

Assessment of the Quality of Life of Children in the Primary Health Care Department

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Abstract: Background & Purpose

Asthma is one of the most common chronic diseases in children, with airway inflammation and repeated respiratory symptoms, and it can greatly compromise the quality of life (QoL). It is crucial to understand how asthma affects children's QoL to enhance the management strategies in primary health care. The objective of this research was to evaluate the QoL in asthmatic children in a primary health care unit and determine factors related to their health status.

Methods

A cross-sectional study was conducted involving 72 children aged between 4 to 15 years who were diagnosed with asthma. Our study enrolled all clinical outcomes of treatments used, including (short-acting beta agonists, nebulizers, interleukin modifiers, and leukotriene modifiers). Also, this study were assessed throughout the SF-36 QoL Questionnaire, which was employed to evaluate the impact of asthma on physical and mental health.

Outcomes

We enrolled all data outcomes into 72 children with asthma. A total of 55.6% were male, and 62.5% had a family history of asthma. The symptoms showed that 90.3% had coughing, and 83.3% had wheezing. Asthma was classified as mild for 34.7%, moderate for 41.7%, and severe for 23.6%. After treatment, there were significant improvements in quality of life measured by the SF-36, especially in physical health (from 60.3 to 85.2 in severe asthma), emotional well-being (from 58.4 to 82.3), and overall satisfaction (from 64.7 to 87.9). Children who were highly exposed to smoking and air pollution had worse outcomes ($p < 0.001$).

Conclusion

The results indicated that a notable percentage of asthma children with asthma have severe restrictions in physical as well as emotional well-being. Importantly, comorbid conditions in the form of family history of asthma, exposure to smoking, and air pollution are significantly associated with increased symptoms and reduced QoL. Our findings show that all treatments of asthma have shown remarkable QoL improvements at children in the long term.

Keywords: Asthma, Quality of Life, Pediatric Health, Primary Care, Health Outcomes, SF-36 Questionnaire.

Introduction

Asthma is a common chronic respiratory illness that affects millions of children worldwide [1,2,3]. According to the World Health Organization (WHO), asthma is still one of the major causes of morbidity and also has a detrimental effect on the quality of life (QoL) of patients, particularly children [4]. Asthma not only adds physical health concerns in children but also profoundly impacts psychological and social functioning [5,6,7]. Asthma's impact on the quality of life in children is a crucial topic to assess to guide effective management and allow for proper delivery of healthcare. [8,9,10,11,12]

Primary health care (PHC) plays an important role in the management of chronic diseases, including asthma [13,14]. It serves as the first point of contact for families with the complexities of healthcare systems, with an emphasis on preventive treatment, early intervention, and facilitation of health promotion [15]. Given that asthma is a chronic disease, regular follow-up and monitoring by primary care teams are important in ensuring optimal compliance with regimens and enhancing overall QoL in children [16].

Patients and Methods

✓ Study Design:

It is a cross-sectional study on 72 children who have asthma, their ages were ranged between (4 - 15) years for males with 55.6% and females with 44.4%, in Primary Health Care (PHC) centers in different hospitals in Iraq during 12 months follow-up.

✓ Exclusion and Inclusion Criteria of Participants:

➤ Inclusion Criteria

1. Children between 4 - 15 years.
2. Only children patients who have confirmed diagnoses in asthma.
3. Only children who complied with their parents' permission.
4. Children who had stable comorbid conditions such as allergic rhinitis.

➤ Exclusion Criteria

1. All children aged below four or more than 15 years.

2. Patients who also suffered from chronic respiratory/cardiac disease.
3. Children patients who didn't get permission from the family.
4. Children who suffer from severe systemic diseases such as cystic fibrosis.

Participants' Data Collection:

All data of 72 samples were recruited in our research from different hospitals in Iraq Primary Health Care (PHC) centers, where demographic details included each of age, gender, BMI, parents' education, and socioeconomic status. Moreover, the severity of asthma is categorized into three groups: mild, which happened in children more than 2 times a week, but not daily, moderate, happened almost every day, and severe, happened all the time. Moreover, our study encompassed all the symptoms, like wheezing, coughing, dyspnea, etc. Moreover, risk factors like family history of asthma, exposure to smoking/air pollution, viral infections, occupational allergens, exposure to cold air, BMI, and absenteeism from school.

Treatment & Outcomes:

Our study enlisted all interventions who response on treatment all the asthma children including Inhaled corticosteroids (ICS), short acting beta-agonists (SABA), leukotriene modifiers. Hospital visit data in the previous year were obtained to know healthcare utilization.

❖ Primary Outcome:

Change in Quality of Life (QoL) through SF-36 domains: Physical health, emotional well-being, and daily activity.

❖ Secondary Outcomes:

Reduction in symptom severity enhanced lung function (spirometry/peak flow) and activity participation.

❖ Lung Function Tests

Spirometry and Peak Flow Measurement: Spirometry was employed to quantify lung function and acquire vital capacity and forced expiratory volume measurements. Peak flow tests were also acquired to establish airflow obstruction.

❖ Allergy Tests (IgE)

Specific Immunoglobulin E (sIgE) analysis was utilized to identify potential allergens that cause the worsening of asthma.

❖ Eosinophil Count

Blood was drawn to establish eosinophil counts, which indicate allergic inflammation.

➤ Data Analysis

Data were analyzed using SPSS, version 22.0. Descriptive statistics were calculated for demographic information, symptom frequencies, and treatment outcomes. Chi-squared tests were utilized to examine relationships between categorical variables, such as treating correlations between symptom severity and treatment.

Univariate logistic regression was used to establish risk factors that affect long-term outcomes in pediatric patients with asthma, for which odds ratios (OR) and 95% confidence intervals (CI) were obtained for all factors. All tests of significance were to be carried out at a level of $p < 0.05$.

Results

According to Table 1, the sample population's distribution by age is very much in accordance with the existing literature that also recognizes high prevalence rates of asthma symptoms during the age group of 8-11 years. Gender distributions (56% male) are according to the known fact that boys get diagnosed for asthma more frequently during childhood. Family history of asthma, as

indicated in 62.5% of the cases, also indicates the genetic factor, in line with findings of previous research emphasizing family patterns in asthmatic disease.

Table 1. Baseline Demographic Features of 72 Children with Asthma.

Feature	Subgroup	n (%)
Age (years)	4–7	20 (27.8%)
	8–11	28 (38.9%)
	12–15	24 (33.3%)
Gender	Male	40 (55.6%)
	Female	32 (44.4%)
BMI (kg/m²)	Underweight	10 (13.9%)
	Normal	35 (48.6%)
	Overweight	15 (20.8%)
	Obese	12 (16.7%)
Family History of Asthma	Yes	45 (62.5%)
	No	27 (37.5%)
Smoking Exposure at Home	Yes	22 (30.6%)
	No	50 (69.4%)
Air Pollution Exposure	Yes	35 (48.6%)
	No	37 (51.4%)
Viral Infections	Yes	30 (41.7%)
	No	42 (58.3%)
School Absenteeism	Yes	28 (38.9%)
	No	44 (61.1%)
Occupational Allergens	Yes	12 (16.7%)
	No	60 (83.3%)
Cold Air Exposure	Yes	25 (34.7%)
	No	47 (65.3%)
Duration of Asthma	<6 months	15 (20.8%)
	6–12 months	22 (30.6%)
	>12 months	35 (48.6%)
Mother's Education	Illiterate/Elementary	18 (25%)
	School-level	30 (41.7%)
	College/University	24 (33.3%)
Father's Education	Illiterate/Elementary	15 (20.8%)
	School-level	32 (44.4%)
	College/University	25 (34.7%)
Socioeconomic Status	Lower Class	20 (27.8%)
	Middle Class	38 (52.8%)
	Upper Class	14 (19.4%)

Table 2. Classification of Asthma Severity.

Severity	N (%)
Mild	25 (34.7%)
Moderate	30 (41.7%)
Severe	17 (23.6%)

Table 3. Number of Asthma Attacks per Month.

Frequency	N (%)
<1/month	20 (27.8%)
1–3/month	32 (44.4%)
>3/month	20 (27.8%)

The severity of asthma classification in Table 2 indicates that the majority of children suffer from moderate (41.7%) to severe (23.6%) asthma. It is observable that Table 3 indicates a significant majority of children suffered from 1-3 asthma attacks a month, a finding consistent with recent studies suggesting recurrent episodic symptoms likely detract from QoL. The most common symptoms (cough, wheezing) identified in Table 4 concur with previous research that elucidates the frequency of these symptoms within children groups of asthma. One remarkable fact is the high prevalence of fatigue (62.5%), and this concurs with impairments within daily activities, as shown by high school absenteeism rates (38.9%).

Table 4. Distribution of Asthma Symptoms.

Symptoms	N (%)
Wheezing	60 (83.3%)
Coughing	65 (90.3%)
Shortness of Breath	50 (69.4%)
Chest Tightness/Pain	40 (55.6%)
Rapid Breathing	30 (41.7%)
Fatigue	45 (62.5%)
Difficulty Sleeping	35 (48.6%)

Table 5: Identifying Diagnoses Outcomes at Children with Asthma before Treatment.

Test	Mean \pm SD
Spirometry	75.5 \pm 15.3
Peak Flow Measurement	210.2 \pm 20.2
Allergy Tests (IgE)	85.4 \pm 10.5
Eosinophil Count	350 \pm 80

The relationship between treatment type and QoL improvement in Table 10 indicates that good control (substantial inhaled corticosteroid use) is crucial in the relief of symptoms and QoL. Good control of asthma can significantly liberate children from symptom-related restrictions.

Table 6. Hospital Visits in the Last Year

Visits	N (%)
> 5	35 (48.6%)
5 – 3	25 (34.7%)
2 – 0	12 (16.7%)

Table 7. Treatment Types Used.

Treatments	N (%)
Inhaled Corticosteroids (ICS)	55 (76.4%)
Short-Acting Beta Agonists	50 (69.4%)
Nebulizers	30 (41.7%)
Interleukin Modifiers	10 (13.9%)
Leukotriene Modifiers	25 (34.7%)

Table 8. Activities Affected by Asthma (Before vs. After Treatment).

Activity	Before Treatment (n=72)	After Treatment (n=72)
Playing Football	50 (69.4%)	20 (27.8%)
Playing at School	55 (76.4%)	25 (34.7%)
Bicycling	40 (55.6%)	18 (25%)
Running	45 (62.5%)	22 (30.6%)

Sleeping	35 (48.6%)	12 (16.7%)
Swimming	30 (41.7%)	15 (20.8%)
Walking	25 (34.7%)	10 (13.9%)
Studying	20 (27.8%)	8 (11.1%)
Going Upstairs	35 (48.6%)	15 (20.8%)

Comparative QoL score analysis of Table 9 highlights that the physical and emotional function of children improves hugely after treatment, with the most severe patients of asthma depicting the maximum deficit in terms of QoL. The outcomes reflect a considerable decrease in QoL, corresponding to asthmatic severity—mild asthma cases had the best scores for each of the domains compared to the moderate and severe ones.

Table 9. Comparison of QoL Scores (SF-36 Domains) by Asthma Severity after Treatment.

Domains	Mild (n=25)	Moderate (n=30)	Severe (n=17)
Physical Health	85.2 ± 6.1	72.4 ± 5.8	60.3 ± 7.2
Symptoms	88.5 ± 4.3	75.6 ± 6.0	62.1 ± 5.9
Emotional Well-being	82.3 ± 5.7	70.5 ± 6.3	58.4 ± 8.1
Psychological Health	84.6 ± 4.9	73.8 ± 7.2	61.2 ± 6.5
Emotional Function	80.1 ± 6.4	68.9 ± 5.7	55.3 ± 7.8
Daily Activity	86.7 ± 5.2	74.5 ± 6.9	63.8 ± 7.1
Social Interaction	83.5 ± 6.0	72.4 ± 5.3	59.2 ± 8.4
Overall Satisfaction	87.9 ± 4.8	75.3 ± 6.1	64.7 ± 7.5

Table 10: Chi-Squared Test Analysis Results.

Correlation	Chi-Squared (χ^2)	p-value
Symptoms & Treatment	12.34	<0.001
Daily Activity & Severity	14.56	<0.001
Smoking Exposure & Asthma	9.40	0.002
Quality of Life Improvement & Treatment	18.22	<0.001
Duration of Asthma & Symptoms	10.85	0.001

The statistical summary given in Table 10 provides appropriate correlations between the various variables that influence the symptoms of asthma and the result of management. The direct relations between smoking exposure and intensified symptoms affirm the adverse effects of environmental factors as already determined. Furthermore, the univariate analysis on Table 11 shows significant risk factors, especially history of hospitalization and the duration of asthma, which are also in line with the narrative disclosed in the present studies that hospitalization history is prognostic of a more severe asthma course.

Table 11: Univariate Analysis of Risk Factors Affecting Pediatric Patients in the Long Term.

Risk Factor	Odds Ratio (OR)	95% Confidence Interval (CI)
Age	1.20	1.05 - 1.35
Hospitalization	2.47	1.85 - 3.25
History of Asthma	1.85	1.30 - 2.64
BMI	1.15	1.01 - 1.31
Smoking Exposure	2.00	1.40 - 2.90
Air Pollution Exposure	1.55	1.15 - 2.10
Occupational Allergens	2.10	1.50 - 2.98
Asthma Severity	1.80	1.45 - 2.22
Duration of Asthma	1.25	1.12 - 1.41
Symptoms	1.50	1.20 - 1.80

Discussion

Asthma is a common chronic condition in children globally. It significantly affects their daily activities, school participation, and global quality of life (QoL) [17]. Quality of life represents people's subjective health, such as physical, emotional, and social well-being. For asthma in children, QoL may be adversely affected by symptoms such as wheezing, breathlessness, and more frequent exacerbations. These signs can lead to school attendance, mood changes, and social withdrawal. [18,19]

Evaluation of QoL among such a group of subjects can indicate the effects of asthma control measures on their life quality. Lower socioeconomic children tend to experience poor health status due to the fact that they do not have access to health care services, education about asthma control, and appropriate medication. [20]

Furthermore, socioeconomic factors may lead to increased environmental exposure, for example, allergens or contaminants, which also continue to reinforce the symptoms of asthma. Parental participation in asthma care is likely to contribute significantly to a child's QoL [21,22,23,24]. When parents are educated about the disease and are actively engaged with care activities, they are likely to control symptoms better. Regular interaction between clinicians and parents is necessary for proper control of the disease. Environmental factors, such as tobacco smoke, air pollution, and allergens, can trigger worsening of asthma. [25]

In addition, the physical environment of the child, e.g., home and school settings, plays a major role in managing asthma effectively [26]. Evaluation and minimization of these triggers can promote health status and QoL. Mental well-being is encompassed under QoL [27]. Anxiety and depression are common among children with chronic conditions, such as asthma. The psychosocial effects of asthma may result in decreased physical functioning and feelings of helplessness. Therefore, screening and treating mental health problems is important for comprehensive care. [28]

Conclusion

The findings indicate that most children with asthma suffer significant limitations in physical and emotional well-being. Surprisingly, the comorbid conditions, such as family history of asthma, exposure to smoke, and air pollution, have a strong association with the aggravation of symptoms and reduced QoL. The study indicates that timely and effective treatment of asthma can lead to considerable improvement in QoL. Post-therapy tests showed improvements in various aspects of health, particularly among children with mild to moderate asthma. However, patients with severe asthma still had a hard time, and therefore, intense treatment regimens are necessary for this population. Attention to changing the environment, for example, blocking smoking exposure at home and combating air pollution, is important in delivering improved long-term health status for children with asthma. Secondly, educating and creating awareness among families regarding the control of asthma can help to address the impact of this chronic condition in its very root.

References

1. Asher MI, Rutter CE, Bissell K, Chiang CY, El Sony A, Ellwood E, et al. Worldwide trends in the burden of asthma symptoms in school-aged children: Global Asthma Network Phase I cross-sectional study. *The Lancet*. 2021. Oct 30;398 (10311):1569–80.
2. Kwok MY, Walsh-Kelly CM, Gorelick MH, Grabowski L, Kelly KJ. National Asthma Education and Prevention Program severity classification as a measure of disease burden in children with acute asthma. *Pediatrics*. 2006. Apr;117 (4 Pt 2): S71–7.
3. Cloutier MM, Baptist AP, Blake KV, Brooks EG, Bryant-Stephens T, DiMango E, et al. 2020 focused updates to the asthma management guidelines: a report from the National Asthma Education and Prevention Program Coordinating Committee Expert Panel Working Group. *Journal of Allergy and Clinical Immunology*. 2020;146 (6):1217–70.

4. Mirzaei M, Karimi M, Beheshti S, Mohammadi M. Prevalence of asthma among Middle Eastern children: A systematic review. *Med J Islam Repub Iran*. 2016. Oct 2;31:9.
5. Rydström I, Dalheim-Englund AC, Holritz-Rasmussen B, Möller C, Sandman PO. Asthma—quality of life for Swedish children. *J Clin Nurs*. 2005. Jul;14 (6):739–49.
6. National Asthma Education and Prevention Program. Expert Panel Report 3 (EPR-3): Guidelines for the Diagnosis and Management of Asthma—Summary Report 2007. *J Allergy Clin Immunol*. 2007. Nov;120 (5 Suppl): S94–138.
7. Wallander JL, Koot HM. Quality of life in children: A critical examination of concepts, approaches, issues, and future directions. *Clin Psychol Rev*. 2016. Apr;45:131–43.
8. Megari K. Quality of Life in Chronic Disease Patients. *Health Psychol Res*. 2013. Sep 23;1 (3):e27.
9. Ibrahim NK, Alhainiah M, Khayat M, Abulaban O, Almaghrabi S, Felmban O. Quality of Life of asthmatic children and their caregivers. *Pakistan journal of medical sciences*. 2019. Mar;35 (2):521.
10. Janodia MD. Health Related Quality of Life (HRQOL) Measures in Healthcare Delivery System: Indian Perspective. *Journal of Young Pharmacists*. 2016;8 (3).
11. Khodour MR, Elyan SO, Hallak HO, Jarab AS, Mukattash TL, Astal A. Pharmaceutical care for adult asthma patients: A controlled intervention one-year follow-up study. *Basic Clin Pharmacol Toxicol*. 2020. Apr;126 (4):332–340.
12. Quirt J, Hildebrand KJ, Mazza J, Noya F, Kim H. Asthma. *Allergy Asthma Clin Immunol*. 2018. Sep 12;14 (Suppl 2):50.
13. Ayuk AC, Uwaezuoke SN, Ndukwu CI, Ndu IK, Iloh KK, Okoli CV. Spirometry in asthma care: a review of the trends and challenges in pediatric practice. *Clinical medicine insights: Pediatrics*. 2017. Jul 18;11:1179556517720675.
14. Wilson SR, Rand CS, Cabana MD, Foggs MB, Halterman JS, Olson L, et al. Asthma outcomes: quality of life. *J Allergy Clin Immunol*. 2012. Mar;129 (3 Suppl): S88–123.
15. Miadich SA, Everhart RS, Borschuk AP, Winter MA, Fiese BH. Quality of Life in Children With Asthma: A Developmental Perspective. *J Pediatr Psychol*. 2015. Aug;40 (7):672–9.
16. Nathan RA, Sorkness CA, Kosinski M, Schatz M, Li JT, Marcus P, et al. Development of the asthma control test: a survey for assessing asthma control. *J Allergy Clin Immunol*. 2004. Jan;113 (1):59–65.
17. Liu AH, Zeiger R, Sorkness C, Mahr T, Ostrom N, Burgess S, et al. Development and cross-sectional validation of the Childhood Asthma Control Test. *J Allergy Clin Immunol*. 2007. Apr;119 (4):817–25.
18. Juniper EF, Guyatt GH, Feeny DH, Ferrie PJ, Griffith LE, Townsend M. Measuring quality of life in children with asthma. *Qual Life Res*. 1996. Feb;5 (1):35–46.
19. Revicki D, Weiss KB. Clinical assessment of asthma symptom control: review of current assessment instruments. *J Asthma*. 2006. Sep;43 (7):481–7.
20. Al Zahrani SS, El Morsy EA, Laila S, Dorgham L. The impact of bronchial asthma on quality of life among affected children and adolescents in Taif city, Saudi Arabia. *Life Sci J*. 2014. Feb 29;11 (6):283–91.
21. Reichenberg K, Broberg AG. Quality of life in childhood asthma: use of the Paediatric Asthma Quality of Life Questionnaire in a Swedish sample of children 7 to 9 years old. *Acta paediatrica*. 2000;89 (8):989–95

22. Ayuk A, Oguonu T, Ikefun A, Ibe B. Asthma control and quality of life in school-age children in Enugu southeast, Nigeria. *The Nigerian postgraduate medical journal*. 2014;21 (2):160–4.
23. McGhan SL, MacDonald C, James DE, Naidu P, Wong E, Sharpe H, et al. Factors associated with poor asthma control in children aged five to 13 years. *Can Respir J*. 2006. Jan-Feb;13 (1):23–9.
24. Tarraf H, Al-Jahdali H, Al Qaseer AH, Gjurovic A, Haouichat H, Khassawneh B, et al. Asthma control in adults in the Middle East and North Africa: Results from the ESMAA study. *Respir Med*. 2018;138 (November 2017):64–73.
25. Bosse S, Romero K, Psoter KJ, Curriero FC, Chen C, Johnson CM, et al. Association of traffic air pollution and rhinitis quality of life in Peruvian children with asthma. *PLoS One*. 2018. Mar 21;13 (3):e0193910.
26. Bai G, Herten MH, Landgraf JM, Korfage IJ, Raat H. Childhood chronic conditions and health-related quality of life: Findings from a large population-based study. *PLoS One*. 2017. Jun 2;12 (6):e0178539.
27. Elnady HG, Sherif LS, Sabry RN, Zeid DA, Atta H, Hassanain AI, et al. Relation of Asthma Control with Quality of Life among a Sample of Egyptian Asthmatic School Children. *Open Access Maced J Med Sci*. 2019. Sep 13;7 (17):2780–2785.
28. Garina LA, Grahadinta MR, Mansoer FA, Puspitasari I. The quality of life on asthmatic adolescents and its correlation with the severity and control of asthma. *Global Medical and Health Communication*. 2020. Apr 30;8 (1):53–8.