

Assessment of the relationship between self-efficacy level and asthma control in adolescents^a

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ABSTRACT

Aims: This study aims to evaluate the relationship between asthma self-efficacy levels and asthma control in adolescents aged 12-18 with physician-diagnosed asthma. Additionally, factors associated with asthma control status were examined.

Methods: In this cross-sectional analytical study, 108 adolescents aged 12-18 years with at least one year of physician-diagnosed asthma were included. Data were collected using a sociodemographic and clinical information form, the Asthma Control Test (ACT), and the Adolescent Asthma Self-Efficacy Questionnaire (AASEQ). Those with an ACT score of 19 or lower were classified as not having well-controlled asthma, while those with an ACT score of 20 or higher were classified as having well-controlled asthma. Descriptive statistics, group comparisons, correlation analysis, and simple linear regression analysis were used for data analysis. A p-value of <0.05 was considered statistically significant.

Results: The average age of the participants was 13.9±2.18 years, and 60.2% were male. The mean total ACT score was 18.53±4.93, and 50% of adolescents were in the not well-controlled asthma group (≤19 points). Among adolescents with not well-controlled asthma, emergency department visits due to asthma attacks (p=0.005), hospitalizations related to asthma (p=0.029), and the negative impact of asthma on school/work performance (p=0.006) were significantly higher. The mean total score of the AASEQ was 89.91±10.27. In adolescents with not well-controlled asthma, scores on the medication treatment, symptom management, and asthma beliefs subscales, as well as the overall self-efficacy score, were statistically significantly lower. A moderate, positive, significant correlation was found between the total AASEQ score and the total ACT score (r=0.429; p<0.001).

Conclusion: Not well-controlled asthma is common among adolescents and appears to be associated with increased healthcare utilization and negative impacts on school/work performance. Low asthma self-efficacy, particularly in areas such as medication adherence, symptom management, and beliefs about asthma, was found to be related to lower levels of asthma control. Therefore, in adolescent asthma follow-up, it may be clinically beneficial to consider not only symptom-based control assessments but also asthma self-efficacy. To better understand the direction and clinical significance of the relationship between asthma self-efficacy and asthma control, prospective and intervention-based studies are needed.

Keywords: Adolescent, asthma, disease management, self-efficacy, self-management

^aThis study was presented as an oral presentation at the 1st National Congress on Home Health Care and Longevity, held in April 2026.

INTRODUCTION

Asthma is a chronic inflammatory disease of the airways characterized by variable expiratory airflow limitation and bronchial hyperresponsiveness.¹ In the treatment of asthma in individuals aged 12 and above, inhaled corticosteroids (ICS), long-acting β -agonists (LABA), leukotriene receptor antagonists (LTRA), short-acting β -agonists (SABA), oral corticosteroids, and biological agents in selected cases are indicated.² The indirect costs of pediatric asthma, such as school absenteeism, caregiver work loss, and social burdens, are quite high.³ Recent studies on asthma control have shown

that not well-controlled asthma has significantly higher direct medical costs as well as indirect social costs.⁴ A multicenter study in the literature demonstrated that patients with poor asthma control had more frequent healthcare visits over the following 9 months.⁵

One of the main goals in asthma management is to prevent attacks and achieve long-term control.⁶ However, recent studies indicate that a significant portion of adolescents with asthma do not have adequate control.⁷ During adolescence,

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asthma management gradually shifts from the parent to the adolescent themselves. Adherence to treatment, inhaler use, timely recognition of symptoms, and seeking healthcare are increasingly shaped by individual decisions. Therefore, the assessment of asthma control in adolescents should not be limited to clinical symptoms alone. The adolescent's perception of their ability to manage their illness, that is, their self-efficacy level, should also be considered. Psychological, environmental, and treatment-related factors, together with self-efficacy, may contribute to asthma control by influencing adolescents' self-management behaviors and treatment adherence. Self-efficacy refers to an individual's confidence in performing a specific behavior and plays a critical role in adolescent health behavior change processes. Fundamental studies on asthma control and self-efficacy assume that asthma is not only managed pharmacologically but also involves the patient's ability to recognize symptoms, avoid triggers, use inhalers correctly, adhere to treatment, implement written action plans, and make appropriate decisions during exacerbations.⁸ Adolescents with higher self-efficacy are believed to use asthma management strategies more effectively, resulting in better asthma control.⁹ Therefore, identifying adolescents with asthma who have low self-efficacy and providing supportive interventions to these individuals may contribute to improved asthma control. However, one gap in the literature is the limited number of studies in this area, especially among Turkish adolescents.

This study aimed to evaluate the relationship between asthma self-efficacy and asthma control in asthmatic adolescents aged 12-18, stratified by asthma control groups. Additionally, factors related to asthma control status were also examined.

METHODS

Ethics

This study was conducted with the approval of the İzmir City Hospital Non-interventional Ethics Committee (Date: 09.07.2025, Decision No: 2025/288). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. Written informed consent was obtained from the participants' parents.

Type of the Research and Sample Size

The population of this cross-sectional analytical study was conducted on individuals aged 12-18 who applied to the pediatric immunology and allergy outpatient clinic of İzmir City Hospital between August 1, 2025, and November 1, 2025, and who had a physician-diagnosed asthma condition. Data from all patients who applied during the three-month period have been included in the study, and no participants were excluded or had incomplete data.

Data Collection

For the study, a data collection form was created by reviewing the literature, including questions about demographic data, allergic conditions, emergency department visits, regular doctor check-ups, medication use, and hospitalizations. This form is prepared only for descriptive data that does not require validity and reliability assessments. Following

the data collection form, the Asthma Self-Efficacy Scale and ACT were administered face-to-face by the researcher after informing participants and obtaining parental consent. The data collection form was completed by adolescents with a parent present. The inclusion criteria were between 12 and 18 years old, having physician-diagnosed asthma for at least 1 year, agreeing to participate in the study, and possessing the cognitive ability to complete the questionnaires.

Asthma Control Test

The ACT is a quick, practical self-report assessment tool for individuals aged 12 and older that evaluates the past 4 weeks. It consists of 5 items, with a total score ranging from 5 to 25. Scores range from 5-25 (higher is better). Scores of 20-25 are classified as "well-controlled", 16-19 as "not well-controlled", and 5-15 as "very poorly controlled" asthma. The validation of the Turkish version of the test was conducted by Uysal et al.¹⁰ We compared the groups based on ACT scores. Adolescents with ACT scores ≤ 19 were classified as having "not well-controlled" asthma, whereas those with ACT scores ≥ 20 were classified as having "well-controlled asthma".¹¹ The sample size was calculated based on the comparison of mean AASEQ total scores between two ACT-defined asthma control groups. It was aimed at detecting a difference of approximately 8.5 points, corresponding to a moderate effect size between groups. Assuming equal group allocation, a two-sided test with $\alpha=0.05$ and 80% power indicated that at least 49 participants per group were required, yielding a minimum total sample size of 98. Since the groups were formed according to ACT scores after enrollment, all eligible adolescents during the study period were included. The final sample consisted of 108 participants, with 54 adolescents in each ACT-defined group, thereby meeting the required minimum sample size.

Adolescent Asthma Self-Efficacy Questionnaire

A self-report scale with 27 items and 4 sub-dimensions (1-friends, family, and school, 2-symptom management, 3-asthma beliefs, and 4-medication) scored between 0-100, designed to assess the self-efficacy perceptions related to asthma self-management in asthmatic adolescents aged 12-18. All AASEQ responses are collected and then averaged to obtain the overall average score (0-100). There is no cut-off value in the test. However, increasing scores indicate a higher level of self-efficacy. The validity and reliability of the questionnaire in Turkish have been established by Şan et al.,¹² with a 0.93 Cronbach's alpha coefficient.

Statistical Analysis

The data were performed using SPSS (version 25; IBM, Armonk, NY, USA). Descriptive statistics were presented as numbers and percentages for categorical variables and as means $\pm$ standard deviations for continuous variables. The normality of continuous variables was assessed using the Kolmogorov-Smirnov test. The not well-controlled and well-controlled asthma groups created based on the ACT score were compared in terms of sociodemographic-clinical variables and total/subscale scores of the AASEQ. The independent samples t-test was used for group comparisons. Categorical variables were compared using the Pearson Chi-square test.

The relationship between the ACT total score and the AASEQ total score was evaluated using Pearson's correlation analysis. Simple linear regression analysis was performed to determine whether the AASEQ total score predicted the ACT total score. Regression results were reported as unstandardized coefficients (B), standardized coefficients (β), coefficient of determination (R^2), and p-values. A p-value of <0.05 was considered statistically significant.

RESULTS

In this study of 108 adolescent asthmatics, the average age was 13.9 ± 2.1 years. By gender, 60.2% were male; 81.5% used their medications as recommended by their doctor; 77.8% had regular medical check-ups; and 38.9% had visited the emergency department for asthma within the past year. When evaluating the medications used by the participants, the most used medication was found to be ICS+LABA at 51.9% (**Table 1**).

		Number (n)	Percentage (%)
Gender	Male	65	60.2
	Female	43	39.8
Asthma family history	Yes	47	43.5
	No	61	56.5
Allergic rhinitis history	Yes	24	22.2
	No	84	77.8
Use medications as recommended	Yes	88	81.5
	No	20	18.5
Regular medical checkups	Yes	84	77.8
	No	24	22.2
Asthma negatively affects school/work success	Yes	30	27.8
	No	43	39.8
	Partially	35	32.4
Emergency visit due to an attack	Yes	42	38.9
	No	66	61.1
Asthma and medication use training	Yes	70	64.8
	No	38	35.2
Hospitalization due to asthma in the past year	Yes	12	11.1
	No	96	88.9
Medications*	SABA	23	21.3
	ICS	22	20.4
	ICS+LABA	56	51.9
	Others	15	13.8

*Since multiple options can be selected, the total percentages exceed 100%. SABA: Short-acting beta₂-agonist, ICS: Inhaled corticosteroid, LABA: Long-acting beta₂-agonist

According to the threshold value determined by the ACT, 54 participants (50.0%) were classified as having not well-controlled asthma, and 54 participants (50.0%) were classified as having well-controlled asthma (**Figure 1**).

According to the ACT results, those with not well-controlled asthma had statistically significantly more emergency department visits ($p=0.005$), more hospitalizations ($p=0.029$), and a higher rate of affected school/work performance ($p=0.006$) (**Figure 2**).

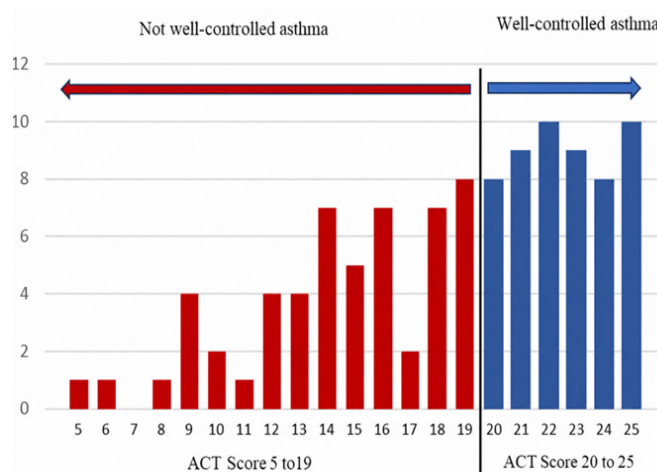


Figure 1. Assessment of asthma control status

ACT: Activated clotting time

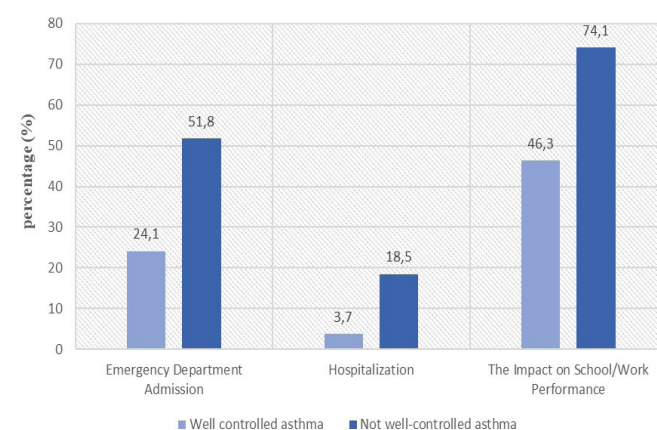


Figure 2. Comparison of emergency department visits, hospitalizations, and impact on school/work performance according to asthma control status

There was no statistically significant difference between those with not well-controlled asthma and other participants in terms of gender, receiving asthma education, having regular medical check-ups, and using medications as recommended (**Figure 3**).

According to AASEQ, medication treatment, symptom management, and asthma beliefs were lower in all subgroups and total scores among not well-controlled asthmatics, with statistical significance (**Table 2**).

The total mean ACT score among the 108 adolescent participants in the study was 18.5 ± 4.9 , and the total asthma self-efficacy score was 89.9 ± 10.2 . A positive and significant correlation was observed between the total asthma self-efficacy score and the total ACT score. In the simple linear regression analysis, the total asthma self-efficacy score significantly and positively predicted the total ACT score ($B=0.206$; $\beta=0.429$; $p<0.001$). The model explains 18.4% of the variance in the total ACT score ($R^2=0.184$). Accordingly, each 1-point increase in the asthma self-efficacy score was associated with a 0.206-point increase in the ACT score.

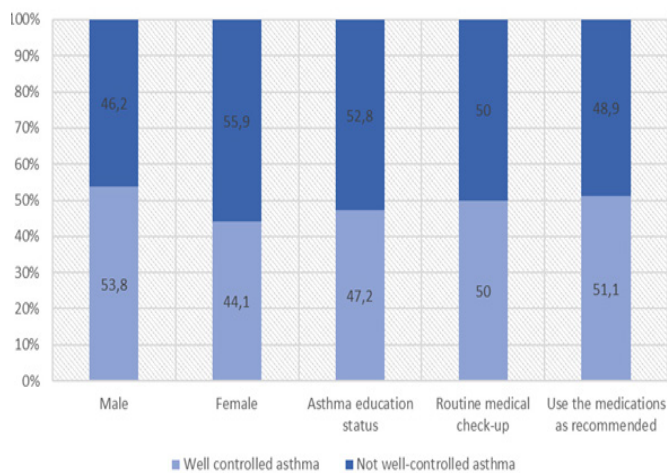


Figure 3. Comparison of gender, asthma education, regular medical check-ups, and medication used according to asthma control status

Table 2. Comparison of asthma control status according to ACT with AASEQ subscale and total scores

AASEQ	ACT	Mean	SD	p
Medication	Well-controlled asthma	96.4	8.8	0.024
	Not well-controlled asthma	90.6	16.0	
Symptom management	Well-controlled asthma	93.8	10.0	p<0.001
	Not well-controlled asthma	83.7	14.3	
Asthma beliefs	Well-controlled asthma	92.5	9.9	p<0.001
	Not well-controlled asthma	75.3	17.2	
Friends, family, and school	Well-controlled asthma	93.4	10.4	0.301
	Not well-controlled asthma	91.1	12.2	
Total score	Well-controlled asthma	93.9	7.4	p<0.001
	Not well-controlled asthma	85.8	11.1	

ACT: Asthma control test, AASEQ: Adolescent asthma self-efficacy questionnaire, SD: Standard deviation

DISCUSSION

In this study of adolescents receiving asthma treatment, half of the patients were classified as not well-controlled asthmatics, and this group had more emergency department visits, hospitalizations, and impacts on school/work performance. Additionally, it was revealed that not well-controlled asthmatics had lower Asthma Self-Efficacy scores, and there was a significant positive relationship between the Asthma Self-Efficacy total score and the ACT total score.

In this study, 50% of adolescents with asthma were in the not well-controlled asthma group, as determined by the ACT. In a recent study conducted in Türkiye involving 312 individuals aged 10-18, the rate of not well-controlled asthma was 52.2%. These results indicate that symptom control in adolescent asthma may still be a significant clinical issue in Türkiye.¹³ Similarly, a study conducted among students aged 12 and over in London also found that nearly half of the participants were in the not well-controlled asthma group.¹⁴ This rate rises to as high as 64.3% among adolescents living in Palestine.¹⁵ The observed differences may stem from variations in the healthcare setting and access to healthcare services.

In our study, it was found that those with not well-controlled asthma had significantly higher rates of emergency

department visits, hospitalizations, and school performance issues. This finding aligns with the literature, which indicates that not well-controlled asthma is a multifaceted problem that affects not only symptom burden but also healthcare utilization and school life.¹⁶ On the other hand, our study did not find a significant difference between the control status according to ACT and factors such as receiving asthma education, regular medical check-ups, and using medications as recommended, which partially differs from the findings in the literature.¹⁷ One of the main reasons for this discrepancy could be that these variables were assessed based on self-report in our study. However, the current GINA (Global Initiative for Asthma) strategy report emphasizes that asthma control cannot be determined solely by whether the patient reports taking medication or attending check-ups; instead, it requires a comprehensive assessment that includes symptom control, exacerbation risk, lung function, comorbidities, inhaler technique, treatment adherence, and a written asthma action plan during each visit.¹⁸

In our study, a positive and significant relationship was found between the total asthma self-efficacy score and the ACT total score. This finding is consistent with Holley and colleagues¹⁹ development of the AASEQ, which showed that better adolescent asthma self-efficacy is associated with better asthma management indicators and that adolescents with poorer asthma control tend to have lower self-efficacy levels. Similarly, Sleath and colleagues²⁰ demonstrated that higher asthma management self-efficacy in adolescents aged 11-17 with persistent asthma is related to controlled asthma and better quality of life. An important point here is that a clinically accepted cutoff score for “low/high self-efficacy” for the AASEQ has not yet been established. Therefore, the findings in our study can be interpreted based on group averages and subscale scores. It can be particularly considered that improving symptom management and asthma beliefs in not well-controlled asthmatics are fundamental intervention areas that need to be targeted.

Limitations

One limitation of this study is that, due to its cross-sectional design, it cannot determine causally whether self-efficacy affects asthma control or whether better asthma control increases adolescents' perceived self-efficacy. Additionally, due to the limited participant group, the roles of confounding factors identified through multiple regression analyses could not be investigated. The fact that the sample is limited to a single center may restrict the generalization of the results to adolescents in different regions, with different socioeconomic levels, or with severe asthma phenotypes. The data, largely based on self-reporting, may have introduced recall bias regarding medication use, regular follow-up, education received, and symptom perception. Finally, asthma control may vary with seasonal factors, and the data collection period may have limited the ability to assess it.

CONCLUSION

This study shows that not well-controlled asthma in adolescents is observed at a clinically significant frequency and that the level of asthma control has important

implications for healthcare utilization and daily functioning in adolescents. Our findings indicate that in adolescents with not well-controlled asthma, attention should be paid not only to symptom control but also to the patient's self-efficacy regarding asthma management. Future prospective and intervention-based studies could better clarify the direction and clinical significance of the relationship between asthma self-efficacy and asthma control.

ETHICAL DECLARATIONS

Ethics Committee Approval

This study was conducted with the approval of the İzmir City Hospital Non-interventional Ethics Committee (Date: 09.07.2025, Decision No: 2025/288).

Informed Consent

Written informed consent was obtained from all individual participants prior to their inclusion in the study. Participants were fully informed about the study's aims, procedures, potential risks and benefits, and their rights-including the right to withdraw at any time without consequence. All participants voluntarily signed a written informed consent form.

Peer Review Process

This manuscript was subject to external peer review.

Conflict of Interest

The authors declare no conflicts of interest related to this study.

Financial Disclosure

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Author Contributions

Concept: İÇ, FG, UG; Design: İÇ, RY, TT, UG; Control: İÇ, TT, UG; Data Collection and/or Processing: İÇ, FG, RY; Analysis and/or Interpretation: İÇ, FG; Literature Review: İÇ, FG, RY, TT; Article Writing: İÇ, FG; Critical Review: All Authors.

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