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Review article

## Nurses' Role and Participation in the Management in Children Respiratory Diseases

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### Abstract

Pediatric respiratory pathology has its unique characteristics and requires specialized approaches in diagnostics, treatment, and care. In many countries, programs are being developed and implemented to optimize nursing care for children with such diseases, which can serve as a valuable source of experience for nurses.

**The current review aims** to describe the existing data on the role of nurses in the management of respiratory diseases in children in primary care settings.

Literature searches were conducted in electronic databases including PubMed/Medline, CINAHL, Cochrane Database of Systematic Reviews, and ProQuest for the period from 2012 to 2023. The following key search queries were used: nurses, nursing roles, primary health care, pediatrics, respiratory diseases. Inclusion criteria were peer-reviewed studies, including quantitative and qualitative studies, as well as mixed-methods research.

Numerous studies demonstrate that nurses significantly improve the quality of life for patients by reducing the number of acute disease episodes and decreasing the need for hospitalization. This is achieved through the effective use of clinical protocols and continuous improvement of their knowledge and skills. Educational programs developed by nurses increase children's and their parents' awareness of the diseases, aiding in better inhalation techniques and overall disease management. This highlights the importance of nurses' roles in education and consultative support. Thus, extensive research confirms the importance of nursing in managing respiratory diseases in children and underscores the need for further development of nurse role in the healthcare system. Strengthening and expanding the competencies of nurses in this area can lead to more effective and high-quality care for children with respiratory diseases.

**Keywords:** Nursing care, primary medical care, pediatrics, respiratory diseases.

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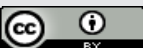
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## Introduction

Nursing for children with respiratory diseases is an important part of primary health care and requires a professional and effective approach. Nursing within the framework of primary healthcare (PHC) is a relevant and significant area in healthcare. Nurses play an integral role in providing quality care and support for children and their families during in management of respiratory diseases [1,2].

Respiratory diseases remain one of the leading causes of mortality and morbidity among children worldwide [3]. According to the World Health Organization, by 2030, lung diseases will account for approximately every fifth of deaths globally (WHO, 2023). In the Republic of Kazakhstan, the primary morbidity of children aged 0 to 14 years in the main groups of diseases shows respiratory diseases lead with 42.429.2 cases per 100.000 children [3–5].

The most common pathologies worldwide, often seen in children, include bronchial asthma, lower respiratory tract infections such as bronchitis, pneumonia, and obstructive sleep apnea syndrome [6]. Lower respiratory tract infections in children can be caused by adenovirus, metapneumovirus, parainfluenza, and influenza. Additionally, these viruses, as well as several types of rhinoviruses, can contribute to the development of bronchial asthma [7]. Bronchial asthma continues to be a serious non-infectious disease; it is estimated that 339 million people worldwide suffer from asthma, and this number is expected to increase by another 100 million by 2025 [8]. In children, asthma remains the most common chronic disease (WHO, 2019) and is the most frequent cause

## Search Strategy

The search for scientific publications was conducted in four databases of evidence-based medicine (Cochrane Library, PubMed, ProQuest, and Google Scholar), electronic scientific libraries, and the national scientific portal of the Republic of Kazakhstan (nauka.kz). The search covered a period of 11 years, from December 2012 to December 2023. The study included only full-text publications in Russian and English that describe the activities carried out by nurses in other countries related to nursing for respiratory

## Innovations in the Role of Nursing in Pediatric Respiratory Care

In the field of respiratory medicine, the role of nurses has been evolving since the early 1980s with the support of the Royal College of Physicians [15]. Initially, this role was created to meet patients' needs in rehabilitation, monitoring therapy using inhalers, and working in specialized areas such as patients with lung cancer, cystic fibrosis, asthma, HIV-infected with respiratory complications, and occupational lung diseases (Table 1). The flexible approach of nurses to patient needs included developing the patients' and their caregivers' understanding of respiratory diseases. The role continued to evolve, and nurses began to conduct training on chronic obstructive pulmonary disease (COPD) and bronchial asthma, as well as provide early supportive discharge and "hospital at home" services for COPD patients. Early diagnosis of worsening lung diseases allows for timely intervention and increases the chances of avoiding a minor problem escalating into a serious illness or exacerbation. Throughout the entire period of a pulmonary infection,

of consultations and hospitalizations, and this high prevalence in childhood continues into adulthood [9]. Bronchial asthma can interfere with sleep and affect a child's academic performance [10]. This puts significant pressure on healthcare resources. Consequently, international and national guidelines for diagnosing and management have been developed, which are regularly updated based on evidence-based scientific research (such as the American Academy of Pediatrics (AAP) Clinical Practice Guidelines, the National Asthma Education and Prevention Program (NAEPP), and the Guidelines for the Diagnosis and Management of Asthma and Global Initiative for Asthma (GINA)). These documents contain recommendations for asthma management and emphasize the role of caregivers in managing children with respiratory diseases (AAP, 2019; GINA, 2018; NAEPP, 2007). Special attention is paid to the need for ongoing education and counseling of caregivers, including basic facts about respiratory diseases, and the role of the caregiver in ensuring that the child receives the necessary medications as prescribed [11]. Appropriate training and counseling of caregivers significantly improve the child's respiratory condition and reduce the use of healthcare services [12,13]. Even though nurses make up the largest group of professionals [14] at the primary health care, there is insufficient scientific data of their role in preventing diseases.

The purpose of this review is to conduct a comparative analysis of nurse role and participation in the treatment of respiratory diseases in children.

diseases in children, as well as descriptions of the roles of nurses. Inclusion criteria were publications containing information about nurses' experiences. The following search queries were used: "nursing" "nurse and patient", "primary healthcare", "knowledge, skills, and attitudes", "nursing guidelines", "nursing care for respiratory diseases in children", "tools for assessing nurses' knowledge and skills". Totally 25 publications were met criteria for analytical material.

the child and their family require the assistance of a nurse, such as training parents to measure breathing rate while their child sleeps, providing advice regarding abnormal rates that change with age, cyanosis, signs of dehydration, shortness of breath, difficult breathing, pulmonary insufficiency after 72 hours, or fever that subsides and then returns [16-19]. Nurses also play a unique role, as they can significantly decrease the burden of lung diseases in children through proper disease' identification, and informing parents about them, and encouraging the prevention of lung diseases.

The emergence of the COVID-19 pandemic has drawn attention to the importance of respiratory health, particularly the link between bronchial asthma and its role as a risk factor for severe outcomes of COVID-19 [20].

Table 1 Nurses' role in management respiratory diseases in children [3, 12, 15]

Healthcare Professional Role	Key Responsibilities and Activities
School nurses	<ul style="list-style-type: none"> <li>■ Early detection and referral to a physician of unhealthy children;</li> <li>■ Encouraging vaccination of children, including dispelling myths;</li> <li>■ Parental support and counseling, including informing parents about the importance of proper nutrition and a smoke-free environment;</li> </ul>
Nurse Practitioners	<ul style="list-style-type: none"> <li>■ Early detection and referral to a physician of unhealthy children;</li> <li>■ Encouraging vaccination of children, including dispelling myths;</li> </ul> <p>Explanation of the side effects of antibiotics, including: gastrointestinal discomfort, diarrhea, rash, yeast infection and the risk of antibiotic resistance of bacterial strains;</p> <ul style="list-style-type: none"> <li>■ Advice to parents, including recommendations on the social protection system, what to do if the child's condition worsens at home;</li> </ul>
Pediatric nurses (inpatient level)	<ul style="list-style-type: none"> <li>■ Regular monitoring, including registration of early warning indicators (PEWS);</li> <li>■ Providing extended respiratory support, such as non-invasive ventilation or the supply of humidified oxygen;</li> <li>■ Administration of fluids (intravenously, if vomiting or inability to drink) and medications, including antipyretics (preferably single use) and antibiotics;</li> <li>■ Strict control of fluid intake and outflow, since children with severe respiratory tract infections are at risk of developing the syndrome of inadequate secretion of antidiuretic hormone, leading to hypernatremia and hypos molarity, which leads to impaired water excretion (Barson, 2016);</li> <li>■ Parental support and regular information about the positive dynamics of the child;</li> <li>■ Discharge planning, including follow-up at the clinic;</li> <li>■ Information for parents on precautionary measures, including informing the family about what to do if the child's condition worsens;</li> <li>■ Encouraging vaccinations if they are missed or remain unfulfilled;</li> </ul>
Advanced Practice Pediatric Nurses	<ul style="list-style-type: none"> <li>■ Independently assess the condition of children with lower respiratory tract infection and treat them and, if necessary, seek support from a senior nurse;</li> <li>■ Prescribe additional examinations, develop management plans and prescribe medications (in the role of a prescription nurse);</li> <li>■ Recommendations for long-term treatment of respiratory diseases, for example, in cases of multiple trigger wheezing (in an advanced position such as a specialist nurse for respiratory diseases or asthma).</li> </ul>

In light of the unpredictable development of the pandemic and the fact that the long-term presence of childhood asthma is associated with a decline in lung function in adulthood [21], this issue becomes even more relevant.

Several studies have identified statistically significant differences in the care of patients with bronchial asthma managed by nurses compared to that provided by physicians. Based on the research presented in the review, it can be said that nurse-led care may be considered appropriate for patients with well-controlled bronchial asthma. However, researchers cannot say with full confidence that such care is suitable for patients with uncontrolled asthma [22].

Many general practitioners and pediatricians have a lack sufficient time to provide comprehensive care for patients. Several studies have shown that care led by a nurse is not inferior to that led by a physician [22–24].

According to Francisco [25,26], a significant number of deaths related to asthma exacerbations can be prevented through effective asthma treatment (AAFA, 2015). It was also found that educational programs [27] on self-management led to an improvement in several

key symptoms, as well as a reduction in the number of school absences and days of limited activity.

Children with respiratory diseases face an increased risk of disability, emotional problems, and reduced academic performance [28]. Along with clinic nurses, school nurses can implement asthma education programs to develop successful asthma management strategies based on the guiding principles of the National Asthma Education and Prevention Program [29] (NAEPP) and the recommendations of the National Association of School Nurses [30] for pupils and their parents (NASN, 2016). Listening to parents' experiences and understanding of asthma can lead to expanded collaboration between parents and nurses and improve asthma management. Parents may adopt a more positive attitude when nurses value their knowledge and involve them in developing asthma management strategies for their children [31,32]. Nurses play an important role in managing children with respiratory diseases. However, this role may vary depending on the healthcare infrastructure in different countries.

### International Nursing Practices in Respiratory Disease Management

In the Netherlands, in most General Practitioner (GP) clinics, practicing nurses (also, known as, General Practice Nurses) are employed. Their primary responsibility is to conduct structured management of diabetes and provide care to patients with COPD and bronchial asthma under the supervision of a GP. In primary healthcare, treatment and care for children with bronchial asthma in a general practice setting, conducted by a practicing nurse under the supervision of a GP, can lead to similar or even more effective asthma treatment outcomes [21,33].

In the United Kingdom (UK), public healthcare policy actively supports the expansion of nurses' competencies in areas such as prescribing medications by nurses and creating Nurse Practitioner positions [34]. Nursing phone consultations ensure the availability of primary care outside of regular working hours. The UK has a system of 24-hour nursing phone consultations. After two years of experience in the UK and Canada, the USA also introduced this service [35].

In Sweden, Primary Health Care specialists, whether GPs or nurses who are experts in bronchial asthma have demonstrated limited adherence to national guidelines [36]. However, a study conducted in Sweden deepens understanding of the important role of nursing telephone consultation in reducing the number of GP visits for respiratory infections and contributes to the reduction in the need for antibiotics. In Spain, clinical practice guidelines for pediatric asthma suggest assessing management indicators as well as patient education (checking the correct use of inhalers and assisting in creating a written action plan). Inadequate use of inhalers is the primary cause of unsuccessful treatment. Children who adhere to a symptom-based action plan are less likely to wake up at night, miss school, and visit emergency departments [37]. The health care of children and adolescents in so-called community health centers falls within the competence of pediatricians and nurses. However, not all pediatric teams have a pediatric nurse. In the study by Úbeda-Sansano M. I. et al [38], it was concluded that it is necessary to strengthen the teams of pediatricians and pediatric nurses in all primary healthcare centers, encouraging more active participation of nurses in caring for patients with bronchitis and bronchial asthma.

In the healthcare system of Kazakhstan, the diagnosis and treatment of respiratory diseases, including bronchial asthma in children, are part of the competence of a general practitioner. Nurses perform only a technical role, and the role of a nurse consultant is not involved. It is important to note that the healthcare system as a whole suffers from uneven distribution of medical personnel and inefficient use of nurses in practical work [41]. To introduce new nursing methods into the practice of healthcare in the Republic of Kazakhstan, including expanded responsibilities of nurses at the level of applied and academic education, a pilot project has been launched to introduce a new model of nursing service in healthcare institutions

## Conclusions

Currently, despite positive dynamics in medical science, there is a practical absence of research in Kazakhstan on evidence-based nursing practice and standard nursing operational procedures based on evidence, aimed at improving the quality of rehabilitation medical services. Therefore, there is a high demand for the development of a model that is comprehensive and integrated, considering the specific needs of this patient category.

This gap in research and practice in Kazakhstan highlights a crucial area for development and underscores the need for an evidence-based approach to nursing, especially in the field of respiratory diseases in children. This approach should not only integrate the latest scientific findings but also tailor them to the specific needs and context of the Kazakhstani healthcare system. The development and

(Order of the Minister of Health of the Republic of Kazakhstan No. 419 dated July 4, 2018 "On the introduction of a pilot project to introduce a new model of nursing service in healthcare organizations") [42]. Fifteen adapted clinical nursing guidelines have been developed in Kazakhstan [43]. However, guidelines have not yet been developed that would address the field of pediatrics, and diseases related to the pathology of the respiratory system.

Nursing for respiratory diseases in children is an indispensable part of primary health care and plays a crucial role in the prognosis of the pathology and improving the quality of life of patients. Respiratory diseases in children represent a serious medical challenge that demands competent and effective intervention. According to certain studies, nurses can often work more efficiently than doctors who are frequently distracted from caring for chronic patients by emergency matters.

In this context, nurses play a decisive role in providing information, support, raising awareness, motivation, understanding, and proper nursing assessment and care for children with respiratory diseases. Moreover, nurses are key in managing these diseases, establishing close connections with patients, helping to set specific treatment goals such as restoring normal activity (including physical exercise), improving lung function, and preventing recurrent attacks. Abroad, nurses develop individual plans and educate patients to ensure adherence to recommendations. Due to modern standardized diagnostic and treatment methods, as well as effective nursing care, the prognosis and quality of life for children with pulmonary diseases can be significantly improved.

Given that respiratory diseases are a leading cause of hospitalization of children in medical centers, primary care pediatric nurses must possess advanced assessment and management skills in this area at the treatment and recovery stages.

implementation of such a model could significantly contribute to the advancement of pediatric respiratory care in the country, ultimately leading to better patient outcomes and a higher standard of healthcare services.

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### Балалардағы тыныс алу жүйесінің ауруларын басқарудағы мейіргерлердің рөлі мен қатысуы

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#### Түйіндеме

Балалардың тыныс алу жүйесінің ауруларының өзіндік ерекшеліктері бар және диагностикалау, емдеу және күтім жасауда мамандандырылған тәсілдерді талап етеді. Көптеген елдерде осындай аурулары бар балаларға арналған мейіргерлік күтімді жетілдіру бағдарламалары әзірленіп, енгізілуде. Бұл медицина саласындағы мейіргер ісі мамандары үшін құнды тәжірибе көзі болуы мүмкін.

**Осы шолудың мақсаты** бастапқы деңгейдегі балалардың тыныс алу ауруларын емдеуде мейіргерлік істің рөлі туралы қазіргі уақытта бар деректерді сипаттау болды.

Зерттеу аясында 2012 жылдан 2023 жылға дейінгі кезеңде PubMed/Medline, CINAHL, Cochrane Database of Systematic Reviews, және ProQuest электрондық дерекқорларында әдебиет іздеу жүргізілді. Келесі негізгі түйін сөздер қолданылды: мейіргерлер, мейіргердің рөлі, бастапқы медициналық көмек, педиатрия, тыныс алу аурулары. Кірістіру критерийлеріне қаралған зерттеулер, соның ішінде сандық және сапалық зерттеулер, сондай-ақ аралас әдістермен зерттеулер кірді.

Көптеген зерттеулер мейіргерлердің науқастардың өмір сапасын жақсартуда, аурудың жедел эпизодтарының санын азайтуда және ауруханаға жатқызудың қажеттілігін төмендетуде маңызды ықпал ететінін көрсетеді. Бұл клиникалық протоколдарды тиімді пайдалану және өз білімдері мен дағдыларын үнемі жетілдіру арқылы жеткізіледі. Мейіргерлік іс мамандары әзірлеген білім беру бағдарламалары балалар мен олардың ата-аналары арасында ауру туралы хабардарлық деңгейін арттырады, сонымен қатар ингаляция әдістерін және жалпы ауруды басқаруды жақсырақ түсінуге ықпал етеді. Бұл мейіргерлердің білім және кеңес берудегі рөлінің маңыздылығын көрсетеді. Қорытындылай келе, ауқымды зерттеулер балалардағы тыныс алу жүйесінің ауруларын басқарудағы мейіргер күтімінің маңыздылығын қолдайды және денсаулық сақтау жүйесінде бұл рөлді одан әрі дамытудың қажеттілігін көрсетеді. Аталмыш саладағы мейіргерлердің құзіреттілігін күшейту және кеңейту респираторлық аурулармен ауыратын балаларға тиімді және сапалы көмек көрсетуге ықпал ете алады.

**Түйін сөздер:** мейіргерлік күтімі, алғашқы медициналық-санитарлық көмек, педиатрия, тыныс алу жүйесінің аурулары.

## Роль и участие медицинских сестер в управлении заболеваниями органов дыхания у детей

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### Резюме

Педиатрическая патология органов дыхания имеет свои особенности и требует специализированного подхода к диагностике, лечению и уходу. В многих странах разрабатываются и внедряются программы по оптимизации сестринского ухода для детей с подобными заболеваниями, что может послужить ценным источником опыта для медицинских провайдеров в области сестринского дела.

**Цель настоящего обзора** заключается в описать имеющиеся в настоящее время данные о роли медицинских сестер при заболеваниях органов дыхания у детей в условиях первичного звена.

Проведен поиск литературы в электронных базах данных PubMed/Medline, CINAHL, Cochrane Database of Systematic Reviews, ProQuest за период с 2012 по 2023 гг. При поиске использовались следующие ключевые поисковые запросы: медицинские сестры, роли медицинских сестер, первичная медицинская помощь, педиатрия, заболевания органов дыхания. Критериями включения были рецензируемые исследования, включая количественные и качественные исследования, а также исследования со смешанными методами.

Многочисленные исследования показывают, что медицинские сестры оказывают значительное влияние на улучшение качества жизни пациентов, уменьшая количество острых эпизодов заболеваний и снижая необходимость госпитализации. Это достигается благодаря эффективному использованию клинических протоколов и постоянному улучшению своих знаний и умений. Обучающие программы, разработанные медицинскими сестрами, повышают осведомленность детей и их родителей о заболеваниях, способствуя лучшему освоению техник ингаляции и общему контролю болезни. Это подчеркивает значимость роли медицинских сестер в образовательном процессе и консультационной поддержке. Таким образом, обширные исследования подтверждают важность сестринского ухода в управлении респираторными заболеваниями у детей и акцентируют внимание на необходимости дальнейшего развития этой роли в системе здравоохранения. Усиление и расширение компетенций медицинских сестер в этой сфере может способствовать более эффективному и качественному оказанию помощи детям с заболеваниями органов дыхания.

**Ключевые слова:** сестринский уход, первичная медико-санитарная помощь, педиатрия, заболевания органов дыхания.