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# Sociodemographic and Clinical Characteristics of Adult Asthma Patients: A Cross-sectional Study

## *Erişkin Astım Hastalarının Sosyodemografik ve Klinik Özelliklerinin Belirlenmesi: Kesitsel Bir Çalışma*

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## ABSTRACT

**Objective:** Asthma is one of the most prevalent public health problems worldwide, known to be difficult to control. This study investigates the sociodemographic and clinical characteristics of patients with asthma and evaluate asthma control using the asthma control test (ACT).

**Methods:** This cross-sectional study was conducted between 13th January 2020 to 27th February 2020 at Kırşehir Ahi Evran University Training and Research Hospital. ACT and general information form were used for data collection. Multiple linear regression analysis was performed to determine the sociodemographic and clinical characteristics of adult asthma patients. Two-dimensional graphics were plotted to investigate the patterns between asthma control levels and these risk factors.

**Results:** Out of 140 participants, n=17 (12.1%) were found to have partly controlled asthma. Exercise habit was associated with uncontrolled asthma levels (p=0.043). Male gender, irregular drug use, and lower body mass index (BMI) were associated with higher ACT scores. Partially controlled asthma levels were associated with males, high school graduates, and normal weight, irregular drug use. Uncontrolled asthma levels were related to obesity, regular drug use, and females, housewives, patients aged between 41 and 50 years, having primary school degrees, and illiterate participants. Male gender was found as a sociodemographic risk factor, while lower BMI and irregular drug use were recorded as clinical risk factors. Moreover, a high prevalence of uncontrolled asthma (87.9%) was revealed among adult asthma patients.

**Conclusion:** Training programs for patients with asthama regarding the risk factors are suggested to be organized to increase the awareness of asthma.

**Keywords:** Asthma, risk factors, control, sociodemographic, clinical

## ÖZ

**Amaç:** Bu çalışmanın amacı, astım kontrol testinin (AKT) değerlendirilmesi ve yetişkin astım hastalarının sosyodemografik ve klinik özelliklerinin belirlenmesidir.

**Yöntem:** Bu kesitsel çalışma 13 Ocak 2020 ve 27 Şubat 2020 tarihleri arasında Kırşehir Ahi Evran Üniversitesi Eğitim ve Araştırma Hastanesi Göğüs Hastalıkları Kliniği'nde gerçekleştirilmiştir. Veri toplama araçları olarak AKT ile genel bilgi formu kullanılmıştır. Yetişkin astım hastalarının söz konusu özelliklerinin belirlenmesi için çoklu doğrusal regresyon analizi uygulanmıştır. Bununla birlikte, astım kontrol seviyeleri ile sosyodemografik ve klinik özellikler arasındaki yapının incelenmesi amacıyla iki boyutlu grafiklerden yararlanılmıştır.

**Bulgular:** Yüz kırk hastanın 17'sinde (%12,1) kısmi kontrollü astım belirlenmiştir. Kontrol edilmeyen astım seviyesi, egzersiz alışkanlığı ile ilişkili bulunmuş (p=0,043); erkekler, düzensiz ilaç kullanımı ve düşük vücut kitle indeksi (VKİ), yüksek AKT skorları ile ilişkili bulunmuştur. Kısmi-kontrollü astım düzeyi,

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erkekler, lise mezunları, normal kilolular, düzensiz ilaç kullananlar ile; kontrolsüz astım hastaları ise kadınlar, ilkokul mezunları ve okur-yazar olmayanlar, 41-50 yaş aralığında, obez, düzenli ilaç kullananlarla ilişkilidir.

**Sonuç:** Erkek cinsiyeti sosyodemografik risk faktörü, düşük VKİ ve düzensiz ilaç kullanımı klinik risk faktörleri olarak bulunmuştur. Dahası, bu çalışmada astım hastalarında kontrolsüz astım prevalansı (%87,9) oldukça yüksek elde edilmiştir. Bu nedenle, astım hastalığı hakkında farkındalığın arttırılması amacıyla yetişkin astım hastaları için astım hastalığından korunabilme ve risk faktörleri ile ilgili eğitim programlarının düzenlenmesi önerilmektedir.

**Anahtar Kelimeler:** Astım, risk faktörleri, kontrol, sosyodemografik, klinik

## INTRODUCTION

Asthma is a chronic inflammatory disease that is known to be characterized by airway obstruction, hyperresponsiveness.[1] Frequent wheezing, dyspnea, shortness of breath, chest tightness, and coughing were reported to be the most common symptoms of asthma.[2] Asthma is a major public health problem; it is estimated that 300 million people are affected by asthma globally. On the other hand, the prevalence of asthma was recorded to vary in Turkey, with a range from 0.2% to 11.2.[3-6]

This disease is also known to lead to mortality, morbidity, and lower quality of life across the world. Therefore, guidelines for asthma control and management such as Global Initiative for Asthma were provided to help improve the quality of life of asthma patients as well as to help lessen the mortality and morbidity of this disease.[1]

Asthma is described as a heterogeneous as well as a multifactorial disease that is related to socioeconomic, clinical, genetic, and environmental determinants.[7] This study aimed to investigate sociodemographic and clinical characteristics of patients with asthma and to evaluate asthma control using the asthma control test (ACT) in Kırşehir, Turkey. To the best of our knowledge, this is the first study identifying sociodemographic and clinical features of an adult asthma patient population in Kırşehir Province.

## METHODS

This paper-based cross-sectional study was carried out between 13th January 2020 to 27th February 2020 at the Pulmonary Diseases Policlinics at Kırşehir Ahi Evran University Training and Research Hospital. Inclusion criteria were defined as 18 years old or older patients who were diagnosed with stable asthma, while patients under 18 years old and having any other pulmonary disease such as chronic obstructive pulmonary disease and patients with asthma exacerbation were excluded.

Data were collected via a validated Turkish version of the ACT and general ınformation form, which was created by the researchers by reviewing the existing literature. The form includes questions regarding sociodemographic (age, gender, educational level, occupation) as well as clinical (BMI, history of asthma, smoking, having allergy, accompanying disease, regular drug use, having eczema, skin rash) questions. Adult asthma patients who were admitted to the outpatient clinic were informed via a written consent form. This study was conducted with volunteer participants who gave their consent.

The ACT is a self-administered questionnaire that includes five questions for measuring asthma severity. Each item has a 5-point Likert rating scale, yielding scores ranging from 5 to 25, 5 indicating poor asthma level while a score of 25 means complete asthma level. Asthma control scores can be classified as "uncontrolled", "partly controlled" and "controlled" if participants' ACT scores are below 19 (ACT ≤19), 20≤ACT≤24, and ACT=25, respectively.[8]

The study was performed in accordance with the principles of the Declaration of Helsinki and was approved by the Kırşehir Ahi Evran University Clinical Studies Ethical Committee (approval number: 2019-23/231, date: 24/12/2019).

### Statistical Analysis

Median (minimum-maximum) values were given for quantitative variables, while frequencies and percentages were reported for categorical ones. Kolmogorov-Smirnov test was used to determine the normality of the quantitative data. Mann-Whitney U test was applied for group comparisons for quantitative data, whilst the chi-square test was used for analyzing the association between categorical variables. Multiple linear regression was performed to identify factors related to asthma control scores. Two-dimensional graphs were plotted to investigate the relationship between asthma control groups and sociodemographic and clinical risk factors by implementing correspondence analysis. R Programming Language (R Core Team, 2020) was used for all analyzes The significance level was taken as 0.05.

## RESULTS

Median age with minimum-maximum ages were 50, 18, and 85 years; respectively. Male and female percentages were 24.3% and 75.7%, respectively. Median, minimum, and maximum ACT scores were found to be 15,7,24 points, respectively. n=17 (12.1%) of the participants were in partly controlled asthma level and n=123 (87.9%) were in the level of uncontrolled asthma group at the time of conducting

this study. Baseline characteristics of the participants are given in Table 1.

| Table 1. Baseline characteristics | | |
|---|---|---|
| **Variable** | **n** | **%** |
| **Gender** | | |
| Female | 106 | 75.7 |
| Male | 34 | 24.3 |
| **Education level** | | |
| None | 4 | 2.9 |
| Primary | 76 | 54.3 |
| Secondary | 11 | 7.9 |
| High school | 30 | 21.4 |
| University/college | 19 | 13.6 |
| **Occupation** | | |
| Housewife | 92 | 67.2 |
| Employer | 12 | 8.8 |
| Officer | 15 | 10.9 |
| Self-employed | 10 | 7.3 |
| Student | 8 | 5.8 |
| **Place where you live** | | |
| City center | 111 | 79.3 |
| Rural | 29 | 20.7 |
| **Smoking** | | |
| Yes | 29 | 20.7 |
| No | 92 | 65.7 |
| Former smoker | 19 | 13.6 |
| **Accompanying disease** | | |
| Yes | 83 | 59.7 |
| No | 56 | 40.3 |
| **Family history of asthma** | | |
| Yes | 82 | 58.6 |
| No | 58 | 41.4 |
| **Allergy** | | |
| Yes | 65 | 46.4 |
| No | 75 | 53.6 |
| **Eczema, skin rash** | | |
| Yes | 36 | 25.7 |
| No | 104 | 74.3 |
| **Regular drug use** | | |
| Yes | 101 | 72.7 |
| No | 38 | 27.3 |
| **Feeding pet at home** | | |
| Yes | 23 | 16.4 |
| No | 117 | 83.6 |
| **Seasonal affect to your asthma severity** | | |
| Yes | 115 | 82.1 |
| No | 25 | 17.9 |
| **Diet** | | |
| Yes | 24 | 17.1 |
| No | 116 | 82.9 |
| **Perfume usage habit** | | |
| Yes | 46 | 32.9 |
| No | 94 | 67.1 |
| **Exercise habit** | | |
| Yes | 37 | 26.4 |
| No | 103 | 73.6 |

The most common accompanying diseases with asthma were reported as hypertension (n=40, 41.2%) and diabetes mellitus (n=23, 23.7%), while diseases such as ulcer (n=1, 1%), thyroid (n=1, 1%) and reflux (n=1, 1%) were recorded as the least common ones. Furthermore, the most common irritant was recorded as house dust-mite (n=32, 64%). The distributions are shown with two different figures (Figures 1, 2).

Moreover, among patients who were marked as having eczema, skin rash, or urticaria; urticaria (n=4, 2.9%) and eczema (n=3, 2.1%) were observed as the most frequent ones. Median (minimum-maximum) age was 52 (18-68) years and 50 (18-85) years in partly controlled and uncontrolled groups, respectively (p=0.434). Even though statistically insignificant, the median duration of asthma was found to be 5 (1-17) years and 5 (1-50) years for these aforementioned groups (p=0.630). Moreover, group comparison results revealed that gender, regular drug use, and exercise habit risk factors were observed to be associated with ACT scores (Table 2).

Multiple linear regression analysis was performed to identify related factors for ACT scores. Even though

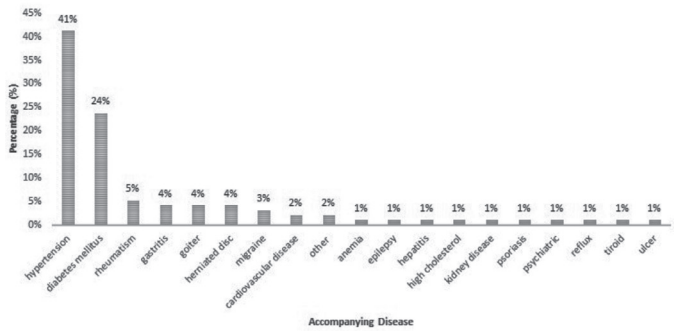


**Figure 1.** Frequency distribution of accompanying disease of asthma

| Table 2. The comparison of uncontrolled and partly controlled level of asthma groups | | | | | |
|---|---|---|---|---|---|
| **Variables** | | **Uncontrolled** | **Partly controlled** | **Total** | **p value** |
| **Age** | | 50 (18-85) | 52 (18-68) | 50 (18-85) | 0.434 |
| **BMI** | | 31.65 (18.69-51.42) | 28.70 (18.07-40.82) | 31.60 (18.07-51.42) | 0.221 |
| **Duration of asthma (year)** | | 5 (1-50) | 5 (1-17) | 5 (1-50) | 0.630 |
| **Duration of smoking (year)** | | 20 (1-50) | 8 (3-50) | 20 (1-50) | 0.706 |
| **Median of count of cigarette per day** | | 17.50 (2-40) | 4 (2-20) | 10 (2-40) | 0.051 |
| **Gender** | Female | 97 (78.9) | 9 (52.9) | 106 (75.2) | 0.032 |
| | Male | 26 (21.1) | 8 (47.1) | 34 (24.3) | |
| **Education level** | None | 4 (3.3) | 0 (0) | 4 (2.9) | 0.07 |
| | Primary | 69 (56.1) | 7 (41.2) | 76 (54.3) | |
| | Secondary | 11 (8.9) | 0 (0) | 11 (7.9) | |
| | High school | 22 (17.9) | 8 (47.1) | 30 (21.4) | |
| | University/college | 17 (13.8) | 2 (11.8) | 19 (13.6) | |
| **Occupation** | Housewife | 86 (70.5) | 6 (40) | 92 (67.2) | 0.127 |
| | Employer | 9 (7.4) | 3 (20) | 12 (8.8) | |
| | Officer | 12 (9.8) | 3 (20) | 15 (10.9) | |
| | Self-employed | 9 (7.4) | 1 (6.7) | 10 (7.3) | |
| | Student | 6 (4.9) | 2 (13.3) | 8 (5.8) | |
| **Place where you live** | City center | 97 (78.9) | 14 (82.4) | 111 (79.3) | 0.999 |
| | Rural | 26 (21.1) | 3 (17.6) | 29 (20.7) | |
| **Smoking** | Yes | 26 (21.1) | 3 (17.6) | 29 (20.7) | 0.126 |
| | No | 83 (67.5) | 9 (52.9) | 92 (65.7) | |
| | Former smoker | 14 (11.4) | 5 (29.4) | 19 (13.6) | |
| **Accompanying disease** | Yes | 75 (61) | 8 (50) | 83 (59.7) | 0.427 |
| | No | 48 (39) | 8 (50) | 56 (40.3) | |
| **Family history of asthma** | Yes | 72 (58.5) | 10 (58.8) | 82 (58.6) | 0.999 |
| | No | 51 (41.5) | 7 (41.2) | 58 (41.4) | |
| **Allergy** | Yes | 55 (44.7) | 10 (58.8) | 65 (46.4) | 0.308 |
| | No | 68 (55.3) | 7 (41.2) | 75 (53.6) | |
| **Eczema, skin rash** | Yes | 35 (28.5) | 1 (5.9) | 36 (25.7) | 0.072 |
| | No | 88 (71.5) | 16 (94.1) | 104 (74.3) | |
| **Regular drug use** | Yes | 93 (76.2) | 8 (47.1) | 101 (72.7) | 0.019 |
| | No | 29 (23.8) | 9 (52.9) | 38 (27.3) | |
| **Feeding pet at home** | Yes | 21 (17.1) | 2 (11.8) | 23 (16.4) | 0.739 |
| | No | 102 (82.9) | 15 (88.2) | 117 (83.6) | |
| **Seasonal affect to your asthma severity** | Yes | 103 (83.7) | 12 (70.6) | 115 (82.1) | 0.188 |
| | No | 20 (16.3) | 5 (29.4) | 25 (17.9) | |
| **Diet** | Yes | 22 (17.9) | 2 (11.8) | 24 (17.1) | 0.737 |
| | No | 101 (82.1) | 15 (88.2) | 116 (82.9) | |
| **Perfume usage habit** | Yes | 38 (30.9) | 8 (47.1) | 46 (32.9) | 0.269 |
| | No | 85 (69.1) | 9 (52.9) | 94 (67.1) | |
| **Exercise habit** | Yes | 36 (29.3) | 1 (5.9) | 37 (26.4) | 0.043 |
| | No | 87 (70.7) | 16 (94.1) | 103 (73.6) | |

Numerical variables were summarized with median (minimum – maximum), Categorical variables were summarized with frequency (%).
BMI: Body mass index

BMI was not associated with these scores, this variable was included in the regression model to investigate its relationship with ACT scores. Results revealed that sociodemographic determinants such as male gender [β=1.354; 95% confidence interval (CI): -0.078-2.786] and clinical determinants such as not using drugs regularly (β=2.741; 95% CI: 1.365-4.116) and lower BMI (β=-0.102; 95% CI: -0.203/-0.002), were associated with higher ACT scores, namely the partly controlled level of asthma in the present study (Table 3).

Scatterplots of the combined distribution of the first two dimensions of multiple correspondence analysis were drawn to assess the relationship between asthma control levels and sociodemographic and clinical risk factors. Plots have shown that partially controlled asthma level was associated with male, employe, self-employe and high-school-graduate participants; while female housewives aged between 41 and 50 and aged between 61-70, having primary school degree and illiterate participants seemed to be related to no asthma control group (Figure 3a).

On the other hand, for clinical risk factors, graphs have suggested that partially controlled asthma levels were found to be associated with normal weight, former smokers or newly smokers (subjects who smoke less than a year), no accompanying disease with asthma, having no regular drug use, having a duration of asthma from 1 to 5 years, and feeding pets at home. The uncontrolled asthma group was found to be related to being overweight, obese, having eczema or skin rash, having regular drug use, and having a family history of asthma (Figure 3b).

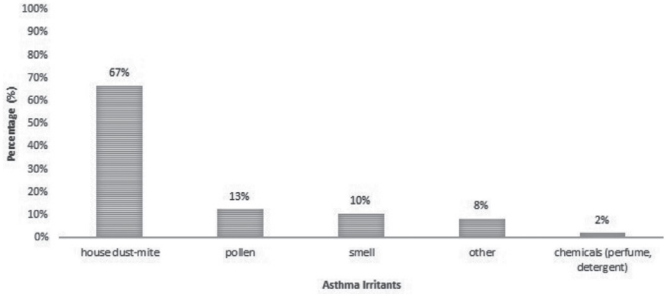


**Figure 2.** Frequency distribution of asthma irritants

## DISCUSSION

In this study, we identified the sociodemographic and clinical characteristics of adult asthma patients in Kırşehir province. Most of the participants were in the uncontrolled

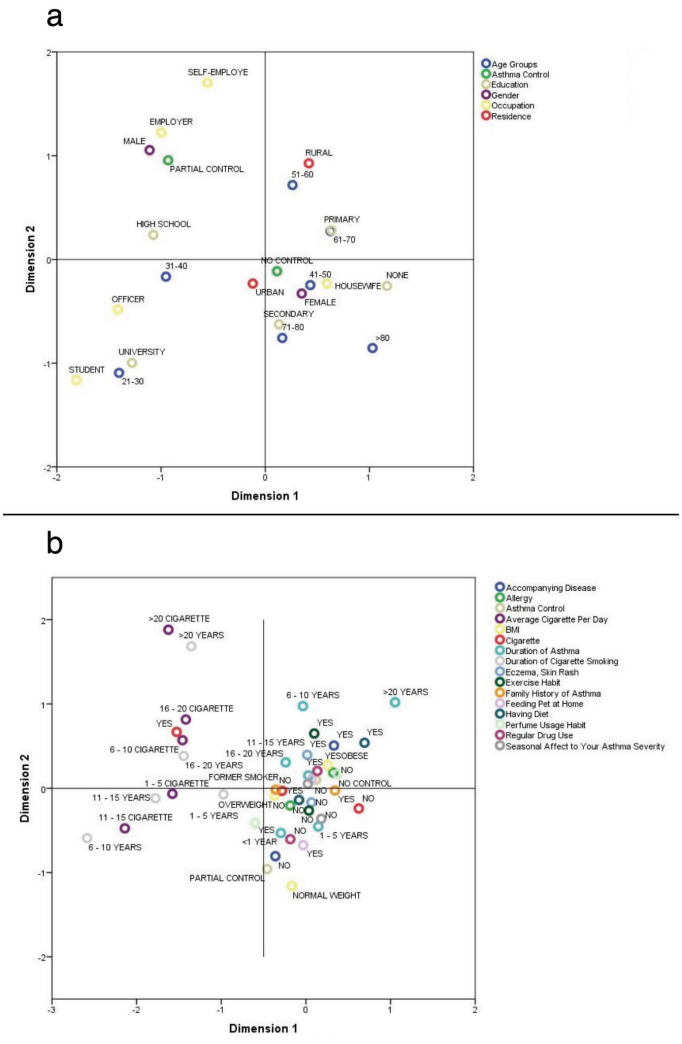


**Figure 3.** a) Two dimensional graphs for (a) sociodemographic and (b) clinical risk factors and asthma control levels. b) Two dimensional graphs for (a) sociodemographic and (b) clinical risk factors and asthma control levels

**Table 3. Results of multiple linear regression analysis**

| Model | β | SE (β) | p value | 95% Confidence interval for β | |
|---|---|---|---|---|---|
| | | | | Lower bound | Upper bound |
| **Constant** | 12.971 | 2.287 | <0.001 | 8.447 | 17.495 |
| **Gender** | 1.354 | 0.724 | 0.050 | -0.078 | 2.786 |
| **BMI** | -0.102 | 0.051 | 0.046 | -0.203 | -0.002 |
| **Regular drug use** | 2.741 | 0.695 | <0.001 | 1.365 | 4.116 |

F=8.140, p<0.001, β: Beta coefficient, SE: Standard error, BMI: Body mass index

asthma level at the time of conducting this research. Partly-controlled and uncontrolled asthma prevalences were found to be 12.1% and 87.9%, respectively, showing that uncontrolled asthma prevalence is quite higher than partly-controlled asthma prevalence. Similar and different partly- and uncontrolled levels of asthma prevalence were reported in previous studies.[9-13] Participants' properties were also evaluated in terms of accompanying disease and irritant frequencies. Hypertension and diabetes mellitus were reported as the most frequent accompanying diseases with asthma in this study. Several kinds of research in literature found different co-morbidities with asthma, such as allergic rhinitis, heart disease, and tuberculosis, on the other hand, inconsistent with our results, diabetes mellitus and hypertension were recorded as the associated diseases with asthma in previous studies.[5,11,12,14] Moreover, house dust mite was observed to be the most prevalent irritant based on the findings of our study. In the literature, house dust mites and pollen were reported as irritants related to asthma, dust mites were recorded to be associated with poor asthma levels, and indoor irritants were observed to be associated with poor asthma control.[15-17] Multiple linear regression analysis results indicated that male gender was the significant sociodemographic risk factor, while lower BMI and irregular drug usage were reported as clinical risk factors for partly controlled asthma levels. Inconsistent with our results, several previous studies revealed that men were more likely to have more controlled asthma levels, while several other studies reported similarities across controlled and uncontrolled asthma in terms of gender.[9,15,18-22] BMI was found to be a clinical risk factor that is related to asthma levels. Similar results have been published earlier on this issue, while some studies found no association between BMI and asthma control levels.[18,23-26] Besides BMI, irregular drug use was observed to be associated with partly controlled asthma levels in our study. Similarly, medication access was associated with poor asthma control.[18] Contrary to our results, low asthma control was reported to be related to errors in asthma medication use, poor drug adherence.[27] Moreover, the prevalence of medication usage for asthma was reported to be higher in urban cities compared to rural areas, which was a consequence of the awareness of asthmatic patients living in urban areas.[7,28] Furthermore, different studies have reported different risk factors for asthma levels. Unemployment, active smoking, being single or widowed, and improper device use by patients were recorded as risk factors for uncontrolled asthma by Al-Zahrani et al.[21] Smoking, family history of asthma, nasal congestion in the past 12 months, biomass smoke exposure, urban residence, and all respiratory symptoms associated with asthma including cough, shortness of breath, chest pain, and sputum production were reported as factors related to asthma by Kirenga et al.[15] In contrast to these studies' roking was not found as a significant risk factor for patients with asthama in this study. Dalcin et al.[9] reported severity of asthma, access to asthma medications dependent on the public health system, and regular use of inhaled corticosteroids as significant risk factors for uncontrolled asthma.

### Study Limitations

This study has some limitations. First, it is a single-center study; therefore, these results cannot be generalized to the whole asthma-patient population of Turkey. Second, part of this study is questionnaire-based, therefore bias cannot be ignored. Third, there are no asthma patients whose status is under control in the current study. Therefore, this level cannot be included in group comparisons. The main reason for this circumstance can be attributed to the application of the questionnaires in a short time, the approximate duration of this study was one month, and in this very limited time, we could not reach adult asthma patients with fully controlled levels. Moreover, even though male gender was listed as a sociodemographic risk factor for adult asthma patients, inclusion of a lower number of male genders should be considered while interpreting this result. Therefore, the small sample size for male gender should be characterized as a limitation of the research. Furthermore, the relationship between asthma control and asthma severity was not investigated in this current study, the focus was rather on assessing the clinical and sociodemographic characteristics of adult asthmatic patients admitted to the outpatient clinic in Kırşehir. On the other hand, the relationship between asthma levels and the quality of life of adult asthma patients was beyond the scope of this present study; therefore, identifying and including this kind of relationship could be seen as a possible future research option.

## CONCLUSION

This current study revealed high prevalence of uncontrolled asthma among adult asthmatic patients who were admitted to outpatient asthma clinics in Kırşehir, Turkey. Enhanced levels of asthma control and awareness of its risk factors are required to determine the burden of this disease. Therefore, educational programs regarding risk factors of asthma and possible ways to avoid them are recommended to be performed to increase the control level.

Furthermore, results of this study suggest that the male gender was found as a sociodemographic risk factor for adult asthma patients despite the small sample size for the

male gender group; lower BMI and irregular drug use were recorded as clinical risk factors for this study sample.

In conclusion, a comprehensive study was conducted for assessing the sociodemographic and clinical characteristics of adult asthma patients in Kırşehir province. Multicenter studies are recommended to be conducted to better understand the risk factors for asthma and determine the effective strategies to control it. Moreover, further research with a larger sample size is needed to precise the current results of the study.

## Ethics

**Ethics Committee Approval:** The study was performed in accordance with the principles of the Declaration of Helsinki and was approved by the Kırşehir Ahi Evran University Clinical Studies Ethical Committee (approval number: 2019-23/231, date: 24/12/2019).

**Informed Consent:** Consent form was filled out by all participants.

**Peer-review:** Externally peer-reviewed.

## Authorship Contributions

Concept: N.M.K, A.E., Design: N.M.K, A.E., Data Collection or Processing: N.M.K, E.K., Analysis or Interpretation: N.M.K, E.K., Literature Search: N.M.K., Writing: N.M.K.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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