Investigating the quality of life level in children with bronchial asthma: an updated systematic review of the literature

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PT and DDV reviewed literature, acquired and analyzed data. DDV helped in drafting the final version of the manuscript and revised it. All authors have read and agreed to the published version of the manuscript.

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Abbreviations
QoL, quality of life.

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Abstract
Objective: Asthma, like other chronic diseases, profoundly impacts the lives of affected children. This systematic review aims to investigate the quality of life of children with bronchial asthma and explore the extent of its impact on their daily lives and families.

Methods: We conducted a comprehensive search of relevant studies from various scientific databases up to June 2023. Our inclusion criteria focused solely on pediatric bronchial asthma, using keywords such as “kids”, “children”, “pediatric asthma”, “quality of life (QoL)”, “health” and “adolescents”. Results: Among the 5,766 articles retrieved from databases, we identified and included 13 studies published between 2015 and 2023, meeting the specific criteria for this review. Conclusions: The findings highlight several key aspects negatively affected by poor quality of life in children with asthma. These include physical activity, emotional well-being, school performance, and sleep quality. Effective asthma management, disease severity, and various environmental factors also play crucial roles in the quality of life of these children. Medical and nursing staff must offer comprehensive guidance to children with asthma and their families, providing them with psychoeducation to enhance their understanding of the medical condition and its implications. Equipping healthcare professionals with the necessary knowledge about the quality of life of these children is of paramount importance. It enables them to incorporate strategies into their medical and nursing care aimed at achieving and maintaining a lifestyle similar to that of healthy children, thereby promoting inclusive practices.

Keywords: quality of life; children; asthma; psychological burden
Background

The most prevalent chronic disease among children is bronchial asthma and its global frequency has been on the rise in recent years [1, 2]. Consequently, it has become one of the leading causes of school absences and emergency department visits for children. Interestingly, the prevalence differs between genders, with boys being more commonly affected before puberty, while girls tend to experience higher rates during adolescence [3]. Globally, asthma’s estimated incidence is approximately 7.2%, with 6% affecting adults and 10% affecting children, indicating that asthma now affects more children than adults [4].

Asthma is characterized as a chronic inflammation of the airways involving mast cells, eosinophils, T-lymphocytes, macrophages, neutrophils, and epithelial cells, all playing crucial roles [5]. This inflammatory condition can lead to heightened bronchial hyperreactivity, causing wheezing, apnea, chest pain and coughing episodes. These episodes are often accompanied by respiratory airflow obstruction, which can be reversible either spontaneously or with the assistance of pharmaceutical intervention [1].

After the completion of a large international epidemiological study (ISAAC) on the asthma and allergic diseases in children, it was observed that its frequency varies significantly from country to country but also in the different regions of the same state. Countries with a predominant Western lifestyle, such as the United Kingdom, Australia, New Zealand and the United States, showed a notably higher frequency of asthma, ranging from 20% to 35%. On the other hand, countries in Eastern Europe and Asia, which have lower development levels, recorded lower frequencies of asthma, typically around 3% to 5% [6]. The shift towards modern urban living and the proliferation of pollutants, along with the interior configurations of houses, contribute to the accumulation of allergic stimuli within living spaces [7]. This phenomenon is more pronounced in countries with high rates of bronchial asthma, like the United Kingdom, where approximately fifteen children succumb to the disease annually. Regarding Greece, based on available epidemiological data, childhood asthma is prevalent at a rate of 11%, and having an upward course and the maximum frequency is observed mostly at the age of five on average [3].

According to a large epidemiological study conducted in 155 sample clinics across six different countries, involving a sample of 463,800 children, the asthma rate was found to be between 20% and 30% of the child population. As for Greece, Priftis and his colleagues conducted three studies in 1978, 1991 and 1998, respectively, to investigate the incidence of childhood asthma in schools in Patras. These studies revealed that 6% of the population in this area suffered from asthma. However, more recent surveys conducted throughout Greece indicate a notable upward trend in the frequency of the disease, particularly among school-age children [4].

The objective of this systematic review is to examine the quality of life (QoL) of children with bronchial asthma and assess the extent to which the disease affects their daily lives and their families. The specific aims of the study are as follows: 1. to investigate the impact of bronchial asthma on the physical activity of affected children. This includes understanding the limitations, restrictions, and challenges they face in engaging in physical activities due to their condition. 2. To explore the emotional impact of bronchial asthma on both the affected children and their families. This involves examining the psychological well-being, emotional struggles, and coping mechanisms of children with asthma. By addressing these objectives, the systematic review aims to provide valuable insights into the overall QoL of children with bronchial asthma and contribute to better understanding and managing the disease’s impact on both the children and their families.

Methods

Search strategy and selection of studies for inclusion

In the absence of a review protocol in the Prospective Register of Ongoing Systematic Reviews (PROSPERO) regarding pediatric bronchial asthma and its psychological burden on children, adolescents and their families, a systematic review of all published articles was carried out following the PRISMA guidelines guided by basic search principles [8, 9]. The review process involved searching for relevant studies in multiple databases, including PubMed, PsycINFO, Web of Science, Scopus, Cochrane, CINAHL, Wiley Online Library, TDX and DIALNET. Additionally, the Google Scholar database was searched for gray literature. The search strategy used combinations of various terms and keywords in both Greek and English languages. The Greek language terms included: “children”, “adolescents”, “pediatric patients”, “asthma”, “pediatric asthma”, “bronchial asthma”, “quality of life” and “health”. The English language terms used were: “kids”, “children”, “adolescents”, “pediatric patients”, “asthma”, “pediatric asthma”, “bronchial asthma”, “quality of life (QoL)” and “health”. Furthermore, the international terms also consistent with those found absent from the catalogs MeSH (http://www.ncbi.nlm.nih.gov/mesh).

In this systematic review, a total of 5,766 articles were identified through the database search process. After screening and applying inclusion criteria, 13 studies were selected for inclusion in the review. These selected studies were published between the years 2015 and 2023. The inclusion criteria specified that the studies had to be peer-reviewed publications, published in any language, and must have quantified the psychological burden experienced by children with bronchial asthma and their families (Figure 1).

Results

The study conducted by Maher Khour and al. aimed to assess the QoL and identify potential risk factors for poor QoL among 132 children and adolescents with asthma [10]. The participants were recruited from outpatient clinics in Ramallah and Hebron, West Bank and Palestine. Among the participants, 47 patients (35.6%) had controlled asthma, while 85 patients (64.3%) had uncontrolled asthma. When compared to uncontrolled asthma individuals, participants with controlled asthma had improved QoL and scored significantly higher in the symptom domain (P = 0.002), activity domain (P = 0.004), emotional domain (P = 0.002), and overall pediatric asthma quality

Figure 1 PRISMA flow diagram
of life scores ($p = 0.002$). In general, the results of the present study showed that in children and adolescents, uncontrolled asthma, disease severity, and previously hospitalized patients were associated with poor QoL.

The research conducted by Agrawal et al. aimed to investigate whether there is a correlation between the presence and severity of asthma and the QoL of African American children from low socioeconomic backgrounds [11]. The study took place at the National Children’s Hospital of Washington and involved 66 children aged 9 to 12 years. The sample was divided into two groups: one group comprised 36 children who had asthma, while the other group included 30 children who may have had other diseases but not asthma. The findings of the research indicated that children with asthma and their parents presented lower QoL compared to the children without asthma. This suggests that the presence of asthma has a negative impact on the QoL of both the affected children and their parents. Interestingly, the study also observed that among the children with asthma, those with milder forms of the condition had a higher QoL compared to those with more severe asthma symptoms. Additionally, children with asthma whose parents had a university education (graduate parents) also exhibited a higher QoL.

The clinical trial conducted by Montalbano et al. aimed to investigate the impact of educational programs delivered through a phone application on the QoL of children with moderate asthma [12]. The study included a sample of 47 children aged between 6 to 11 years who had been diagnosed with moderate asthma. The results of the trial supported the researchers’ hypothesis, as they found that implementing educational programs through a phone application led to a significant improvement in the QoL of the participating children. The intervention provided through the phone application likely offered valuable information, guidance, and support to the children and their families, leading to better asthma management and overall well-being.

Banjari et al. through their research sought to identify the relationship between asthma control and QoL in children with asthma [13]. The research was conducted in Jeddah, Saudi Arabia, and involved a sample of 106 children who had been diagnosed with bronchial asthma. The findings of this study revealed that children with uncontrolled asthma experienced significantly lower QoL. The negative impact of uncontrolled asthma was observed across all psychosocial domains of their lives, including activity, symptoms, and emotional function. On the other hand, the research conducted by Furtado et al. sought to investigate the correlation between QoL, asthma severity, sleep disorders, and physical activity in 48 children with asthma aged between 7 and 12 years from Natal, Brazil [14]. The results of this study demonstrated that disease severity, sleep quality, and shortness of breath after exercise were all factors that affected the QoL of children with asthma. These findings suggest that the disease severity, sleep quality and shortness of breath after exercise affect the QoL of children with asthma.

The research conducted by Hallit et al. aimed to identify the factors that may influence the QoL of children with asthma [15]. The study involved 300 children aged between 7 and 16 years, from a clinic exclusively for pediatric asthmatic patients and from schools of various cities in Lebanon. The findings of the study led the researchers to conclude that disease management is the primary factor affecting the QoL of these children. Additionally, the presence of certain risk factors was associated with lower QoL in these children. Specifically, having pets at home and experiencing respiratory infections during early childhood (before the age of 5 years) were identified as potential risk factors contributing to reduced QoL in children with asthma.

Kouzegaran et al. investigated the various dimensions of the QoL of children with asthma in the city of Mashhad, Iran [16]. The sample of 200 children, age range 8–12 years old, were divided into two equal groups. In the first group, they have been assigned healthy children and in the second group, children suffering from bronchial asthma. The comparison of the two groups showed that children with asthma had lower QoL compared to physically healthy children’s activity, psychological status, and school performance.

Stridsman et al. investigated differences in asthma and QoL of adolescents depending on the management and severity of the disease between the two genders [17]. The sample consisted of children aged 14–15 years from Northern Sweden which were divided into two groups. One had 128 girls and the other had 119 boys. The comparison of the two groups made clear that uncontrolled asthma as well as low QoL are found in a higher percentage in girls than in boys.

The study conducted by Kalvyta et al. aimed to investigate how various factors, including age, sex, severity, and duration of asthma, as well as exposure to parental smoking, may affect the QoL of children with asthma [18]. The study involved 173 children aged between 8 and 12 years. The participants were selected from the Pediatric Asthma Unit of the AHEPA University General Hospital of Thessaloniki and 10 private clinics in Northern Greece. After analyzing the results, the researchers reached several important conclusions. They found that the severity of asthma was negatively correlated with the QoL of the children. Furthermore, exposure to parental smoking was linked to increased asthma symptoms, problems in treatment management, and higher levels of anxiety among the children.

Manion & Velsor-Friedrich in a study they conducted, in 2017, in Chicago compared pediatric asthmatic patients by body weight in order to examine whether obesity may affect the quality of their lives [19]. Of the 90 children who participated, aged 9–14, 36 were overweight or obese based on their body mass index. During the conduct of the study, it appeared that obese children suffered from severe asthma and were the ones with the highest number of hospitalizations. Finally, despite everything argued by the researchers, what was identified was that obesity combined with asthma did not affect the QoL of these children until disease severity was taken into consideration. It appeared, that this seriousness of asthma affects the QoL of obese asthmatic children in comparison to children with average weight.

In the longitudinal study by Li et al. in Florida (US), researchers examined whether the quality of a night’s sleep affects asthma control and QoL of asthmatic children, aged 8–17 years [20]. After an extensive analysis of the results obtained, the researchers concluded that insufficient control of the disease is associated with poorer sleep quality, poorer QoL, and severe sleepiness during the day. Poor night sleep quality, solely, was not found to affect the QoL of asthmatic children.

Miadich et al. investigated the possibility of differences in QoL of children with asthma by age [21]. The children who participated were 215, aged from 5–12 years old. The results showed that the severity of asthma affects children’s everyday life, and therefore their QoL, as they grow older. Specifically, of all the children who suffered from severe asthma, the older ones had lower QoL compared to the younger ones.

Taminskie et al. in their cross-sectional study, in light of the fact that asthma management significantly affects QoL of children, attempted to investigate the negative effect of other environmental factors such as passive smoking, humidity, children’s contact with domestic animals (dogs, cats) etc. [22]. The sample of 553 children, aged 2–16 years, was selected from various primary and secondary health care structures in Scotland. The main finding of the research indicated that factors that could easily be avoidable (e.g., passive smoking) or treatable coexisting diseases (e.g., allergic rhinitis) can have a negative impact on the overall children’s QoL.

**Tools for measuring the QoL of children with bronchial asthma**

The majority of the psychometric tools assessing the QoL of asthmatic children take into consideration several other factors such as the quality of sleep, body weight, physical activity etc., indicating the multifaceted nature of the disease. Table 1 presents the assessment tools used by the authors of the selected studies.

**Discussion**

The thorough analysis of the research articles selected for this
Table 1: Research tools measuring quality of life of children with bronchial asthma

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<tr>
<th>Author</th>
<th>Research tool</th>
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<tbody>
<tr>
<td>Maher Khoudor et al., 2022</td>
<td>PAQLQ</td>
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<td>Agrawal et al., 2020</td>
<td>PedsDLQ</td>
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<td>Montalbano et al., 2019</td>
<td>PAQLQ</td>
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<td>Banjari et al., 2018</td>
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<td>Furtado et al., 2018</td>
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<td>Hallit et al., 2018</td>
<td>Mini-PAQLQ</td>
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<td>Kouzegaran et al., 2018</td>
<td>pedQLTM</td>
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<td>Stridsman et al., 2017</td>
<td>DISABKIDS HRQoL</td>
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<td>Kalyva et al., 2016</td>
<td>PedsQL3</td>
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<td>Manion &amp; Velsor-Friedrich, 2016</td>
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<td>Li et al., 2016</td>
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systematic review of the literature in order to investigate the impact of bronchial asthma on children's QoL indicates that the disease can have a significantly negative impact on patients as well as on the entire family. The assessment of children's QoL with asthma encompassed various aspects, including physical activity, emotional state, school performance, social life and sleep quality. This multidimensional approach highlights the complex nature of the disease and underscores the importance of comprehensive management and control strategies that address biological, psychological and social factors contributing to the overall low QoL.

According to Agrawal et al., children with asthma experience a significantly lower quality of physical activity [11]. This might be attributed to cases with inadequate control or severe asthma [13, 16]. Additionally, Furtado et al. noted a direct correlation between low QoL and instances of breathlessness after exercise [14]. The mentioned study also highlighted that activities such as running, climbing, and playing football caused the most discomfort in children. Finally, while many children are willing to participate in these activities, they tend to avoid them due to their parents' fear of an asthma attack.

Regarding the emotional state of children with asthma, Kouzegaran et al. concluded that asthma is correlated with lower QoL compared to that of healthy children [16]. On the other hand, Banjari et al. did not detect differences comparing asthmatic and healthy children [13].

The social life of children with asthma and how much it is affected by the disease seems to have been investigated by Banjari et al., Kouzegaran et al. and Agrawal et al., who concluded that one does not affect the other [11, 13, 16]. Asthma does not appear to have a negative impact on the school performance of children who are sick, according to Agrawal et al. [11]. In contrast, Kouzegaran et al. concluded that children with asthma struggled in school compared to healthy children [16].

Regarding sleep quality, there is agreement between the research of Furtado et al. and Li et al. [14, 20]. Specifically, the two studies argue that the existence of sleep disorders cannot individually disturb the general QoL, but only when combined with other factors such as asthma management etc.

The main factors that affect either positively or negatively on the QoL asthmatic children are asthma management, asthma severity and various environmental factors, without, however, being the only ones.

The QoL of children with asthma is understood to be significantly affected by the management of the disease as seen in the studies of Hallit et al., by Taminskiene et al., by Furtado et al. and Banjari et al. [13–15, 22]. That is, the better the asthma management, the higher the level of QoL.

The severity of asthma appears to be a crucial factor influencing the QoL, as indicated by the conclusions of studies specifically focused on this aspect. Specifically, Hallit et al. concluded that the asthma symptoms and the emotional state of asthmatic children are directly affected by the severity of the disease [15]. They further concluded that the milder the asthma, the better the children's QoL and vice versa. This finding is consistent with the results reported by Agrawal et al., Furtado et al. and Kalyva et al. [11, 14, 18]. These studies also supported the notion that better asthma control is associated with an improved QoL for affected children.

According to Taminskiene et al. and Montalbano et al., the systematic exposure of asthmatic children to a smoking environment negatively affects the quality of their lives [12, 22].

Regarding the gender differences among children with asthma, conflicting outcomes are apparent. Hallit et al. and Taminskiene et al. argued that gender is not correlated with QoL [15, 22]. On the other hand, Kouzegaran et al. observed that girls with asthma have a higher QoL than boys [16]. However, the research of Stridsman et al., which involved only adolescents, concluded that girls of this age group had a lower QoL than boys [17].

The children’s age did not appear to affect their QoL according to Hallit et al. and Kalyva et al. [15, 18]. In contrast, Miadich et al. concluded that older children with severe asthma had lower QoL than the younger as their obligations and obstacles multiplied their daily life [21].

The research of Taminskiene et al. highlighted that obesity further complicates the condition [22]. However, Manion & Velsor-Friedrich failed to demonstrate a correlation between the QoL of children with asthma and their weight [19].

Moreover, Taminskiene et al. indicates that coexisting rhinitis contributes to a decline in the QoL of children with asthma as it intensifies the symptoms and, often, leads them to emotional breakdown [22].

The investigations of Hallit et al., by Banjari et al., by Agrawal et al. and of Li et al. came to the same conclusion regarding the effect of the formative level of parents in the QoL of their asthmatic children [11, 13, 15, 20]. Specifically, parents with a high level of education may positively influence the overall QoL of their children.

Additionally, a positive factor influencing the level of QoL of children with asthma appeared to be the socio-economic robustness of their families, according to studies by Taminskiene et al. and Banjari et al. [13, 22].

Finally, better management results in an overall increase in the QoL of children with asthma, as demonstrated by Montalbano et al., and thus information provision, targeted interventions which adopt and focus on the biopsychosocial implications of pediatric asthma are more than important [12].

Conclusion

In conclusion, the present study highlights that the QoL of children with bronchial asthma is influenced not only by the disease itself but also by various environmental and external factors. The medical and nursing staff’s objective should be to guide these children and their families towards achieving a carefree and productive everyday life. However, this goal necessitates a comprehensive understanding of the areas of these children’s QoL that might be potentially affected. Focusing on identifying the factors that negatively impact their condition will be crucial in providing effective support and management for children with asthma to improve their overall well-being.

The contradictions found in the analysis of the studies underscore the need for further research in this field. Specifically, highlight the importance of studying the biopsychosocial determinants of asthma, whereas the complete absence of relevant studies in Greece raises issues to the management of asthmatic children within the country.

Absolutely, in-depth knowledge of the QoL factors related to children with asthma can significantly enhance the competence of health professionals in providing targeted medical and nursing care practices as well as develop better methods and strategies for the achievement and maintenance of higher levels of physical activity,
increased quality of sleep, emotional stability and enhanced social life; components that seem to be of major importance for children with asthma and their families.

References


