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Investigating the awareness and knowledge of secondary school students about the effects of allergic pollen on human health: A case of Burdur Province

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The overall objective of this study is to increase the awareness of secondary school students of the effects of pollen allergy on human health by mapping allergic pollens appearing in Burdur atmosphere. This study is a pre-test and post-test experimental design. Mix method is applied thus. Both qualitative and quantitative data are gathered. The sample of this study consists of students in 6th and 7th grades in Alpaslan Ali Can Secondary School, Burdur. Pre-treatment and post-treatment questionnaire and achievement test are administered in order to determine the effectiveness of the education seminar given on the effects of pollen allergy. According to the findings obtained from the analysis of the achievement test, cognitive awareness of the students about the effects of pollen allergy on human health is found to be higher. Post-treatment results obtained from the questionnaire show there is increase in awareness of the students about the importance of pollen allergies and how to take precautions.

Key words: Polinization, hay fever, human health, secondary school students.

INTRODUCTION

The first study on Aeropalinologic was conducted by Blackeley in the United Kingdom in 1866. Blackeley proved that pollens cause hay fever by carrying out a skin test (Pehlivan ,1995).The studies on the presence of pollens in the atmosphere of Turkey began with the studies of Özkaragöz and Karamanoğlu on pollens and spores in the atmosphere of Ankara (Capital City of Turkey) in 1967. Afterwards, İnceoğlu et al. (1994) make contribution to Aeropalinologic studies with their research on the atmospheric pollen concentration in Ankara. In this study, they analyzed the presence and concentration levels of pollens between 1990-1993 in Ankara. Davies and Smith(1973) state that pollen concentrations are effected by such factors as season, precipitation, sunlight, temperature and wind.

Aytug et al. (1990), examining the allergenic plants in the region of Thrace, indicated the importance of pollen analysis and consequently prepared allergenic pollen calendar for Istanbul city and its surroundings. In addition, they specify how to use allergenic pollen

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calendar and refer to the importance of informing people about pollen dissemination periods.

Pollens appearing abundantly and prevalantly in the atmosphere affect us as soon as they reach our respiratory organs via breathing and cause allergic diseases. In order to take precautions against them, creating pollen allergenic calendar of the region via detection of allergenic pollen and their concentration in the atmosphere is of vital importance (Aytuğ et al., 1995).Pehlivan (1995) indentifies the fact that pollen calendars depend on the climate and echological conditions of certain regions in certain period, and in his book entitled “Turkey's Allergenic pollens Atlas”, he exhibits the importance of these pollen calendars by stating that they include crucial information for both doctors and patients.

On the other hand, Kalyoncu (1994) conducts a review study to evaluate the state of allergic asthma and other allergic diseases across the world. Moreover, he introduces data on the allergic diseases occuring in Turkey.

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Effects of pollen allergy on human health

Specific IgE (immunoglobulin E) is defined as the antigens that stimulate antibody formation and react with this antibody. Being influenced by allergens is an important risk factor for the development of allergic respiratory tract disease which affects one third of the world population. In 1873, Charles Blackley discovered that pollens cause allergic diseases thereupon; studies conducted on this issue specify the fact that pollens take important place underlying allergic diseases (Brusic et al., 2003).

Pollens are the first distinguished allergens dispersed into the environment in various ways depending on a particular month in the blooming period. For instance; pollens carried by wind are quite aerodynamic and may cause sensitivity by moving away 200 km from the pollen sources. They are elliptical or circular in shape. On the other hand, the pollens carried by insects are the pollens of colorful and flowery plants and they are moist and sticky. People having direct contact with such pollens are more likely to develop allergic disease.

Allergenic degrees of pollens depend on the abundance of plants disseminating these pollens and the amount of the pollens appearing in the atmosphere. To assist in the diagnosis and treatment of these diseases, recognition and naming of the morphologies of allergen pollens and their amount in the atmosphere as well as the surrounding vegetation and determination of the blooming period are of great importance. While the beginning period in which allergen pollens appear in the atmosphere, the maximum concentration they reach and the ending period are announced in the daily meteorology broadcasts, they should also be continuously publicized via radio, television and newspapers (Pehlivan, 1984, 1995; Esch et al., 2001).

Pollen allergies have considerable clinical importance in the world and a significant increase is observed in the prevalence of allergic reactions caused by pollens. Pollen allergy research conducted in Europe reports that dissemination period is a six-month period extending from spring to autumn (D'Amato et al., 1998).

Pollens of plants of Gramineae are regarded as the most important allergen sources worldwide. Pollens of this family have been reported as important aeroallergens in many countries (Baldoet al., 1982; Bousquetet al., 1984 and Malik et al., 1991). Approximately 50% of the allergic patients show sensitivity to Gramineae pollen (Corti et al., 2005).

Pollen allergy is mostly seen in people between the ages of 5-40, and the number of people contracting this disease now seems to increase. Allergies can cause complaints by affecting different organ systems. If the nose is affected, it is known as "allergic rhinitis "; if it affects the lungs, it is known as "allergic asthma". Pollen allergy is also popularly known as seasonal allergy in medicine and hay fever in colloquial language (Topalet al.2014). The knowledge of allergies may help to prevent their influence and their management (Twichell et al., 2015).

Pollens in the atmosphere mostly settle into the body through inhalation. The immune system actually sees these harmless pollens as enemies and save data bank and surveil. The most important symptoms are recurrent colds, nasal itching, nasal congestion and sneezing at least 4-5 times in succession. Other symptoms are as follows;

1. Cough due to postnasal drainage, vomiting, abdominal pain and poor appetite,
2. Hearing loss due to effusion,
3. Sinusitis depending on the infection tendency of the allergies,
4. Frequent throat infections in the mouth depending on nasal congestion,
5. Striae on the nose due to wiping also known as allergic salute,
6. Itching and watery eyes, eye redness, swelling of the eyelids,
7. Shade color is observed under the lower eyelid skin of the children with allergic rhinitis.

The accuracy of diagnosis is important to guide treatment. For instance, untreated rhinitis not only causes future asthma, sinusitis, lower respiratory tract infections, otitis media, nasal polyps and dental malocclusion, it may also negatively affect one’s quality of life, intellectual capabilities, work and school performance as well (Kavutet al. 2012).

There is an urgent need to inquire into the allergy management plans and policies in schools and to develop teacher education organizations on the subject.

Teachers and students in K-12 level are not fully aware

of allergic pollens; both training and informative seminars need to be organized for them (Ercan et al., 2012; Polloni et al., 2013). Therefore, the purpose of this study is to investigate the awareness and knowledge of secondary school students about the effects of allergic pollen on human health in Burdur located Southwest of Turkey.

Measures to be taken to protect one from pollens

1. You should not go outdoors from 05.00 a.m to 10.00 a.m when the pollens are disseminated intensively in the atmosphere. However, you can go out with the mouth and nose masks on you.
2. You should not do sports outdoors at pollen times.
3. Hair keeps dust. Therefore, take a shower; wash your hair every evening. So you can rid of the dust on you.
4. Make sure your children change their clothes after coming from outside.
5. Do not open the window while in the car. Use the air conditioner for air exchange.
6. Prefer the seaside for holidays.
7. Use sunglasses and hat outdoors. Wash your sunglasses under water every day.
8. Consult a doctor for allergy.
9. Avoid mowing the lawn or use mask while mowing.

MATERIALS AND METHODS

In this study, pollen movement in Burdur (a small city of Turkey) was investigated for 5 months. Durham instrument is used for this. The Durham sampler is the standard instrument and a traditional and representative method for sampling and collecting airborne pollen (Durham 1946). After creating the pollen map in Burdur atmosphere, the following procedures are applied to the students selected as the study group.

Research design

In the study, pretest and post-test model forms the basis of the experimental model. Mix method combining quantitative and qualitative data collection methods is used.

Sample of the research

The sample of this study consists of 50 students in 6^{th} and 7^{th} grades in Alpaslan Ali Can Secondary School in Burdur. However, considering the participation on voluntary base, data obtained from the students with poor attendance are excluded from the study.

Data collection tools and process

Pre-treatment and post-treatment 5 items-questionnaire and achievement test are administered in order to determine the effectiveness of the education seminar given on the effects of pollen allergy. Experts' opinion is consulted in order to determine the validity and clarity of the questionnaire items. On the other hand, the opinions of relevant experts are taken in order to ensure achievement test validity.

Reliability study of the achievement test is administered based on the results of this study since no study has been conducted on this test.

Data analysis

The data obtained in this study are analyzed by SPSS Windows 21.0 (Statistical Package for the Social Sciences). Data are analyzed using descriptive statistical methods (Number, percentage, mean, standard deviation). These statistics are used to summarize data and provide information about the sample from which the data were drawn and the accuracy with which the sample represents the population of interest. The mean, median, and mode are measurements of the "central tendency" of the data. Paired sample t-test is used to compare quantitative data obtained from pretest and post test result of the groups.

Research application process

Education environment

Trainings were given to participants in Alpaslan Ali Can Secondary School. It was conducted in the learning environment equipped with computer and overhead projector (Table 1).

Education process

A 3-day training program was prepared for the participants. In the first day of the training program, questionnaire (15 min) and pre-test (25 min) were conducted. In the second day, a seminar was given on the pollen and pollen allergy. In the last day (3^{rd} day), the questionnaire was administered (15 min); additionally, post-test was applied to participants.

In preparing for the training program, active participation of the students is taken into consideration. The use of learner-centered teaching and learning approaches and methods are so important in modern education (Modan, 1995). Constructive teaching approaches were applied during the training session. Constructivist approach in teaching is an approach that requires active participation of students during the teaching process. Research found that the mean achievement of the students who participated actively in teaching learning process was greater than their counterparts who attended traditional classes (Brooks & Brooks, 2001; Bhattacharjee, 2015 and Juvova et al, 2015).The training process is conducted on the basis of reciprocal questions and answers.

FINDINGS

The findings of the study are presented on the basis of data collection instruments used.

Findings obtained from questionnaire

Content analysis is administered to analyze the data (qualitative data). The following steps are followed in the content analysis. Content analysis is a research technique for systematically analyzing written text data collected from the participants. Content analysis can help be used to identify propaganda or describe attitudes and psychological states (Hardy et al., 2004). It is a research

Table 1. Descriptive statistics of participants.

Tables	Variables	Frequency	Percentage
Grade level	6	22	56.4
	7	17	43.6
	Total	39	100.0
Gender	Female	24	61.5
	Male	15	38.5
	Total	39	100.0

tool used to determine the presence of certain words or concepts within texts or sets of texts. The following steps are followed in the content analysis:

1. Code numbers given to each student instead of their name are used in the analysis of qualitative data.
2. Answers given by the students for each question of the survey are combined in the computer environment. That is, for example all responses to question 1 are gathered together. This procedure is applied for all questions.
3. Improper answers are excluded from the research study.
4. Responses are classified according to similarities and differences.
5. Codes related with each other are grouped under a specific category.

In this research, the data obtained from questionnaires administered in pre and post training are categorized under such subtitles as importance of pollens, possible cases occurring in the absence of pollens, negative effects of pollens on people, factors causing allergies and allergy prevention methods.

Importance of pollens

Students' opinions on the importance of pollens are introduced under two headings for Environment and society. Pre-treatment findings indicate that students state the importance of pollens for environment as growth of plants (38%), necessary for honey process (36%) and effective for protecting nature (13%). However, after post-treatment, significant increase (74%) is observed among the students who identify another important duty of pollens such as propagation of plants/ensuring polinization. Considering that the most important task of pollens is polinization, after training there seems to be an increase in the students' awareness.

In the pre-treatment process, students indicate the importance of pollens as follows: source of income (horticulture 13%), ensure the continuity of life (13%), raw materials for fruit nutrition (2%) whereas, post-treatment provides us the same answers with different results: source of income (0%),ensure the continuity of life (23%), raw materials for fruit nutrition (77%). As a result, it can be said that there is an increase in students' awareness after treatment of the importance of pollens for environment and society.

Possible cases occurring in the absence of pollens

The students are asked about the possible cases which may occur in the absence of pollens and their answers are categorized as environment-based and society-based. In their society-based views, such opinions as the importance of honey as bee product (36%), mal-nutrition of people (10%), bad health (38%) as well as causing allergy and reduction in plant diversity(15%) are the main answers reported by the students in the pre-treatment. In their society-based views, they uttered such opinions as plants with blooming problems (59%), breaking the food chain (30%) not of any importance (2%).After training, increase in malnutrition (70%) and plants with blooming problems (77%) rise as well. This case indicates that increase in their awareness is realized as they are now well aware of the possible results in the absence of pollens.

Negative effects of pollens on people

In pre-treatment, majority of the students give such answers to the question "What are the negative effects of pollens on people?" as itching eyes, sneezing (77%), no effect on human health (8%) and heart attack, stroke (5%)as well as nasal itching and body itching (10%).

In post-treatment, the answers itching eyes, sneezing (100%) are observed to increase. This case is an indicator of increased awareness of the levels of the main symptoms of pollens.

Factors causing allergies

In pretreatment process, the answers given to the question on the factors causing allergies by the participants

Table 2. Pretreatment and post treatment achievement results of the participants (secondary school 6th and 7th graders) in terms of gender.

Variables	Group	N	Mean	St.Dev.	t	p
Pretreatment achievement test	Female	24	4.250	2.090	0.340	0.736
	Male	15	4.067	1.280		
Post treatment achievement test	Female	24	8.375	1.498	0.962	0.342
	Male	15	7.867	1.767		

Table 3. Pretreatment and post treatment achievement results of the participants (secondary school 6th and 7th graders) in terms of their grade levels

Variables	Group	N	Mean	St. Dev.	t	p
Pretreatment achievement test	6	22	4.636	1.840	1.856	0.071
	7	17	3.588	1.622		
Post treatment achievement test	6	22	8.182	1.500	0.010	0.992
	7	17	8.176	1.776		

are: “Pollen (20%), animal feather (3%), house dust (5%) and all (72%)”; on the other hand, post treatment results demonstrate that all (100%) is answered by the students.

Allergy prevention methods

If pollens cause allergy, what are their prevention methods? This question is answered thus, ‘You shouldn’t go outdoors from 05.00 a.m. to 10.00 a.m. when the pollens spread intensively in the atmosphere (23%)’,‘buying allergy pills from pharmacy and using them regularly (59%)’, ‘pollens do not cause allergy (5%)’,‘consult a doctor for allergy and take syrup (13%)’.

After seminars, the answer “You shouldn’t go outdoors from 05.00 a.m. to 10.00 a.m. when the pollens spread intensively in the atmosphere (100%) is observed to increase significantly.

Findings obtained from achievement tests

Within the scope of this study, achievement tests administered in pre and post training are presented in order to indicate the difference among students’ cognitive awareness in allergic rhinitis caused by pollens. According to the grade level distribution, 22 students (56.4%) are 6th graders and 17 students (43.6%) are 7th graders .According to the gender distribution, 24 of them are females (61.5%) and 15 them are males (38.5).

Participants who have allergic diseases or affected by pollen were excluded from the study (Table 1). There is no statistically significant difference between pretest and posttest results of the participants in terms of their gender when analyzing their t-test results administered to determine whether there is a difference or not (t=0.340; p=0.736>0.05) (Table 2).

In addition, no significant difference is observed between pretest and posttest results of the participants in terms of their gender when analyzing their t-test results applied to identify whether there is a difference among group averages. (t=0.962; p=0.342>0.05).

There is no statistically significant difference in pretest results of the participants in terms of their grade level based on the result of t-test used to examine inter-groups averages (t=1.856; p=0.071>0.05) (Table 3).

Besides, no significant difference is found in post test results of the participants in terms of their grade level based on the result of t-test used to examine inter-groups averages. (t=0.010; p=0.992>0.05).

Findings obtained from the analysis results in order to determine whether there is a significant difference between pretreatment and post treatment achievement tests of the students are introduced in Table 4 and Figure 1. In paired sample t-test results of the participants administered to see whether there is a difference between pretreatment and post treatment achievement tests of the students, significant difference is observed between arithmetic means (t=-10.999; p=0.000<0.05). Achievement test mean scores of the 6th and 7th graders are lower in pretreatment process (x = 4.180) than those of post treatment process (x = 8.180) (Table 5 and Figure 2).

DISCUSSION

This study represents an investigation of the awareness and knowledge of secondary school pupils about the effects of allergic pollen on human health. The findings of the study showed that after the training students’ awareness towards allergic pollens was increased.

Table 4. Difference between pretreatment and post treatment achievement tests of the participants.

Groups	N	Mean	St. Dev.	sd	t	p
Pretreatment achievement test	39	4.180	1.805	38	-10.999	**0.000**
Post treatment achievement test	39	8.180	1.604			

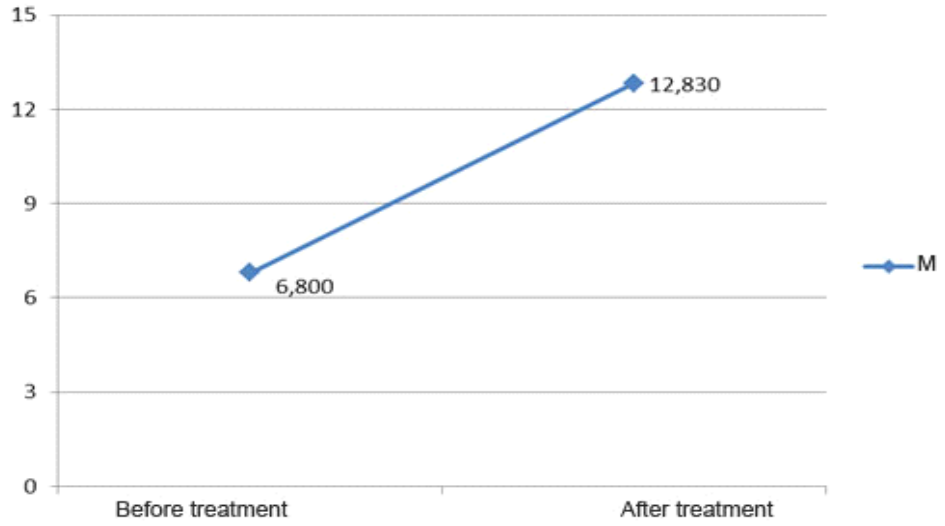

Figure 1. Difference between Pretreatment and Post treatment Achievement Tests.

Table 5. Difference between pretreatment and post treatment achievement tests of the participants

Groups	N	Mean	St. Dev.	sd	t	p
Pretreatment achievement test	39	4.180	1.805	38	-10.999	**0.000**
Post treatment achievement test	39	8.180	1.604			

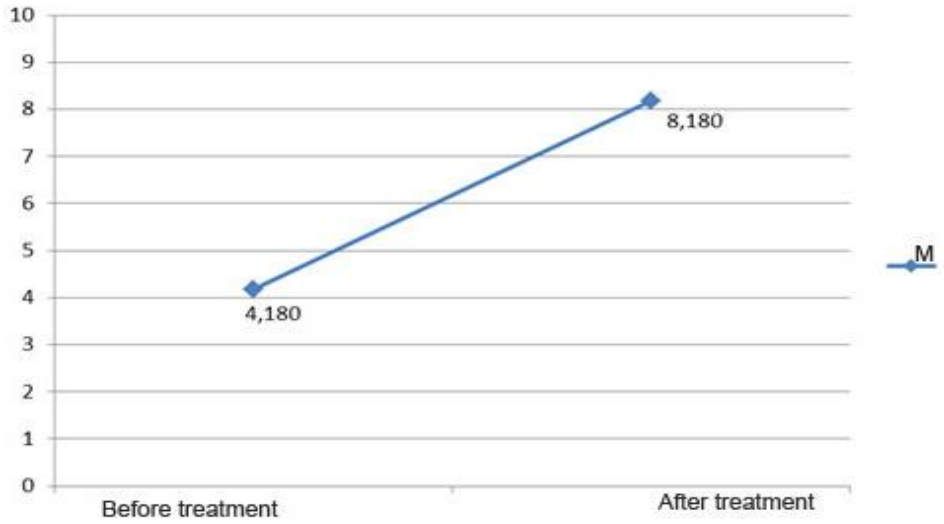

Figure 2. Difference between pretreatment and post treatment achievement tests of the participants.

Allergic pollens have the potential to trigger respiratory problems. Therefore, increasing students' awareness on allergic pollens is a significant issue from human health perspective. Furthermore, the findings obtained from the analysis of achievement test, cognitive awareness of the students about the effects of pollen allergy on human health is found to be higher. Post-treatment results obtained from the questionnaire show increase in awareness of the students of the importance of pollen allergies and how to take precautions.

The current research studies are by definition constrained by sample size but allow for a deeper exploration of life experience. According to the findings obtained from the achievement tests after mapping pollen atmosphere of Burdur, it is concluded that significant increase is observed in the cognitive awareness level of secondary school students about pollen allergy. According to the findings obtained from survey data (qualitative data), after training, students' awareness on the important effects of pollen allergy on human health is found to increase.

Conflict of Interests

The author has not declared any conflict of interests.

REFERENCES

Aytuğ B, Yaltırık F, Efe A (1995). Allergenic pollen producing plants of Turkey. In: Aytuğ B (ed.): Proceedings of the National Palynology Congress, 21–23 December, İstanbul University, Forest Faculty, İstanbul. pp. 201-212.

Aytug B, Efe A, Kursad C (1990). Trakya'nın allerjen polenleri (Allergent pollence of thrace) Allergen pollens of Thrace. Acta Pharm. Turcica 32:67-88.

Baldo BA, Sutton R, Wrigley CW (1982). "Grass allergens with particular reference to cereals", Prog. Allergy, 30: 1-66.Bhattacharjee, J. (2015) Constructivist Approach to Learning– An Effective Approach of Teaching Learning. Int. Res. J. Interdiscipl. Multidiscipl. Stud. 1(4):65-74.

Brusic V, Millot M, Petrovsky N, Gendel SM, Gigonzac O, Stelman SJ (2003). Allergen databases. Allergy 58(11):1093-1100.

Brooks JM, Brooks MG (2001). Chapter 9. Becoming a Constructivist Teacher. In In Search of Understanding: The Case for Constructivist Classrooms (2nd ed.)

Bousquet J, Cour P, Guerin B, Michel FB (1984). Allergy in the Mediterranean area. I. Pollen counts and pollinosis of Mont Pellier. Clin. Allergy 14:249-258.

Corti V, Cattaneo A, Bachi A, Rossi RE, Monasterolo G, Paolucci C, Burastero ES, Alessio M (2005). Identification of Grass Pollen Allergens by Two-Dimensional Gel Electrophoresis and Serological Screening. Proteomics 5:729-736.

D'Amato G, Spieksma FTh M, Liccardi G (1998). Pollen-related Allergy in Europe. Position Paper of the European Academy of Allergology and Clinical Immunology. Allergy 53:567-578.

D'Amato G (2000). Urban Air Pollution and Plant Derived Respiratory Allergy. Clin. Exp. Allergy 30:628-636.

Davies RR, Smith LP (1973). Forecasting the start and severity of the hay fever season. Clin. Allergy 3:263-267.

Durham OC (1946). The volumetric incidence of atmospheric allergens IV. A proposed standard method of gravity sampling, counting, and volumetric interpolation of results. J. Allergy 17:79-86.

Ercan H, Ozen A, Karatepe H, Berber M, Cengizlier R (2012) Primary school teachers' knowledge about and attitudes toward anaphylaxis. Pediatr. Allergy Immunol. 23:428-432.

Esch RE, Hartsell CJ, Crenshaw R, Jacobson RS (2001). Common allergenic Pollens, Fungi, Animals, and Artropods. Clin. Rev. Allergy Immunol. 21:261-263.

Hardy C, Harley B, Phillips N (2004). Discourse analysis and content analysis: two solitudes? Qual. Methods (newsletter of the APSA Organized Section on Qualitative Methods) 2(1):19-22.

Juvova A, Chudy S, Neumeister P, Plischke J, Kvintova J (2015). Reflection of Constructivist Theories in Current Educational Practice. Universal J. Educ. Res. 3(5):345-349.

Kalyoncu AF (1994). Türkiye'de Astım ve Alerji Hastalıklarının Konumu ve Epidemiyolojisi. Medikal Dergi. 100:49-55.

Kavut AB, Kalpaklıoğlu F, Atasoy P (2012). Contribution of neurogenic and allergic ways to the pathophysiology of nonallergic rhinitis. Int Arch Allergy Immunol. 160:184-191.

Malik P, Singh AB, Babu CR (1991). Atmospheric concentration of pollen grains at human height. Grana 30:129-135.

Modan A (1995). Psikoloji müzeye giriyor. Siyah Beyaz Gazetesi 26:10.

Pehlivan S (1995). Türkiye'nin Alerjen Polenleri Atlası. Ankara: Ünal Offset.

Pehlivan S (1984). Aeropalinolojik çalışmaların tıptaki önemi", Türk Hijyen ve Deneysel Biyoloji Dergisi 41(3):315-323.

Pehlivan, S (1994). Scanning electron microscope studies of the pollen grains of some Turkish endemic Centaurea. J. Fac. Pham. Gazi 11(2):205-211.

Polloni L, Lazzarotto F, Toniolo A, Ducolin G, Muraro A (2013). What do school personnel know, think and feel about food allergies? Clin. Transl. Allergy 3:39.

Topal E, Bakirtas A, Yılmaz O, Karagöl IHE, Arslan U, Arga M, Demirsoy MS, Turktas I (2014).June. Predictive factors to differentiate between allergic and nonallergic rhinitis in children. In International forum of allergy & rhinology 4(6):447-452.

Twichell S, Wang K, Robinson H, Acebal M, Sharma H (2015). Food Allergy Knowledge and Attitudes among School Nurses in an Urban Public School District. Children 2(3):330-341.