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Prevalence of Allergy and Risk Factors in Nursery Children

Okul Öncesi Çocuklarda Alerji ve Risk Faktörlerinin Yaygınlığı

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Abstract

Allergy is an important health problem in preschool children and its prevalence is increasing. Allergy is especially common in nursery and preschool children. There is limited data on allergy epidemiology in children in Türkiye. The aim of this study was to investigate the prevalence of allergy in nursery children and to determine the risk factors that lead to allergies. The descriptive cross-sectional field study was carried out between 01.11.2017 and 01.05.2018 in the nurseries in Yozgat City Center. The study was conducted with the parents of 320 children who continued nursery education between the specified dates. The data were obtained by a 35-question information form prepared by the researchers. The mean age of the children was 4.7±0.95 and 56.25% (180/320) were male. A family history of asthma or disease with appearance of allergic symptoms, history of upper respiratory tract infection (URTI) in the first two years of life and having pets at home were significantly more common in the group with allergic sensitivity compared to the group without allergic sensitivity ($p<0.05$). It was determined that 14.7% of the children were diagnosed by the physician, 38.3% (18/47) of these diagnoses were urticaria, 31.9% (15/47) were allergic asthma, 19.1% (9/47) were atopic dermatitis-eczema, and 10.6% (5/47) were allergic rhinitis. According to the results of this study, it was found that children with allergic sensitivity had a history of asthma or atopic disease in their families, experienced allergic symptoms frequently, and frequently had URTI until the age of two.

Keywords: Allergic disease, Child, Prevalence.

Özet

Alerji okul öncesi çocuklarda önemli bir sağlık sorunudur ve sıklığı giderek artmaktadır. Alerji, özellikle okul öncesi çocuklar arasında yaygındır. Türkiye'de çocuklarda alerji epidemiyolojisi hakkında sınırlı veri bulunmaktadır. Bu çalışmanın amacı, okul öncesi çocuklarda alerji prevalansını araştırmak ve alerjiye neden olan risk faktörlerini belirlemektir. Tanımlayıcı kesitsel saha çalışması 01.11.2017-01.05.2018 tarihleri arasında Yozgat İl Merkezindeki okul öncesi eğitim merkezlerinde yürütülmüştür. Araştırma belirtilen tarihler arasında okul öncesi eğitimine devam eden 320 çocuğun ebeveynleri ile gerçekleştirilmiştir. Veriler, araştırmacılar tarafından hazırlanan 35 soruluk bilgi formu ile elde edilmiştir. Çocukların yaş ortalaması 4.7±0.95 idi ve %56.25'i (180/320) erkekti. Ailede astım veya alerjik semptomlarla seyreden hastalık öyküsü, yaşamın ilk iki yılında üst solunum yolu enfeksiyonu geçirme öyküsü ve evde evcil hayvan beslenmesi alerjik duyarlılığı olan grupta alerjik duyarlılığı olmayan gruba göre anlamlı olarak daha yaygındı ($p<0.05$). Çocukların %14.7'si bir hekim tarafından tanı almıştı ve bu tanıların %38.3'ü (18/47) ürtiker, %31.9'u (15/47) alerjik astım, %19.1'i (9/47) atopik dermatit-egzama ve %10.6'sı (5/47) alerjik rinit idi. Bu çalışmanın sonuçlarına

göre, alerjik duyarlılığı olan çocukların ailelerinde astım veya atopik hastalık öyküsü olduğu bulundu ve bu çocukların sık alerjik belirtiler yaşadığı ve iki yaşına kadar sık üst solunum yolu enfeksiyonu geçirdikleri belirlendi.

Anahtar Kelimeler: Alerjik hastalık, Çocuk, Prevalans.

Introduction

Allergy is a reaction of hypersensitivity of the immune system to normally harmless substances called allergens [1]. While healthy people have no problem when they encounter these substances called allergens (house dust mites, pollen, nutrients, etc.), the metabolism of allergic people sees these substances as a "threat" and responds in the form of an allergic response. As a result, allergic reactions may occur in different organs in our body [2].

Although allergic diseases and allergic reactions can be seen in children of all ages, they are most common in children under 5 years of age and in infants [3]. It is reported that the prevalence of allergic diseases is increasing in Western and developed countries, especially due to changing and lifestyle, environmental and socioeconomic factors in recent years [4,5]. Among the risk factors for allergic disease are individual factors such as genetic predisposition, atopy, gender and race, as well as environmental factors such as viral infections, passive smoking, socioeconomic status, and diet [6–8]. Although many studies have been carried out on the epidemiology of allergic diseases, it is difficult to make a comparison due to the lack of established diagnostic methods [9]. In recent years, studies have been carried out with ISAAC (International Study of Asthma and Allergy in Childhood) survey to set a standard for the epidemiology of allergic diseases [10].

Nurseries, private kindergartens and public kindergartens serve as early childhood educational institutions. Determination of risk factors, especially in the prevention of allergic diseases in preschool children, allows healthcare professionals to take the necessary measures to prevent the development of bronchial asthma and allergic rhinitis, which are early childhood diseases. Since the symptoms related to allergic diseases mostly begin in the first years of life, it is important to identify the children at high risk for the development of the disease [11]. Therefore, the aim of this study was to determine the prevalence of allergies and the risk factors that cause allergic diseases in preschool education institutions.

Material and Method

Study design and ethical considerations

This research was designed as a descriptive cross-sectional field study to determine the prevalence and risk factors of allergy in nursery and kindergarten age children. Ethical approval was obtained from Yozgat Bozok University Ethics Committee (2017-KAEK-189-2018.02.21-10) and necessary permissions were obtained from the institutions where the research was carried out. Questionnaires were filled out by the parents of the children. The parents were informed about the purpose of the research and written and oral consent were obtained from those who agreed to participate in the study. Attention was paid to parents' willingness and volunteerism to participate in the study.

Place and time of study

The study was conducted between 01.11.2017 and 01.05.2018 in Yozgat Bozok University Application Nursery and Kindergarten, Kindergartens affiliated with Turkish Ministry of Education in Yozgat, and private kindergartens and nurseries.

Study population and sample

Study population consisted of the parents of children in nurseries and kindergartens in Yozgat city center. A total of 320 parents who agreed to participate in the study between the specified dates constituted the sample of the study. Study data were collected by a 35-item questionnaire prepared by the researchers in accordance with the relevant literature, which included the socio-demographic characteristics of the parents and the allergy conditions and risk factors of the children. The data was collected during face-to-face interviews.

Data Analysis

Data was evaluated in a computer environment using SPSS (Statistical Package For Social Sciences) 18.0 program. Percentage, mean and standard deviation, and Chi-square test was used for evaluation of data.

Results

As shown in Table 1, the mean age of mothers of the children (n=320) was 32.4±4.14 and the mean age of fathers was 35.65±4.38 years. As shown in Table 2, the mean age of the children was 4.7±0.95 years and 56.2% were male.

It was determined that 50.3% of the families had two children, 63.75% had an income equal to their expenses, and 92.5% had a nuclear family. It was determined that 26.9% of the families smoked in the home, 96.25% got sunlight in their home, 19.1% had a damp house, 17.5% had pets, and 31.6% had a family history of asthma or atopic disease. The most common allergy history was in mothers (66.3%), followed by father and brother/sister, respectively (Table 1).

Table 1. Descriptive features of family.

	Descriptive features	n	%		Descriptive features	n	%
○	Number of children (n=320)			○	Type of family (n=320)		
	1 child	117	36.6		Nuclear family	296	92.5
	2 children	161	50.3		Extended family	24	7.5
	3 children and above	42	13.1	○	Sunlight condition of the house (n=320)		
○	Income status (n=320)				Yes	308	96.25
	Income less than expenses	34	10.6		No	12	3.75
	Income equals expense	204	63.75	○	Humidity status of the house (n=320)		
	Income more than expenses	82	25.6		Humid	61	19.1
○	Family history of asthma or atopic disease (n=320)				Dry	259	80.9
	Yes	101	31.6	○	Status of pet feeding (n=320)		
	No	219	68.4		Yes	56	17.5
○	Family member with allergies (n=101)				No	264	82.5
	Mother	67	66.3	○	Smoking at home (n=320)		
	Father	27	26.7		Yes	86	26.9
	Brother/Sister	7	6.9		No	234	73.1

It was determined that 29.1% of the children were born by normal birth, 85.9% were term babies, 92.8% received breast milk, and the mean duration of breastfeeding was 17.21±7.9 months. It was determined that 84.7% of the children rarely consumed ready-meals, fast food, packaged food, and carbonated drinks (Table 2).

When conditions that may be risk factors for allergic sensitivity were evaluated, it was determined that 14.1% of the children were preterm and 70.9% were born by cesarean delivery. It was determined that 7.2% of children did not receive breast milk, 31.6% had a family history of asthma or atopic disease, 80% (n=256) had allergic symptoms such as runny nose, nasal itching, sneezing, and 49.4% (n=158) had coughing after physical activity.

It was determined that 8.4% (n=27) of the children previously had pneumonia and 23.4% (n=75) had URTI in the first two years of life. When the groups with and without allergies were compared in terms of risk factors, it was found that family history of asthma or atopic disease, allergic symptoms, frequent URTI in the first two years of life, and having pets at home were significantly more common in the group with allergic sensitivity compared to the group without allergic sensitivity ($p<0.05$, Table 3).

Table 2. Descriptive features of children.

	Descriptive features	n	%		Descriptive features	n	%
○	Sex of child (n=320)			○	Consumption of prepared food, fast food, packaged food, carbonated drinks (n=320)		
	Female	140	43.75		Does not consume	22	6.9
	Male	180	56.25		Rarely consume	271	84.7
○	Breastfeeding status (n=320)				Consumes too often	27	8.4
	Yes	297	92.8	○	Time of birth (n=320)		
	No	23	7.2		Preterm	45	14.1
○	Duration of breastfeeding (month) (n=297)				Full-term	275	85.9
	0-6 ay	57	19.2	○	Type of birth (n=320)		
	7-12 ay	49	16.5		Normal birth	93	29.1
	13-18 ay	45	15.5		Cesarean sections	227	70.9
	19-24 ay	146	49.2				

Table 3. Comparison of groups with and without allergic sensitivity.

	Allergic sensitivity (+)	Allergic sensitivity (-)	p value
	n=73, %	n=247, %	
Female / Male	39.7 / 60.3	44.9 / 55.1	0.430
Normal birth / Cesarean sections	28.8 / 71.2	29.1 / 70.9	0.950
Preterm / Full-term	11.0 / 89.0	15.0 / 85.0	0.385
Does not breastfeeding	12.3	5.7	0.053
Family history of asthma or atopic disease	42.5	28.3	**0.023**
Appearance of allergic symptoms (runny nose, itchy nose, sneezing etc.)	90.4	76.9	**0.011**
Cough after physical activity	53.4	48.2	0.431
URTI status up to the age of two	39.7	18.6	**0.000**
Status of pneumonia	12.3	7.3	0.173
Smoking at home	21.9	28.3	0.277
Status of pet feeding	26.0	15.0	**0.029**

While there was no statistically significant difference between allergic sensitivity with respect to the father's educational status, a statistically significant difference was found with respect to the mother's educational status ($p<0.05$, Table 4).

As shown in Table 5, it was determined that 22.8% of children had allergic sensitivity (n=73), 37% had drug sensitivity (7.5% antibiotics), 30.1% had sensitivity to different types of food (2.2% peanuts), and 15.1% had sensitivity to household dust.

It was determined that 14.7% (n=47, 19 girls and 28 boys) of the children were diagnosed with a disease by the physician, 38.3% (18/47) of these diagnoses were urticaria, 31.9% (15/47) were allergic asthma, 19.1% (9/47) were atopic dermatitis-eczema, and 10.6% (5/47) were allergic rhinitis. The mean age (month) at diagnosis 25.93 ± 13.91 (month).

Among parents, 36.25% stated that they taking some precautions; frequently ventilated the house (14.1%), frequently cleaned the house (12.2%), and kept the child away from dust, humidity and pollen (10.9%) to prevent allergies. It was determined that 65% of parents had information about allergies, and 46.9% obtained this information from medical personnel.

Table 4. Educational status of parents in groups with and without allergic sensitivity.

Educational status	Mother		Father	
	Allergic sensitivity (+)	Allergic sensitivity (-)	Allergic sensitivity (+)	Allergic sensitivity (-)
Primary education	11.0	11.7	9.6	6.5
High school	19.2	25.1	11.0	25.5
Bachelor's degree	42.5	50.2	57.5	46.2
Postgraduate	27.4	13.0	21.9	21.9
p value	**0.032**		0.054	

Table 5. Characteristics of allergic diseases of children.

	Descriptive features	n	%		Descriptive features	n	%
○	Allergic sensitivity (n=320)			○	Measures taken* (n/320)		
	Yes	73	22.8		Not using drugs too often	13	4.1
	No	247	77.2		Cleaning with steam	12	3.8
○	Allergy factor (n=73)				Frequent house cleaning	39	12.2
	Food	22	30.1		Airing the house frequently	45	14.1
	Medicine	27	37		Carpet cleaning frequently	11	3.4
	Pollen	6	8.2		Keeping the child away from dust, humidity, and pollen	35	10.9
	Home dust	11	15.1		Do not take the child out of the house	13	4.1
	Humid	5	6.8		Dressing the child thicker in cold weather	8	2.5
	Perfume	2	2.7		Using hypoallergenic detergents	20	6.3
○	Types of foods* (n/320)				Paying attention to the cleaning of toys	5	1.6
	Peanut	7	2.2		Not consuming ready meals	31	9.7
	Sausage, salami, sausage	6	1.9	○	Information about allergies (n=320)		
	Sugary foods	5	1.6		Yes	208	65
	Strawberry, kiwi	4	1.3		No	112	35
	Egg	4	1.3	○	Where the information was obtained from* (n/320)		
	Milk, cream	3	0.9		Health personnel	150	46.9
○	Types of drugs* (n/320)				Internet	124	38.8
	Antibiotic	24	7.5		TV, press	71	22.2
	Antipyretic	5	1.6		Congress, symposium	14	4.4
○	Diagnosed allergic disease (n=320)			○	Diagnosis of allergic disease (n=47)		
	Yes	47	14.7		Urticaria	18	38.3
	No	273	85.3		Allergic asthma	15	31.9
○	Status of allergy prevention (n=320)				Atopic dermatitis-eczema	9	19.1
	Taking precautions	116	36.25		Allergic rhinitis	5	10.6
	Not taking precautions	204	63.75				

*More than one answer given or more than one factor.

As shown in Figure 1, 46.7% (7/15) of children with allergic asthma were 5 years old, 60% (3/5) of children with allergic rhinitis were 5 years old, 44.4% (8/18) of children with urticaria were 5 years old, and 33.3% (3/9) of children with atopic dermatitis were 3, 4 and 5 years old. As shown in Figure 2, four of girls diagnosed with allergic asthma (21.1%), two were diagnosed with allergic rhinitis (10.5%), seven were diagnosed with atopic dermatitis-eczema (36.8%) and six were diagnosed with urticaria (31.6%), whereas eleven of boys were diagnosed with allergic asthma (39.3%), three were diagnosed with allergic rhinitis (10.7%), two were diagnosed with atopic dermatitis-eczema (7.1%) and twelve were diagnosed with urticaria (42.9%).

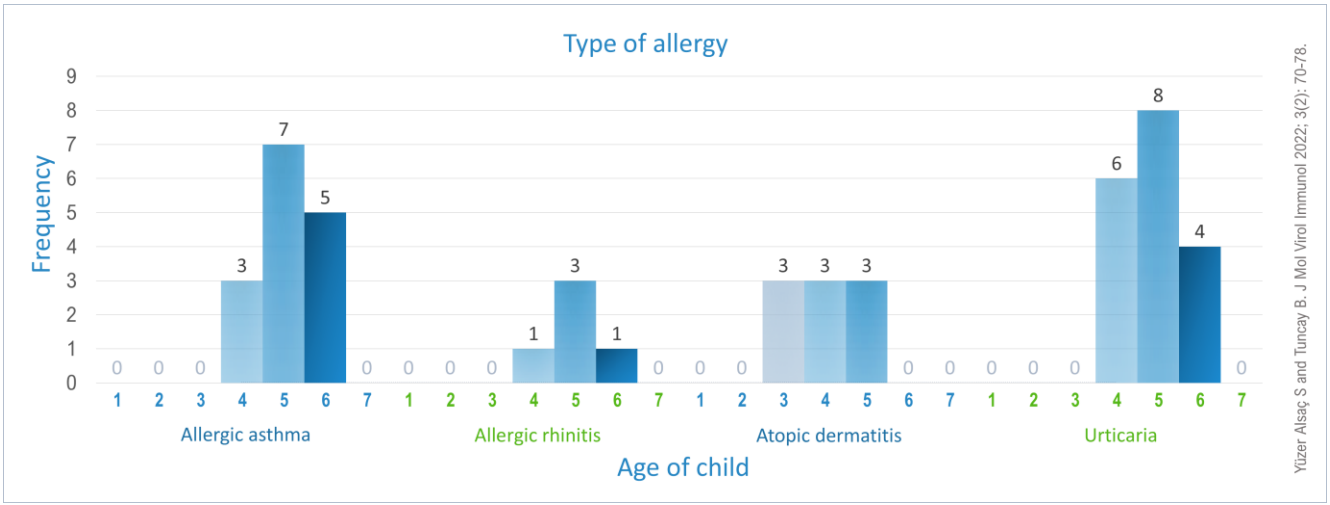

Figure 1. Distribution of allergy types by age.

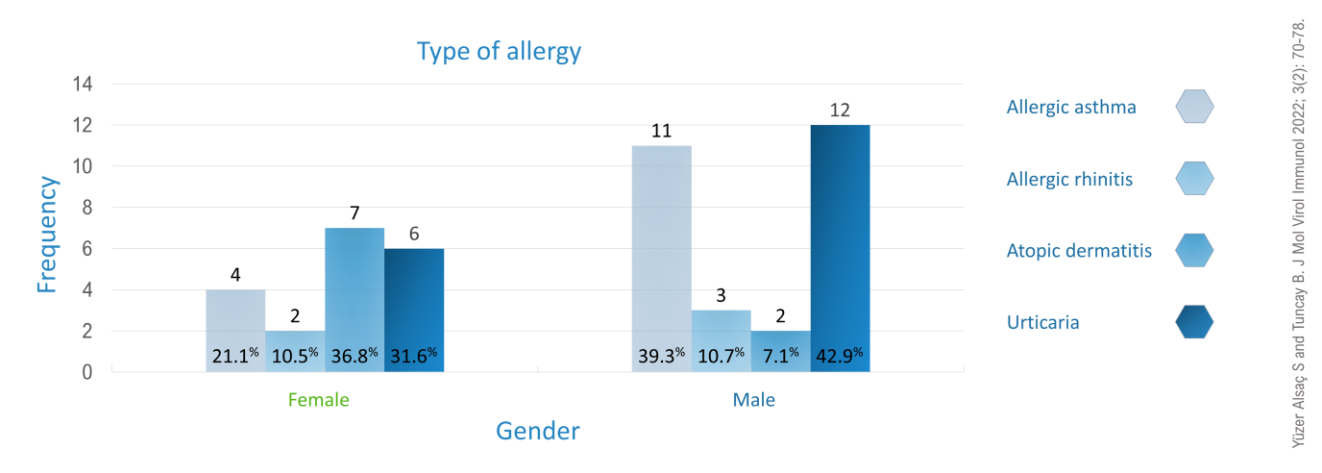

Figure 2. Distribution of allergy types by gender.

Discussion

It has been reported that allergic diseases, which are common in childhood, have become an important health problem in the world due to the increase in their prevalence in recent years [12]. Studies investigating the prevalence of allergic diseases in Turkey reported different results in different age groups. According to the responses of the parents of the 320 children included in the present study, it was determined that 22.8% of the children had allergic sensitivity and 14.7% were diagnosed with allergic disease. Of the children diagnosed with allergic diseases, 38.3% were diagnosed with urticaria and 31.9% were diagnosed with allergic asthma. Studies have shown that asthma prevalence increases significantly in children between the ages of 3 and 7 [13,14]. The results of the present study are consistent the literature, and it was determined that urticaria and asthma are the most common types of allergic diseases in children between the ages of 4 and 6 (Figure 1).

Allergens include house dust mites, animal feathers and epithelia, pollen, mold fungi, certain foods and medicines that threaten human health. In the present study, 37% of children with allergic sensitivity had drug sensitivity, 30.1% had food sensitivity, and 15.1% had sensitivity to house dust. In another study conducted in Turkey, it was determined that 21.5% of children had pollen, 8.1% had house dust mite, 3.8% had animal epithelia, 2.5% had mold and 23.7% had food allergies [15].

A positive family history of atopy, low socioeconomic status, exposure to cigarette smoke, low birth weight and having pets at home

are considered potential risk factors for childhood asthma and atopic diseases [16]. In the present study, a statistically significant difference was found in family history of asthma or atopic disease, allergic symptoms, frequent URTI until the age of two, and having pets at home between children with allergic sensitivity and those without allergic sensitivity (Table 3). Similarly, different studies have shown that allergic diseases in family members increases the risk of allergies in children [17–19].

In the present study, no significant difference was found between children with allergic sensitivity and those without allergic sensitivity in terms of breastfeeding (p>0.05). While breast milk intake was found to be protective in some studies in terms of allergic diseases, other studies did not find such a significant relationship. Hu et al. (2021) found that children who were exclusively breastfed for six months had a lower prevalence of allergic diseases such as asthma, allergic rhinitis, urticaria and food allergy compared to children who were breastfed for less than six months [19]. Fidan et al. (2006) [20], also found that the incidence of asthma was significantly higher in children with a family history of asthma or atopic disease (p=0.015) than children who were not breastfed (p=0.039). Similar to the results of the present study, other studies also reported that the duration of breastfeeding was not associated with the presence of allergic diseases [20–22].

Many studies have shown that there is a relationship between poor lung function and respiratory complaints such as asthma, bronchitis and pneumonia, cough, wheezing and dyspnea in children and passive smoking [16,23,24]. Contrary to current studies in the literature, no significant correlation was found in the present study between the presence of smokers in the house and allergic sensitivity of the child (p>0.05). This may be due to the different sample sizes, regional differences and family structures in different studies investigating this issue.

It is reported in the literature that cesarean births cause a 20% increase in asthma risk and moderate increase in the risk of allergic rhinitis, and this risk is likely due to less exposure of the baby to microbial factors during cesarean delivery [25,26]. Although the effect of gender on allergy is not fully understood, environmental exposures involving immunological and hormonal factors have been associated with gender-specific reactions [27]. In the study conducted by Sarışık (2020), asthma symptoms were significantly more common in children who were male, premature and born by caesarean section, went to nursery, had smokers at home, and had mold in the rooms of the house [28]. In the present study, no significant relationship was found between allergy and birth type, gender, and time of birth (p>0.05).

High level of education of the family is categorized as one of the risk factors of allergic symptoms. In the present study, a statistically significant difference was found in allergic sensitivity with respect to mother's educational status (p=0.032). It was determined that the children of mothers with postgraduate education had higher allergic sensitivity. Similar to the results of the present study, Sarışık also reported a statistically significant difference in past asthma symptoms in children whose mothers had postgraduate education (36.9%) [28]. A study in Japan concluded that while high maternal education status may increase the risk of wheezing and asthma in the child, an increase in paternal education status increases the risk of atopic dermatitis [29]. A study conducted in Turkey reported a significant relationship between maternal education level and asthma control [30].

The most effective prevention and treatment method in allergic patients is to avoid allergens. In the present study, 36.25% of families stated that they taking some precautions; frequently ventilated the house (14.1%), cleaned the house frequently (12.2%), and kept the child away from dust, moisture and pollen (10.9%) to prevent allergy. In a study conducted by Atla et al. (2020) with parents who applied to the pediatric outpatient clinic for any reason, when asked about the measures that can be taken to prevent the child from an asthma attack, 52% of respondents answered "I don't know", while 35.5% of the respondents answered "dust-free environment, cleanliness" [31].

Conclusion

According to the results of this study, it was found that children with allergic sensitivity had a history of asthma or atopic disease in their families, experienced allergic symptoms frequently, and frequently had URTI until the age of two. In addition, the most common allergic disease was urticaria and asthma. In line with these results, identifying the preventable and modifiable factors that play a role in the etiology of allergic diseases and increasing the knowledge and awareness of families with the help of health professionals is extremely important for reducing the increased prevalence of allergic diseases.

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