečjih pulmologa a koji je uključivao pitanja o izboru dijagnostičkih i terapijskih pristupa kod akutnog i hroničnog kašlja.

**Rezultati:** Većina pedijatara primarne zdravstvene zaštite ocenila je vrednost međunarodnih smernica kao iskoristljivu. Međutim, skoro 70% je izjavilo da propisuje biljni sirup za akutni kašalj. Hronični kašalj se leči uglavnom ekstraktom bršljana, bronhodilatatorima i antihistaminicima. Većina lekara se izjasnila pozitivno o biljnim lekovima, a negativno o alternativnoj medicini. Oko 73% njih je izjavilo da ne koristi rendgenski snimak grudnog koša kao deo dijagnostičke procedure.

**Zaključci:** Pedijatri u Srbiji u primarnoj zdravstvenoj zaštiti se ne pridržavaju u potpunosti međunarodnih smernica u vezi sa dijagnostikom i lečenjem kašlja. Razloge za nepridržavanje smernica treba dalje istražiti.

Ključne reči: kašalj, smernice, deca, primarna zdravstvena zaštita

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