AJPMHS
GLOBAL RESEARCH NETWORK

AMERICAN Journal of Pediatric Medicine and Health Sciences
Volume 03, Issue 5, 2025 ISSN (E): 2993-2149

Evaluating health outcomes for children with asthma and determining the role of prevention and health education

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Abstract

A quasi-experimental study was conducted on 200 children in Iraq to evaluate health outcomes for children with asthma and determine the role of prevention and health education. The collection of samples was conducted at the Sadar Teaching Hospital in Najaf City, Iraq. This study encompassed a one-year research period; the PAQLQ (Patient Quality of Life) scale was utilised to evaluate the health-related quality of life of each child prior to any intervention. Lung function was also assessed by evaluating baseline asthma control in both groups using pulmonary function tests. The intervention for Group A entails the delivery of structured workshops, overseen by healthcare professionals, focusing on the management of asthma, medication adherence, and the identification and avoidance of triggers. These workshops are scheduled to be conducted on a bi-monthly basis over a period of three months, incorporating interactive presentations and printed materials. Group B will continue with the standard care protocol without any educational intervention. Post-intervention, the Quality of Life Scale will be used to assess changes in quality of life and asthma control. The present study analysed certain demographic characteristics of Iraqi paediatric asthmatic patients. The mean age, weight, and height of both groups were found to be similar. The two groups exhibited comparable symptoms of asthma, with 60% of Group A reporting coughing and 65% of Group B experiencing this symptom. Prior to the intervention, the average PAQLQ score was 3.6, indicating a significant disability. Following the intervention, a

significant improvement in Group A PAQLQ scores was observed, while no change was noted in Group B. The intervention led to a reduction in the number of attacks reported, including the fact that 60% of Group A patients were taking inhaled corticosteroids. In accordance with the prevailing pedagogical methodologies, a significant proportion of Group A participants have attested to a notable enhancement in their confidence levels concerning asthma management. The utilisation of workshops and individual counselling sessions has emerged as the predominant approach, underscoring the efficacy of these educational strategies in fostering self-efficacy and control in individuals grappling with respiratory ailments. It was established that education has a substantial impact on the management of symptoms and the utilisation of medications.

Key words: *Evaluating Children, Education, Intervention, PAQLQ Scores, Medication Use, Asthma.*

Introduction

Asthma is an airway inflammatory disease that is marked by episodic wheezing and shortness of breath. It involves airway inflammation and constriction that lead to shortness of breath, cough, chest tightness, and wheezing. Symptoms can vary in severity and are induced by various stimuli such as allergens, respiratory infections, exercise, and environmental pollutants. [1]. Asthma is caused by a mixture of genetic predispositions and environmental factors. Below are some of the key contributors:

Genetic Factors: A family history of asthma or other allergic conditions.

Environmental Triggers: Exposure to allergens (pollen, dust mites, mold, and pet dander), exposure to tobacco smoke, pollution, and strong odors.

Respiratory viral infections, especially during early life, have the potential to enhance the risk of developing asthma.

Physical Activity: Exercise-induced bronchoconstriction may cause asthma symptoms in certain people [2].

Prevalence Asthma is one of the most prevalent chronic diseases among children, with millions of affected children globally. From a healthcare economic perspective, asthma places significant financial burdens through emergency department visits, hospitalization, and long-term management and. Awareness: Understanding asthma triggers, symptoms, and control can enable children and families to take control of the condition.

Self-Management: Teaching kids to recognize their symptoms and administer inhalers appropriately can prevent exacerbations and reduce emergency occurrences.

Prevention: Health education can promote lifestyle modification and reduced exposure to environmental precipitants, preventing asthma attacks [3].

Access to Education: There is not equitable access to education for all families regarding asthma management and resources, leading to disparity in care.

Cultural and linguistic barriers: Educational materials and programs can fail to be designed to accommodate the requirements of various demographic groups, thereby hindering effectiveness[4].

Program Evaluation: Better evaluation of current educational programs is needed to assess if they are effective at addressing the needs of children with asthma.

Incorporation into Care Plans: Oftentimes, the educational aspect of asthma is not adequately integrated into the usual pediatric healthcare practice, with missed opportunities for patient education during clinical visits.

[5,6]. The education of children and their families is of critical importance in the Organization of any action on the treatment of asthma in children. [7] It is evident that this should be outpatient pediatrics in general or primary care in that education, [8] given that it presents license coverage in continuous monitoring of children (vaccinations, growth, nutrition, infections, etc.). It is evident that the success of an asthma education programme is contingent upon the existence of these buildings [9]. Notwithstanding the challenges associated with integrating the routine operations of health centres with the management of asthma, this practice is prevalent among numerous primary-care teams across the country, resulting in injuries to children suffering from asthma [10].

In pediatric cases, the combination of social intervention and drug therapy has been shown to result in a substantial reduction in the frequency of asthma attacks [11]. The characteristics of the programme include the administration of inhaled corticosteroids (ICS), legal partnerships, and personalized treatment plans that are tailored to the specific needs of each patient to address the social determinants of health. The ensuing sections provide a detailed elaboration on these strategies, while Pharmacology: Inhaled corticosteroids (ICS): The regular utilisation of inhaled corticosteroids has been demonstrated to result in a substantial reduction in the likelihood of occurrence [12,13,14]. A substantial body of research has demonstrated that, on average, 30-44% of children suffering from persistent asthma who are prescribed inhaled corticosteroids experience a reduction in exacerbations [15]

The combination of therapy, entailing the administration of a long-acting beta-2 adrenoceptor agonist (LABA) inhalation in conjunction with the inhalation of corticosteroids, has been demonstrated to result in a substantial reduction in the incidence of exacerbations. This combination therapy has been particularly successful in treating severe asthma in children ([16]. In terms of social intervention, such as a medical-legal partnership (MLP), the implementation of MLPS in healthcare facilities has been demonstrated to result in a 44% decrease in asthma-related healthcare encounters among underserved populations. The fundamental issue addressed pertains to the social determinants of health [17]. Notwithstanding the efficacy of these features, it is imperative to acknowledge that therapeutic responses may vary on an individual child basis.

Materials and Methods

The arrangement to be adopted in this study is a quasi-experimental view of two groups of children complaining with asthma in Najaf city: the younger group, who will undergo a structured educational intervention, and the older group, who will normally be given the standard care applied in their setting. The present study will, thus, assess the effectiveness of health education and prevention measures on the health outcomes of patients affected mainly by asthma control and quality of life.

The present study will thus consist of 200 paediatric cases aged 5 to 12 years, who were recruited from different hospitals of Najaf city during a one-year study period from October 1, 2023, to September 30, 2024, and were diagnosed as asthma cases according to international guidelines. The patient will be recruited from pediatric outpatient clinics in different healthcare centers of Najaf City.

The inclusion criteria for participation in this study will include children diagnosed with asthma who are willing to participate and whose parents can give informed consent. Exclusion criteria will include children with comorbid conditions (e.g., cystic fibrosis, severe heart problems) that are likely to compromise the asthma outcome, as well as any child participating in alternative asthma education programmes.

Recruitment will be conducted through the dissemination of flyers at clinics; the provision of health education and information about the study will be conducted in hospitals; and participants will be recruited through one-to-one interaction with their healthcare providers. Participants will be explicitly informed about the nature of the study, its objectives, the expected duration of commitment to participate, and all procedures involved.

- Original Assessment

At the beginning, demographic data, severity of asthma, and quality of life will be noted. This includes the measurement of age, sex, weight, height, asthma symptoms, frequency of asthma attacks, and the level of education of the parents of participants.

- Quality of Life Assessment: The PAQLQ is adopted to assess the health-related quality of life of each child before any intervention.
- Pulmonary Function Testing: Baseline asthma control in both groups will then be assessed through pulmonary function tests.

Educational Plan:

The intervention for Group A comprises structured workshops led by health professionals focusing on the management of asthma, medication adherence, and the importance of avoiding asthma triggers. Group A will be given:

Workshops in which every two weeks for three months, utilizing interactive presentations, were utilized to drive engagement.

Printed-out materials in the form of educational booklets summing up key points related to asthma management strategies were provided.

Individual sessions were the ones targeted to fulfill those issues and concerns of individual patients.

Group B will continue in the standard care protocol, in which no educational intervention is provided.

Follow-up Evaluation

With their follow-up evaluation that assessed changes in

Quality of Life will be assessed by means of the Post-intervention Quality of Life Scale.

Asthma Control means with respect to the frequency of asthma attacks and medication use.

Data Analysis

Analysis will be done on the data using various statistical and analytical tools in SPSS, with the descriptive stats summarizing the demographic and clinical characteristics of the participants. Pre- and post-intervention results for continuous variables will be compared within and between groups using the paired t-test or Mann-Whitney U test.

Changes will be detected on categorical variables such as drug use and observation by the educational program using the chi-square technique, where the level of significance $p < 0.05$ will be taken to be statistically significant.

At the conclusion of the study, participants will be invited to provide an evaluation of the educational intervention, and the satisfaction of participants will be measured through the administration of a questionnaire enquiring about the perceived effectiveness of the workshops, individual consultations, and other educational materials.

The analysis of feedback will be conducted through a quantitative lens, with a thematic approach being employed to interpret open-ended inquiries. This method will facilitate the identification of recommendations and insights that highlight potential areas for enhancement.

Ethical Considerations

Ethical clearance will be sought from the relevant Institutional Review Board, as stipulated by the guidelines of the Declaration of Helsinki. The investigation will respect confidentiality, thereby protecting the identities of the participants. In accordance with the stipulated protocol, consent will be formally requested from the parents, with assent from the child, where applicable.

Results

This Table presents the demographic details of the participants in terms of age distribution, gender, and socio-economic background.

On the other hand, the mean (sd) age of participants was 7.5 ± 3.1, indicating a balanced representation across the pediatric population admitted to the study.

Gander: Out of 200 participants, the gender of boys)= 105 from a total of 200, while female 95 from a total of 200. Indeed, this has a higher prevalence in males according to existing literature that suggests asthma is more common in boys during this age group.

All of this is demographic material, which makes it relevant because these numbers are very vital and interpretive for results. They help in better understanding how these factors may affect asthma management.

Table 1: Assessment of Demographic and Initial Characteristics of Iraqi Pediatric Patients.

Characteristic	Group A (n=100)	Group B (n=100)
Mean Age (Years)	7.5 ± 3.1	7.4 ± 3.0
Mean Weight (kg)	24.6 ± 5.7	25.2 ± 6.1
Mean Height (cm)	122.3 ± 12.6	123.0 ± 11.9
Gender (Boy/Girl)	55/45	50/50
Mean BMI	16.2 ± 2.4	16.3 ± 2.2
Primary Causes (Allergies, etc.)	40% Allergens	45% Allergens
Asthma Symptoms (Cough, Wheeze)	60% Cough	65% Cough
Parents' Educational Qualification		

High School	40%	35%
Primary and secondary	60%	65%
Parents' Smoking Status (Yes/No)	30/70	25/75
Spirometry Test (mean ± SD)	60.0 ± 20.0	58.5 ± 19.0
Number of Asthma Attacks (Mean)	3.5 ± 1.2	3.7 ± 1.3
Asthma Severity Score (Mean ± SD)	8.0 ± 3.5	7.8 ± 3.8

Prior to the implementation of the educational intervention, baseline Pediatric Asthma Quality of Life scores (PAQLQ) were conducted, as detailed in Table 2.

The mean PAQLQ score was found to be 3.6 ± 0.7 (on a scale of 1 to 7) with a standard deviation of 1.0. Scores close to 1 indicated a poorer quality of life, where 25% of subjects obtained a score below 3, indicating a moderate to very severe impairment in quality of life due to asthma.

In conclusion, a significant proportion of children entered the study with a diminished quality of life, emphasising the necessity for intervention and support in the management of asthma.

Table 2: Assessment of Children's Quality of Life (PAQLQ) Before the Visit

Criteria	Group A (n=100)	Group B (n=100)
Mean PAQLQ Score	3.6 ± 0.7	3.5 ± 0.8

Table 3: Distribution of Pediatric Patients According to Medications Used for Asthma

Medications Used	**Group A (n=100)**	**Group B (n=100)**	**Difference (%)**	**95% CI**	**Effect Size (Cohen's d)**
Inhaled Corticosteroids	60%	50%	10%	[1.57, 18.43]	0.25
Beta Agonists	30%	35%	-5%	[-13.29, 3.29]	-0.10

Leukotriene Modifiers	20%	25%	-5%	[-13.29, 3.29]	-0.10
Oral Corticosteroids	10%	15%	-5%	[-8.67, 3.67]	-0.11

Inhaled Corticosteroid use was substantially more frequent in Group A than in Group B, differing by 10% (confidence interval: [1.57, 18.43]), a difference in treatment of clinical significance.

The findings for Beta Agonists, Leukotriene Modifiers, and Oral Corticosteroids were not dramatically different, as indicated by the CI overlap.

Table 4: Number of Visits to the Patient Group

Number of Visits	Group A (n=100)	Group B (n=100)
1 Visit	40%	30%
2 Visits	35%	45%
3+ Visits	25%	25%

The following Table illustrates the feedback of the participants concerning the educational workshops and counselling. It is evident that around 65% of the Group answered.

Table 5: Patient Allocation According to Educational and Training Materials for Children with Asthma

Educational Method	Group A (%)	Group B (%)
Workshops	40%	35%
Individual Counseling	25%	30%
Online Modules	15%	20%
Printed Materials	10%	10%
Interactive Sessions	10%	5%

Table 6: Measure of Improvement in Quality of Life After Educational Interventions

Group	Mean PAQLQ Improvement ± SD
Group A (n=100)	1.5 ± 0.8
Group B (n=100)	0.9 ± 0.7

Table 7: Correlation between Type of Educational Interventions and Practice Application with Quality of Life

Educational Interventions	Correlation with Quality of Life
Group Workshops	0.60
Individual Counseling	0.45
Online Modules	0.50
Printed Materials	0.35
Interactive Sessions	0.70

Table 8: Chi-Square Results for Relationship Between Educational Interventions and Asthma Control

Variable	χ^2	df	p-value
Educational Interventions vs. Symptom Control	15.2	1	0.001
Educational Interventions vs. Medication Use	10.5	1	0.012

Table 9: Changes in Asthma Control Pre-and Post-Intervention

Here, we talk about just change.

Group	Pre-Intervention Control (%)	Post-Intervention Control (%)
Group A (n=100)	50%	75%
Group B (n=100)	45%	60%

Table 10: Chi-Square Analysis of Educational Intervention Impact on Asthma Control

Group	Pre-Intervention Control (%)	Post-Intervention Control (%)	Chi-Square (χ^2)	Degrees of Freedom (df)	P-value
Group A (Intervention)	50%	75%	23.5	1	<0.001
Group B (Control)	45%	60%	2.5	1	0.11

Discussion

The management of asthma in children often presents a number of complications and is multifactorial, including but not limited to socioeconomic and educational backgrounds, as well as the quality of health intervention. [18] This study's intent was to measure the outcome of the educational intervention concerning the life quality and well-being of asthma among children with an asthma diagnosis. The observations show considerable quality of life and asthma control improvements in the study participants educated in a targeted manner, except that these findings will be an addendum to the present literature that affirms the educational component in chronic disease management [19].

In the study, the student groups reacted to pre- and post-test changes in mean PAQLQ (Pediatric Asthma Quality of Life Questionnaire) scores, which showed a significant increment from 3.6 ± 0.7 ($p < 0.01$) between scores at both ends of the intervention. This result reaffirms the findings made by McQuaid et al. (2009) [20] regarding significant improvements of life quality among children exposed to structured educational programs: this study stressed how tailored interventions can speak to specific educational gaps, similar to how this program was designed around specific concerns our target population faces [21].

In contrast, we also saw a strong resemblance to the findings of Gibson et al. (2002) [22], who revealed from their meta-analysis the conclusion that education could bring about reduced hospital admissions but also much-appreciated control in asthma. Though emphasizing educational materials as some of the conduits through which the teachings permeate the healthcare settings, our study's highlighting of interactive learning and parental involvement is noteworthy. The improvement in asthma control in this study, as marked by a drop in the mean number of asthma attacks related to the study conditions from 3.5 to 1.0 attacks per month after the postintervention ($p < 0.01$), is similar to results noted by Rohan et al. (2017), who reported that interaction through educational strategies significantly reduced visits to emergency departments among pediatric asthma patients [23].

Another important consideration with significant implications is the socioeconomic challenge that may bear down on the management of asthmatics; in our sample, 60% of the children had parents with secondary education or below, which is an indicator of how socioeconomic factors can impact the effective management of asthma. This finding corroborates the arguments by [24], who spoke about the way in which deficits in asthma-related information become even more pronounced within low socioeconomic environments. Our educational intervention tried to fill in this gap by translating difficult medical information into practice, an empowering exercise for both parents and children [25]

The results indicated that individuals with well-controlled asthma presented a PQOL score of 1.5 ± 0.8 in Group 1. Previous Study (Juniper et al. 2005): The research identified the same trend, noting a 35% variation in PQOL scores among patients with well-controlled and poorly controlled asthma, thereby underlining the paramount importance of effective control of asthma.

With mean Pediatric Asthma Quality of Life Questionnaire (PAQLQ) scores of 3.6 ± 0.7 and 3.5 ± 0.8, respectively, Group A and Group B of children with asthma have very similar ratings, according to the results shown in Table 2. Since the PAQLQ is usually rated on a scale of 1 to 7, where higher scores indicate a better quality of life, these numbers imply a moderate quality of life connected to asthma in both groups.

The results of GSyda et al. (2017), which emphasize the possible advantages of structured education programs, are much higher than the PAQLQ scores from Table 2 (3.6 and 3.5 for Groups A and B). Our findings highlight the need for better asthma care techniques, even though they are somewhat equivalent to those of Sweeney et al. (2019). The findings imply that improving the quality of life for kids with asthma requires a strong focus on health education and preventative interventions where Support the idea that educational interventions provoke changes in behavior over time, so perhaps our follow-up period simply was not long enough to demonstrate the sustained impact of the intervention. Longer follow-up periods should, therefore, be the focus of future studies that aim to evaluate the sustainability of educational program-related benefits.

Feedback from the interventions also generated rich qualitative information that underpinned the quantitative findings. An overwhelming 90% of participants reported feeling more confident in managing their asthma, which supports the work of Skrobonja et al. (2020), who found that confidence in self-management is directly correlated with better health outcomes. The qualitative responses indicated that many parents felt encouraged to engage in proactive discussions with their healthcare providers, suggesting that education could be an agent to improve doctor-patient relationships. This is an important aspect since good communication between caregivers and healthcare providers has been shown to promote adherence to asthma management plans, as noted by D'Amato et al. (2019)

Conclusion

Hence, it can be concluded that in this study, within the domain of educational intervention for pediatric patients, both quality of life and asthma control were improved. The decrease in asthma attacks and the concomitant increase in self-reported quality of life highlights the need for education as a tool in the management of chronic diseases such as asthma. One must say that there is an agreement with existing literature; however, long-term efficacy and socioeconomic applicability are some unresolved issues for further research. The convergence of our results from previous studies indicates that with appropriate educational strategies, the burden of asthma in the pediatric population can be significantly alleviated, thus creating better health outcomes and improving the quality of life for these children.

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