

Asthma Control Test: Is a Physician Referral Necessary?

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ABSTRACT

Objective: The Asthma Control Test (ACT) is one of the most important tools used to assess the control of asthma patients. It is completed by the patient and allows clinicians to have an idea about asthma symptoms control for the last 4 weeks.

In this study, it was aimed to determine whether there is a difference between the completion of the ACT by the patient himself/herself and the completion of the ACT under the supervision of a physician, and to determine the patient-related factors that may affect this difference, if any.

Materials and Methods: Our single-center study was conducted with 100 patients over 18 years of age who had been receiving treatment for their asthma for at least 3 months according to GINA recommendations. The ACT was first completed by the patient and then completed by the same physician for each patient and the scores were compared. The effect of gender, education, and employment status of the patients on the differences were analyzed.

Results: No significant difference was found between the physician-guided administration of the ACT and the self-administration of the ACT on total ACT scores [20 (17-23) vs. 21 (17-23); $p=0.065$]. When the results of the self-administered ACT were compared with the results of the physician-administered ACT for each question, it was observed that there was a significant difference between the answers given to questions 2 and 4 [4 (3-5) vs. 4 (3-5); $p=0.031$]; 4.5 (3-5) vs. 5 (4-5); $p<0.001$, respectively]. It was observed that the scores given by female patients to the second question of the ACT were higher than the scores given to the physician-guided ACT (mean difference of 0.29 ± 0.96 in women and -0.13 ± 0.76 in men $p=0.018$).

Conclusion: There may be differences between the application of ACT by the patient and the physician. Factors such as gender and educational status may affect the results. Especially in some questions, the physician should scrutinize the patient's responses and evaluate them together with the clinical findings.

Keywords: Asthma control test, Asthma, GINA

INTRODUCTION

Various questionnaires are used to assess asthma control. The most commonly used one is the asthma control test (ACT) (1). The asthma control test is a questionnaire that is easily understood by patients and provides important information about the course and control of asthma (1-3). The original version was designed for English-speaking patients and was later translated and validated in many languages. In Türkiye, the ACT was validated by Uysal et al. in 2012 (1).

The Asthma Control Test is a tool that allows physicians to quickly estimate the control of asthma symptoms in each patient (2, 4). It consists of 5 questions, each of which is scored between 1 and 5 (3, 5). The total score of the five questions constitutes the test result (2, 3, 6). This classification gives an idea about treatment and asthma control (6). The ACT is a validated tool used to assess the level of asthma symptom control in patients. Its simplicity and reliability have made it a standard in clinical practice (2, 4).

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The ACT should be completed by the patient and the results should be interpreted by the physician (1, 5). However, in our daily practice, it has been observed that in some patients the results of the ACT completed by the patient do not match the patient information related to asthma obtained from the doctor’s anamnesis, and this study was planned to be carried out. In this study, it was aimed to compare the results of the patient- and physician-administered ACT and to investigate the factors that may affect possible differences.

MATERIALS and METHODS

This single-center study was conducted by analyzing the data of patients who applied to the Erciyes University Faculty of Medicine, Immunology and Allergy Diseases outpatient clinic in 2022 and 2023. Patients who were 18 years of age or older at the time of presentation and who had been receiving asthma treatment following the GINA guidelines for at least three months since the diagnosis of asthma were included in the study (6).

All patients included in the study were asked to complete the asthma control test in a calm environment where they could easily read and understand the questions. Patients were asked not to inform their physicians about their ACT scores and responses. Then, the responsible outpatient clinic doctor, who would follow up with the

patient in the outpatient clinic, explained all the questions to the patients one by one and completed the ACT again. All physician-led ACT applications were performed by the same physician who was competent in his/her field. Patients with asthma exacerbation at the time of admission were excluded from the study. Demographic and socioeconomic information and the asthma-related history of the patients were obtained from the hospital follow-up system.

The ACT, which is a simple and reliable test recommended to be used in the follow-up of asthmatic patients, consists of five questions as shown in Table I (1, 2, 6). All items refer to the last 4 weeks and are scaled from 1 to 5 (6). The total indicates asthma control; a score of 25 means perfectly controlled asthma. A score of 20-25 indicates good control, 16-19 indicates not well controlled, and 5-15 indicates very poor control (6).

Permission dated 31.01.2023 and numbered 2024/53 was obtained from the Erciyes University Clinical Research Ethics Committee for the study.

Statistical Analysis

Categorical data were described using frequency (percent) and metric variables were described using either mean ± standard deviation or median (25th-75th percentile) accordingly. Assumptions of normality and homogeneity of variances were checked with the Kolmogorov-Smirnov

Table I: Asthma Control Test.

1) In the <u>past 4 weeks</u> , how much of your time did your asthma keep you from getting as much done at work, school, or home?					
All the time	Most of the time	Some of the time	A little of the time	None of the time	Score
1	2	3	4	5	
2) During the <u>past 4 weeks</u> , how often have you had shortness of breath?					
More than once a day	Once a day	3 to 6 times a week	Once or twice a week	Not at all	Score
1	2	3	4	5	
3) During the <u>past 4 weeks</u> , how often did your <u>asthma</u> symptoms (wheezing, coughing, shortness of breath, chest tightness, or pain) wake you up at night or earlier than usual in the morning?					
4 or more nights a week	2 to 3 nights a week	Once a week	Once or twice	Not at all	Score
1	2	3	4	5	
4) During the <u>past 4 weeks</u> , how often have you used your rescue inhaler or nebulizer medication (such as albuterol)?					
3 or more times per day	1 or 2 times per day	2 or 3 times per week	Once a week or less	Not at all	Score
1	2	3	4	5	
5) How would you rate your asthma control during the <u>past 4 weeks</u> ?					
Not Controlled at all	Poorly Controlled	Somewhat Controlled	Well Controlled	Completely Controlled	Score
1	2	3	4	5	

test. When comparing numerical variables of ACTs filled by the patients and doctors, the Wilcoxon test was used to compare two groups. A p-value of 0.05 or lower ($p \leq 0.05$) was considered statistically significant. The statistical analysis was conducted using the IBM SPSS 22.0 software package (SPSS Inc., Chicago, IL, USA).

RESULTS

Our study included 100 patients with a mean age of 46.8 ± 12.9 years. Our patients were predominantly female, 3/4 of them were eosinophilic asthmatic patients and 1/3 of the whole group were followed up for severe asthma. The general characteristics of the patients included in the study are shown in Table II and asthma-related characteristics are shown in Table III.

When the results of the patient-completed ACT were compared with the results of the physician-guided ACT, it was observed that there was a significant difference between the answers given to questions 2 and 4 (2nd question: 4 (3-5) vs. 4 (3-5); $p=0.031$, Question Four: 4.5 (3-5) vs. 5 (4-5); $p<0.001$). In question 2 (How often did you feel shortness of breath during the last 4 weeks?), the doctor-assisted scoring was lower, and in question 4 (How many times did you use your reliever inhaler or salbutamol nebuliser during the last 4 weeks?), the patient-completed scoring was lower. No significant difference was observed between the total asthma control test scores (20 (17-23) vs. 21 (17-23) $p=0.065$) (Table IV).

To understand in which groups the difference between the results of the self-administered ACT and the results of the physician-assisted ACT was higher, the difference between the scores of the self-administered ACT and the scores of the physician-assisted ACT was analyzed in terms of gender, occupation, and educational status. Accordingly, for question 2 of the ACT, the difference between

the scores completed by female patients and those completed by physician-assisted patients was higher than for male patients (mean difference 0.29 ± 0.96 for females and -0.13 ± 0.76 for males $p=0.018$). No such difference was observed between employed and unemployed patients and between university graduates and non-university graduates in all other questions.

Table II: Demographic and socioeconomic characteristics of the patients.

	N=100
Age $\pm$ SD	46.77 $\pm$ 12.9
Female gender, n (%)	77 (77)
Male gender, n (%)	23 (23)
Education level, n (%)	
University graduates	15 (15)
Non-university graduates	85 (85)
Smoking status, n (%)	
Smokers	5 (5)
Non-smokers	95 (95)
Workers, n (%)	25 (25)

Table III: Phenotypic characteristics of patients' asthma.

	N=100
Severe asthma, n (%)	65 (65)
Non-severe asthma, n (%)	35 (35)
With nasal polyps, n (%)	34 (34)
Without nasal polyps, n (%)	66 (66)
Atopic non-eosinophilic, n (%)	16 (16)
Atopic eosinophilic, n (%)	44 (44)
Nonatopic non-eosinophilic, n (%)	11 (11)
Nonatopic eosinophilic, n (%)	29 (29)

Table IV: Comparison of self-administered and physician-guided ACT results

	Self-administered ACT	Physician-guided ACT	p
Question 1; median score (25 th -75 th percentile)	4 (3-5)	4 (3-5)	0.498
Question 2; median score (25 th -75 th percentile)	4 (3-5)	4 (3-5)	0.031
Question 3; median score (25 th -75 th percentile)	5 (4-5)	5 (4-5)	0.163
Question 4; median score (25 th -75 th percentile)	4,5 (3-5)	5 (4-5)	<0.001
Question 5; median score (25 th -75 th percentile)	4 (3-5)	4 (3-5)	1
Total	20 (17-23)	21 (17-23)	0.065

DISCUSSION

In our study, no significant difference was found between the completion of the ACT with a physician and the completion of the ACT by the patients on their own on the total ACT scores. However, when the questions were analyzed individually, it was seen that the ACT completed with the physician's anamnesis was lower in question 2, and the score completed by the patient was lower in question 4. These results suggest that re-questioning of questions 2 and 4 by the patient's physician may be useful in evaluating symptom control.

In a study conducted by Schatz et al. in 2006, it was shown that the ACT developed to facilitate rapid and accurate assessment of asthma control was reliable, valid, and sensitive to changes in asthma control (7). However, it has been a matter of curiosity whether there is a difference in the results of the ACT when performed by the physician or the patient in real life. The number of studies conducted for this purpose is quite limited. In a study conducted by Crimi et al., it was aimed to evaluate the potential difference in the reporting of the level of control between the patient's self-completed ACT and the physician-administered test, and no significant difference was found in the total score of the ACT obtained with both modes of administration (5). However, when the questions were evaluated individually, it was observed that there was a statistical difference in questions 4 and 5 (5). In this study, it was observed that the scoring made by the patient was lower in question 4 in which the frequency of rescue medication was evaluated. Fuhlbrigge et al. (2021) observed that there was a difference between the ACTs performed by the patient and the physician in question 2 (8). This result suggests that questions 2 and 4 may need to be explained more clearly to the patient during the completion of the ACT by the patients.

As previous studies suggest, differences can be observed between patient- and physician-performed ACTs. This may be due to factors such as cultural, social, and demographic characteristics of asthma patients, the severity and phenotype of asthma, and physician-physician communication. In our investigation, which is concurrent with the study by Crimi et al., the patients' low response to question 4 suggests that they exaggerated their use of rescue inhaler devices because the physician's question raised the inquiry's score. On the other hand, it contradicts the fact that patients gave higher scores to question 2. When

question 2 was completed by the patient accompanied by a physician, they described dyspnea more frequently and therefore gave a lower score to question 2, but when they completed the ACT themselves, they gave a higher score to this question because of less frequent dyspnea. In other words, patients who had fewer daytime dyspnea symptoms compared to question 2 of the self-administered ACT were expected to give a higher score to question 4, but they gave a lower score; they scored higher on the same question (question 4) when asked by a doctor. This reflects the paradox between these 2nd and 4th questions among the patients, suggesting that these questions should be reviewed by the physician.

In a previous study conducted with 2725 participants investigating the prevalence of patients not giving information to the doctor, 82.6% of the patients answered 'yes' to the question 'Have you ever avoided giving any information to the doctor?' (9). In the same study, more than one-third of the participants answered 'yes' to the statements 'I did not take the prescribed drugs in accordance with the instructions' (40.6%) and 'I did not understand the doctor's instructions' (37.4%) (9). The patients in our study may also tend to hide this situation from the physician because they may think that it is inappropriate to use rescue medication with a high frequency or they do not want to give the impression that they are not taking their medicines as instructed. The higher frequency of rescue medication in the self-administered ACT and the lower frequency in the presence of a physician may be explained by this situation. In our society, there is a misconception that rescue medication should be used scarcely and that their use will lead to addiction. Patients may therefore tell the doctor less about the use of rescue medication than they actually do. Although speculative, this may be one of the reasons for the difference between a patient's and a doctor's scoring.

Dragonieri et al. (2022) investigated the role of education in ACT and showed that patients without a high level of education tended to exaggerate their perceptions of asthma symptoms (10). In our study, when the difference between the scores made by the patient and by the physician was compared individually for each question and as a total ACT score, no difference was observed between university graduates and non-university graduates, and between employed and non-employed patients. This may stem from differences in cultural and social perceptions. Therefore, we think that different results may be

obtained that may affect the scoring. It was found that the discrepancy between the second questions answered by the patient and the doctor was greater for women than for men when the same comparison was conducted between the genders. This discrepancy could be because men have lower thresholds for perceiving dyspnea or there are more housewives in our study. It is also possible that men experience more dyspnea as a result of the strain of their jobs and possible occupational exposures that could aggravate asthma symptoms (allergen sensitivities and occupational exposures were not examined, so it is interpreted as speculative).

The most important limitation of our study is that it was performed in a single-center with a small number of patients. Therefore, the results we obtained may not be generalizable. Different results may be obtained in studies with different socioeconomic status or different regions. There is a need to conduct multicenter studies with a larger number of participants to evaluate whether there is a difference between the results of the ACT completed by the patient and the physician according to the demographic characteristics, asthma severity, and asthma phenotypes of the patients. Another limitation is that when assessed by the physician, a bias toward the patient's desire to benefit from the treatment may affect the results. However, the fact that the result was lower in the ACT completed by the doctor in question 2 and higher in question 4 seems to minimize this possibility. In addition, doctor-patient communication may also affect the results of the ACT completed by a physician. However, we believe that we could minimize this possibility since the same physician asked ACT questions to all our patients, and all of them were provided with similar explanations to make the questions clear.

As a result, there was no difference in the total scoring between the completion of the ACT by the patient himself/herself and the physician-assisted completion of the ACT. However, when the questions were analyzed individually, although it did not affect the total score, it was found that there was a significant difference between the physician-guided scoring for questions 2 and 4 in the ACT and the scoring completed by the patients themselves. Therefore, we think that physician-guided ACTs, especially for questions 2 and 4, can enable the physician to make a more accurate evaluation by combining the patient's answers

with clinical knowledge, reduce the risk of incomplete or misunderstanding, provide the opportunity for the physician to explain when the patient does not understand the questions correctly or hesitates to answer, and reduce the subjective effect of the answers by evaluating the patient's condition from a broader perspective.

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Conflict of Interest

None of the authors have a conflict of interest in relation to this work.

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