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The Effect of Central Obesity in Children with Allergic and Non-Allergic Rhinitis

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ABSTRACT

Objective: Although there has been increased attention in recent years to the relationship between allergic disease and obesity, there is limited information about allergic rhinitis (AR) and central obesity. The aim of this study is to investigate the relationship between central obesity and rhinitis severity in patients with rhinitis and controls.

Materials and Methods: A total of 164 children, aged 7-17 years, were included in the study between 2020 and 2021. Three groups were formed: AR, non-allergic rhinitis (NAR), and the control group. The height, weight, waist, hip, neck, and arm circumference of the groups were measured. The BMI, waist-to-hip ratio, waist-to-height ratio, and conicity index were calculated. Eosinophil and neutrophil counts, IgE levels, and allergic sensitization were recorded. Anthropometric measurements, rhinitis severity, and persistence were compared among the groups.

Results: The study included a total of 164 children: 63 with AR, 51 with NAR, and 50 in the control groups of the children included in the study, 71 (43.3%) were boys, and 93 (56.7%) were girls. Approximately 30% of children with normal BMI were evaluated as centrally obese despite having a normal weight. Rhinitis patients had a higher prevalence of central obesity compared to the control group. When comparing both persistence and disease severity, central obesity was higher in AR patients than in NAR patients. The AR group had higher BMI, arm circumference, waist circumference, and neck circumference than the control group (p=0.003, p=0.01, 0.001, 0.004, respectively), while the waist-to-height ratio was higher in both the AR and NAR groups compared to the control group (p=0.001, p=0.026).

Conclusion: In this study, central obesity was significantly higher in patients with AR and NAR than in the control group although there was no significant difference in obesity between the groups according to BMI. Additionally, centrally obese AR patients exhibited higher persistence and disease severity compared to NAR patients. In conclusion, other obesity indicators such as waist circumference should be measured in addition to height and body weight in children with AR and NAR.

Keywords: Allergic rhinitis, central obesity, children, non-allergic rhinitis

INTRODUCTION

Allergic rhinitis (AR) is one of the most common chronic inflammatory diseases in childhood, and its prevalence is increasing in both developed and developing countries (1,2). Globally, the prevalence of AR in childhood ranges from 0.8% to 45% (3). The World Health Organization (WHO) European Childhood Obesity Surveillance Initiative (COSI) has reported overweight and obesity rates among 6 to 9-year-old children in Europe as 9% to 43% in boys and 5% to 43% in girls in the 2015-2017 period (4,5). The prevalence of both disorders is increasing globally, leading to a decreased quality of life and becoming a major public health concern (6).

Numerous epidemiological studies have demonstrated an association between increased body mass index (BMI) and asthma or AR (7-10). However, little is known about the relationship between obesity and AR (11). There are conflicting results regarding the effect of obesity on the

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development of atopy (12). Recent studies have indicated that elevated levels of leptin and IL-1β, observed in obesity, lead to the activation of inflammatory cells, exacerbating inflammation in AR and contributing to disease severity (13,14). However, there are also studies suggesting that central obesity, which more accurately reflects visceral adiposity, is associated with a reduced likelihood of AR in both boys and girls (15).

BMI is commonly used as an obesity marker in epidemiological studies on AR. While the association between AR and BMI has been primarily investigated, the relationship between body fat distribution, central obesity, and AR is uncertain. Furthermore, it is unclear whether alternative methods of measuring adipose tissue provide different or additional phenotypic information compared to BMI (16). Our study aims to evaluate the relationship between the anthropometric measurements and the severity, persistence, and allergen sensitivity of rhinitis in AR patients, non-allergic rhinitis (NAR) patients, and the control group.

MATERIAL and METHODS

This study included children with rhinitis who were followed up in between 2020 and 2021. Patients with rhinitis were divided as AR and NAR. Healthy children with no known chronic or allergic diseases were included in the control group.

Exclusion criteria included the presence of other diseases (such as congenital heart disease, chronic illnesses, etc.) accompanying the diagnosis of rhinitis in the patient group, and the presence of chronic illness, asthma, AR, urticaria, atopic dermatitis symptoms, or known allergies (food, house dust mite, etc.) in the control group.

The skin prick test and allergen-specific IgE were evaluated when there were clinical findings of rhinitis. Positive results were considered indicative of allergic rhinitis, while negative results were considered indicative of non-allergic rhinitis (17). According to ARIA criteria, the classification and severity of AR and NAR were determined (18). Age, rhinitis diagnosis age, follow-up period, rhinitis type, severity, and classification of AR and NAR patient groups were recorded. Measurements of weight, height, waist circumference, hip, neck, and arm circumference were taken in both the patient and control groups. Waist-to-hip ratio, waist-to-height ratio, BMI, and conicity index were calculated. Individuals with a positive skin prick test results were included in the AR group, while those with negative results were included in the NAR group.

Atopy was determined based on the skin prick test performed using common inhaled allergens or the serum level of specific IgEs.

The patients' skin prick test (SPT) results, eosinophil, and neutrophil values, specific IgE, and total serum IgE were recorded from our hospital's data system.

Informed consent form signatures were obtained from the parents of the children participating in the study. This research was approved by Selcuk University's local ethical committee on 17.01.2020 with decision number 2020/50.

Skin Prick Test

A skin prick test was conducted using common allergens, including Dermatophagoides farinae, Dermatophagoides pteronyssinus, Alternaria, Cladosporium, a mixture of 3 trees (Alnus, Betula, Corylus), a mixture of 4 cereals (Avena, Hordeum, Triticum, Secale), a combination of 6 herbs (Dactylis, Festuca, Lolium, Phleum, Poa, Urtica dioica), and cat and dog dander extracts. Histamine was used as a positive control and saline as a negative control. The results were evaluated after 15 minutes, and an induration diameter of 3 mm or more was considered a positive result.

Anthropometric Measurements

Bodyweight was measured without shoes, and after removing outer garments, using a digital scale that was sensitive to 100 grams and maintains its calibration.

Height was measured using a stadiometer with a precision of 1 mm, capable of measuring heights between 80-200 centimeters (cm), while the child stood without shoes maintaining an upright position as much as possible. During the measurement, care was taken to ensure that the most prominent parts of the head, scapulae, gluteal region, back of the legs, and heels contacted the measuring board.

Waist circumference was measured, at the level of the umbilicus, using a non-stretchable tape measure on the exposed waist circumference, with the child performing slight expiration (i.e., immediately after exhaling). The assessment of waist circumference was conducted using reference curves, created by Hatipoğlu et al., based on gender, by measuring a total of 4770 school children aged 7-17 years (19). A threshold value above the 90th percentile was considered as indicative of central obesity (20). Hip circumference was measured around the greater trochanter using a non-stretchable tape measure.

Arm circumference was measured from the midpoint between the acromial process on the shoulder and the olecranon process on the elbow, with the arm bent at a 90-degree angle from the elbow. The measurements were recorded in centimeters. Arm circumference reference curves, according to gender, were used based on measurements conducted by Ozturk et al. on a total of 5553 school children aged 6-17 years (21). A threshold value above the 90th percentile was considered as indicating subcutaneous fat distribution (21,22).

Neck circumference evaluation was performed using reference curves developed by Mazicioglu et al., using measurements from 5481 school children aged 6 to 18, and considering gender. Neck circumference was measured in an upright position, facing forward, just below the larynx, perpendicular to the axis of the neck. A threshold value above the 90th percentile was accepted as indicative of subcutaneous fat distribution (23). BMI, BMI percentile, and BMI z-score were calculated using the WHO AnthroPlus Anthropometric Calculator, applying WHO's BMI reference values that vary according to age and gender. Patients were classified as obese if their BMI for age value was above the 95th percentile (>2 SD) according to the WHO criteria for ages 5-19 years (30 kg/m^2 for 19 years) (16). The conicity index was calculated using the formula '= waist circumference (m)/ (0.109) √ weight (kg)/height (m)'. The constant value of 0.109 converts volume units to length units.

Since there are no national and international standard data available specifically for hip circumference, waist/hip ratio, waist/height ratio, and conicity index in children, these were evaluated by comparing the groups.

Laboratory

An eosinophil count of 400/mm^3 or higher and an eosinophil percentage of 4% or above were considered as eosinophilia (24). Normal neutrophil counts and percentages were determined based on age using the Harriet Lane Handbook 2020 (25).

The groups were assessed based on total IgE levels in serum. Levels below 100 IU/ml were considered normal, while levels above 100 IU/ml were classified as high (18). A specific IgE level greater than 0.35 kU/L was considered positive.

Statistical Analysis

Statistical analysis was conducted using the SPSS 21.0 software package. The Kolmogorov-Smirnov normality test was utilized to determine whether the data followed a parametric or non-parametric distribution. The Levene test was employed to assess the homogeneity of variances for comparing the differences between two groups, and either the independent two-sample T-test or the Mann-Whitney U test was employed, depending on the distribution of the data. ANOVA or the Kruskal-Wallis H test was used to evaluate the differences among more than two groups. Pairwise comparisons between groups were performed using either the Tukey test or the Mann-Whitney U test. The chi-square test was employed to examine the relationship between variables. A significance level of $p<0.05$ was considered statistically significant.

RESULTS

Demographic and Clinical Data

The total sample consisted of 164 children who were divided into three subgroups: AR, NAR, and control. Among them, there were 63 AR patients with a median age of 13.0 years (range, 10 to 16 years), 51 NAR patients with a median age of 11.0 years (range, 9 to 15 years), and 50 control participants with a median age of 13.0 years (range, 10 to 16 years). There was no significant difference between the groups in terms of sex and age distribution (p=0.672 and p=0.09, respectively) (Table I).

The mean age at diagnosis was 10.49±3.87 years for AR patients and 10.02±3.85 years for NAR patients, with no significant difference between the two groups (p=0.53). The follow-up period for AR patients was 24 months (range: 0-132), which was longer compared to NAR patients with a follow-up period of 12 months (range: 0-96) (Table I).

In terms of rhinitis severity, 38 children (33.4%) had intermittent mild rhinitis, 3 children (2.6%) had intermittent moderate-to-severe rhinitis, 39 children (34.2%) had persistent mild rhinitis, and 34 children (29.8%) had persistent moderate-to-severe rhinitis. The number of patients with persistent and moderate-to-severe rhinitis was higher in the AR group compared to the NAR group (p=0.003 and 0.025, respectively).

Table I: Demographic and clinical characteristics of all participants.

	AR n=63	NAR n=51	Control n=50	*p*-value
Gender (male/ female)	30/33	21/30	20/30	0.672[1]
Age (year)	13 (10-16)	11 (9-15)	13 (10-16)	0.092[2]
The age of diagnosis (years)	10.49±3.87	10.02±3.85	–	0.533[3]
Follow-up period (months)	24 (3-148)	12 (1-36)	–	0.114[4]
Rhinitis severity				0.025[1]
mild	37 (59)	40 (78)	–	
moderate to severe	26 (41)	11 (22)	–	

AR: Allergic rhinitis, **NAR:** Non-allergic rhinitis
Data are presented as mean ± standard deviation, median (Q1-Q3), or number (percentage)
1: Chi-Square test 2: Kruskal-Wallis test 3: Two independent samples t-test 4: Mann-Whitney U test

Table II: The comparison of anthropometric measurements between groups.

Variables	AR n=63	NAR n=51	Control n=50	p-value	AR vs NAR	AR vs Control	NAR vs Control
Weight (kg)	52.68 ± 17.74	45.07 ± 16.33	43.83 ± 13.94	0.007[1]	0.04	0.01	1.00
Height (cm)	159 (140-165)	150 (135-158)	155 (137-163)	0.01[2]	0.01	0.65	0.34
BMI	20.4 (17.8-24.0)	18.9 (16.4-23.6)	18.2 (16.7-21.0)	0.005[2]	0.39	0.003	0.27
BMI z-score	0.72 ± 1.12	0.57 ± 1.36	-0.17 ± 1.29	0.001[1]	0.23	0.06	0.01
Waist circumference (cm)	75 (67-84)	65 (62-81)	67.5 (62-70)	0.001[2]	0.02	0.001	0.94
Hip circumference (cm)	89.75 ± 12.55	85.56 ± 13.10	82.82 ± 10.95	0.011[1]	0.37	0.06	0.78
Arm circumference (cm)	24.47 ± 4.40	23.14 ± 4.20	22.72 ± 3.12	0.052[1]			
Neck circumference (cm)	31 (30-34)	30 (28-33)	30 (28-32)	0.005[2]	0.13	0.004	0.74
Waist Hip ratio	0.84 ± 0.06	0.82 ± 0.07	0.81 ± 0.06	0.058[1]			
Conicity index	0.62 (0.54-0.74)	0.69 (0.58-0.77)	0.59 (0.54-0.73)	0.091[2]			
Waist Height ratio	0.48 (0.44-0.52)	0.45 (0.43-0.52)	0.44 (0.41-0.46)	0.001[2]	0.86	0.001	0.02

AR: Allergic rhinitis, **NAR:** Non-allergic rhinitis
Data are presented as mean ± standard deviation or median (min-max)
1: One-way variance analysis (ANOVA) test 2: Kruskal-Wallis H test

Among the AR group, 22 patients were monosensitized, and 41 patients were polysensitized based on the SPT results. Further analysis revealed that 10 patients (15.8%) were sensitized to pollen, 8 patients (12.7%) were sensitized to house dust mites, 4 patients (6.4%) were sensitized to cat and dog dander, and 41 patients (65.1%) showed allergic sensitivity to more than one allergen (polysensitized).

Table I presents a comprehensive overview of the demographic and clinical characteristics of all participants.

Anthropometric Measurements

In terms of anthropometric measurements, the three groups (AR, NAR, and control) showed a significant difference in height, weight, BMI, BMI z-score, waist circumference, hip circumference, waist/height ratio, and neck circumference, while no significant difference was observed in the conicity index and arm circumference. The AR group had higher mean BMI, arm circumference, waist circumference, neck circumference, and waist/height ratio compared to the control group. Additionally, the NAR group had higher BMI z-score and waist/height ratio than the control group. Detailed comparisons of anthropometric measurements between the groups are presented in Table II.

When comparing the proportions of participants in the AR, NAR, and control groups with neck and arm circumference above the 90th percentile, no significant differ-

Table III: The comparison of neck, waist, arm circumference, and BMI between groups.

		AR n=63	NAR n=51	Control n=50	p-value [1]
Neck circumference percentile	≤90 P	46 (73.0)	35 (68.6)	44 (88.0)	0.055
	>90 P	17 (27.0)	16 (31.4)	6 (12.0)	
Waist circumference percentile	≤90 P	26 (41.3)	28 (54.9)	40 (80.0)	0.001*
	>90 P	37 (58.7)	23 (45.1)	10 (20.0)	
BMI percentile	≤95 P	48 (76.2)	40 (78.4)	44 (88.0)	0.263
	>95 P	15 (23.8)	11 (21.6)	6 (12.0)	
Arm circumference percentile	≤90 P	37 (58.7)	33 (64.7)	38 (76.0)	0.154
	>90 P	26 (41.3)	18 (35.3)	12 (24.0)	

AR: Allergic rhinitis, **NAR:** Non-allergic rhinitis
Data are presented as numbers (percentage)
1: Chi-Square test, * AR & Control p=0.001 and NAR & Control p=0.001

Table IV: The distribution of obesity is defined by BMI percentile and waist circumference (WC) percentile in all groups.

			p-value	AR vs NAR	AR vs Control	NAR vs Control
Central obesity, according to WC >90 P	**AR**	38 (60,3)	0.001[1]	0.152	0.001	0.013
	NAR	23 (45)				
	Control	10 (20,0)				
General obesity, according to BMI >95 P	**AR**	15 (23,8)	0.263[1]	0.953	0.174	0.308
	NAR	11 (21,5)				
	Control	6 (12,0)				

AR: Allergic rhinitis, **NAR:** Non-allergic rhinitis
Data are presented as numbers (percentage)
1: Chi-Square test

ence was found (p=0.055 and p=0.154, respectively). The comparison of neck and arm circumference percentiles between groups can be found in Table III.

While there was no difference between the groups in terms of general obesity, a significant difference was observed in central obesity. The prevalence of central obesity was higher in both the AR and NAR groups compared to the control group (p=0.001). The distribution of obesity based on BMI percentile and waist circumference (WC) in all groups is provided in Table IV.

Laboratory Data

In terms of laboratory data, there was no significant difference in eosinophil count and percentage between the AR and NAR groups. However, a significant difference was observed between the AR group and the control group (p=0.001; 0.001) in terms of eosinophil count and percentage. Additionally, the mean total serum IgE value showed a significant difference (p=0.004) between the AR and NAR groups. Children with AR had higher total serum IgE levels (>100 IU/ml) compared to children with NAR.

The relationship between rhinitis, central and general obesity

The frequency of central obesity was found to be higher in both the AR and NAR patient groups compared to the control group (p=0.001; 0.013, respectively). However, there was no significant difference between the groups in terms of general obesity (p=0.263). No significant relationship was observed between central and general obesity and gender among the groups.

A significant difference was found between obesity based on waist circumference and obesity frequency based on BMI (p=0.001). Among the children evaluated as obese based on waist circumference, 55% (39 out of 71) were not classified as obese based on BMI. On the other hand,

Table V: Comparison of rhinitis severity in central and general obese patients with allergic and non-allergic rhinitis.

	Intermittent Mild	Intermittent moderate-to-severe	Persistent Mild	Persistent moderate-to-severe	p-value
General obesity, according to BMI					0.068[1]
AR, n (%)	4 (12.2)	–	3 (8.3)	8 (25.0)	
NAR, n (%)	4 (6.0)	2 (66.6)	4 (8.3)	1 (3.1)	
Central obesity, according to WC					0.006[1]
AR, n (%)	9 (24.2)	–	14 (36.1)	15 (46.9)	
NAR, n (%)	11 (27.2)	2 (66.6)	9 (22.2)	1 (3.1)	

AR: Allergic rhinitis, **NAR:** Non-allergic rhinitis
Data are presented as numbers (percentage)
1: Chi-Square test

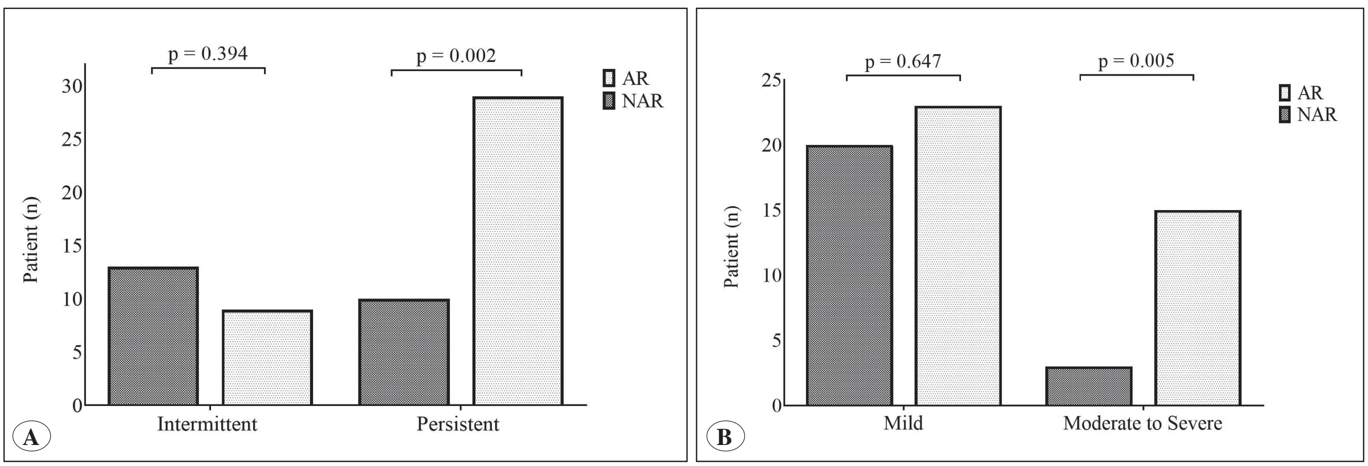

Figure 1. Rhinitis severity according to ARIA classification in patients with AR and NAR who had central obesity.

approximately 30% (39 out of 132) of the children classified as normal weight based on BMI were considered obese based on waist circumference.

There was a significant difference between the groups according to the severity of rhinitis in patients with AR and NAR with central obesity (p=0.006). There was no significant difference in AR and NAR patients who were generally obese (p=0.068) (Table V).

In terms of the severity of rhinitis, a significant difference was observed between the central obese AR and NAR patient groups (p=0.006). However, there was no significant difference in terms of general obesity between the AR and NAR patients (p=0.068). The severity of rhinitis, based on the ARIA classification, was higher in central obese AR patients compared to NAR patients.

No significant difference was found between the central and general obese AR patients regarding the relationship between allergen sensitivity types (p=0.202; 0.533, respectively). Furthermore, no significant relationship was observed between anthropometric measurements and allergen sensitivity types. The relationship between rhinitis, central obesity, and general obesity in terms of severity, classification, and allergen sensitivity is summarized in Table V and Figure 1.

The relationship between rhinitis, asthma, and other comorbidities

Out of the total 114 children with rhinitis, 55 (48.2%) also had asthma. There was a significant difference between the rhinitis with asthma group and the control group in terms of central obesity (p=0.001) and general obesity (p=0.035). Additionally, there was a significant difference between the rhinitis group and the control group in terms of general obesity (p=0.003). However, no significant difference was found between rhinitis patients and rhinitis

Table VI: The distribution of obesity is defined by BMI percentile and waist circumference (WC) percentile in all groups.

			p-value	Rhinitis with Asthma vs. Rhinitis	Rhinitis with Asthma vs. Control	Rhinitis vs. Control
Central obesity, according to WC >90 P	Rhinitis with Asthma	32 (58.2)				
	Rhinitis	29 (49.2)	0.001[1]	0.334	0.001	0.003
	Control	10 (20.0)				
General obesity, according to BMI >95 P	Rhinitis with Asthma	17 (30.9)				
	Rhinitis	9 (15.3)	0.030[1]	0.077	0.035	0.832
	Control	6 (12.0)				

Data are presented as numbers (percentage), 1: Chi-Square test

with asthma patients in terms of general and central obesity (p=0.077, p=0.334) (Table VI).

Serous otitis media was detected in 7 (11.1%) of the patients with AR and 7 (13.7%) of the patients with NAR. There was no significant difference between the two groups in terms of otitis media (p=0.443). Similarly, chronic rhinosinusitis was observed in 18 (28.6%) of the patients with AR and 14 (27.9%) of the patients with NAR, with no significant difference between the two groups (p=0.532).

DISCUSSION

In the present study, the relationship between anthropometric measurements such as waist circumference, hip circumference, waist/hip ratio, waist/height ratio, neck circumference, arm circumference, and conicity index, and pediatric patients with rhinitis, as well as their association with AR, NAR, rhinitis severity, allergen sensitivity types, and obesity, was examined. The findings revealed that central obesity was associated with rhinitis but not with atopy, while general obesity was not significantly associated with rhinitis.

The literature presents conflicting results regarding the impact of obesity on allergic conditions. Some studies have reported a strong relationship between BMI and AR, finding higher BMI values in AR patients compared to controls (26,27). A large-scale study conducted in Wuhan City, China, involving 3,327 participants, also found a significant association between obesity (based on BMI) and increased AR and atopic dermatitis (28). However, other studies, such as those by Sybilski et al. and Kusunoki et al., have shown no relationship between obesity (based on BMI) and asthma or AR, which is consistent with the results of the current study (29,30).

Central obesity, characterized by excess abdominal fat, is considered a crucial determinant of obesity-related morbidity in various diseases. It is an independent predictor of insulin resistance in children and has been associated with airway inflammation, insulin resistance, and dyslipidemia. However, studies investigating the association between central obesity and childhood asthma and AR have yielded inconsistent results. For example, a study based on the National Health and Nutrition Examination Study (NHANES) involving 2,358 children and 4,906 adults demonstrated that central obesity in children was associated with a reduced likelihood of AR (15). On the other hand, Musaad et al. found a positive association between measures of central obesity, such as waist circumference, and asthma in children with AR (31).

In the current study, it was observed that children with central obesity had wider neck circumferences compared to non-obese children. This finding is in line with the studies by Hacihamdioglu et al. and Nafiu et al., which reported a significant relationship between wider neck circumference and severe asthma, positive history of asthma, obstructive sleep apnea, snoring, and perioperative adverse respiratory events (32,33).

Akın et al. (34) conducted a study involving with a total of 196 children, including 102 asthmatic children, and 94 children admitted to the outpatient clinic for other reasons such as AR and urticaria. They compared various parameters such as BMI, waist circumference, hip circumference, prevalence of overweight and obesity, prevalence of atopy, total serum IgE levels, and eosinophil count values between the two groups. The results showed no significant difference between the groups in terms of these parameters. However, they did find that children in the asthmatic group had wider neck circumferences compared to non-asthmatic obese or overweight subjects. They also observed a relationship between neck circumference above the 90th percentile and the presence of asthma in obese or overweight children. Waist circumference, hip circumference, and BMI values were deemed insufficient in explaining the relationship between asthma and obesity in children. In our study we found a significant difference in waist circumference and BMI values between the AR and control groups.

Although childhood obesity is known to be a risk factor for asthma and AR, the precise molecular mechanisms linking obesity to the severity of AR remain unclear. Recent studies have suggested that obesity can be a risk factor for severe and persistent AR symptoms, and elevated levels of leptin and IL-1β may contribute to symptom activation. Leptin is believed to be involved in TH2/17-mediated inflammation and may increase disease severity by promoting the accumulation and activation of inflammatory cells in obese children with AR. In our study, we found that AR symptoms were more severe and persistent in patients with central obesity compared to patients without obesity.

One limitation of the study was the lack of reference curves for age and gender in the country, which resulted in comparisons only between groups when investigating the role of hip circumference, waist/hip ratio, waist/height ratio, and conicity measurements in the relationship between obesity and AR. Additionally, the study's cross-sectional design may have led to an over- or underestimation of rhinitis severity, as seasonal variations (e.g., high pollen season) were not considered. Further research is needed to explore the relationship between central obesity and AR more comprehensively, including investigations into disease severity, central obesity, and environmental control measures such as diet and exercise.

In conclusion, understanding the relationship between AR and obesity is crucial for implementing preventive measures against both conditions, considering their increasing prevalence. Further comprehensive studies should be conducted to investigate the association between anthropometric measurements, obesity, and allergic diseases. Moreover, investigations on disease severity, central obesity, and environmental control measures (e.g., diet, exercise) are warranted.

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Conflict of Interest

No conflict of interest.

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Authorship Contributions

Concept: **Melike Akyuz, Hasibe Artac,** Design: **Hasibe Artac,** Data collection or processing: **Melike Akyuz, Tugba Guler,** Analysis or Interpretation: **Hulya Ozdemir, Ayca Ceylan,** Literature search: **Melike Akyuz, Tugba Guler, Hasibe Artac,** Writing: **Melike Akyuz, Tugba Guler, Hasibe Artac,** Approval: **Melike Akyuz, Hasibe Artac.**

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