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Journal: Stephane A. Management of Congenital Cholesteatoma with Otoendoscopic Surgery: Case Report. J Med Sci 2010;30(2):803-7.

Levine WC, Pope V, Bhoomkar A, Tambe P, Lewis JS, Zaidi AA, et al. Increase in endocervical CD4 lymphocytes among women with nonulcerative sexually transmitted diseases. J Infect Dis. 1998;177(1):167–174.

Chapter of an edited book: Hornbeck P. Assay for antibody production. In: Colign JE. Kruisbeek AM, Marguiles DH, editors. Current Protocols in Immunology. New York: Greene Publishing Associates; 1991. p. 105-32.

A single-authored book: Fleiss JL. Statistical Methods for Rates and Proportions. Second Edition. New York: John Wiley and Sons; 1981. p. 105-32.

An editorial book: Balows A. Mousier WJ, Herramaflfl KL, editors. Manual of Clinical Microbiology. Fifth Edition. Washington DC: IRL Press. 1990. p. 105-32.

Paper: Entrala E, Mascaro C. New structural findings in Cryptosporidium parvum oocysts. Eighth International Congress of Parasitology (ICOPA VIII); October 10-14; Izmir-Turkey: 1994. p. 1250-75

Thesis: Erakinci G. Searching for antibodies against parasites in donors. Izmir: Ege University Health Sciences Institute. 1997.

Electronic format: Morse SS. Factors in the emergence of infectious diseases. Emerg Infect Dis (serial online) l995 Jan-Mar (cited 1996 June 5): 1(1): (24 screens). Available from: URL: http:/ www.cdc.gov/ncidodlElD/cid.htm.

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Title

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Keywords

Introduction

Methods

Results

Discussion

Conclusion

Acknowledgement

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Structure

Title

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Keywords

Introduction

Case report

Discussion

Conclusion

Acknowledgement

References (up to 20)

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Title

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Keywords

Introduction

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Conclusion

Acknowledgement

References (up to 50)

Except for the references and the English abstract, the full text should not exceed 6550 words.

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AUGUST 2023 **VOLUME 10** **NUMBER: 2**

CONTENTS

EDITORIAL

We are happy to meet you in the August issue of our magazine. We will walk with firm steps towards the formation of a world-class magazine…

In this direction, our competent team will serve with determination and effort by pushing all kinds of possibilities. I fully believe that we will achieve our goals with the contributions of you in the academic community.

We would like to thank the researchers who contributed to the issue of our journal, and everyone who contributed to the preparation and publication process.

Hoping to meet in new issues...

Stay well…

Prof. ORHAN BAŞ

Owner of ODU Medical Journal

ODU TIP DERGİSİ/ODU MEDİCAL JOURNAL (ODU MED J) **August 2023;10(2):41-53**

ARAŞTIMA MAKALES/ RESEARCH ARTICLE **DOI:** 10.56941/odutip.1299859

Determination of Nutrient Contents of Some Medicinal Plants Sold by Herbalists in Bingöl

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Abstract

Objective: In this study, the nutritional parameters such as moisture, ash, crude fiber, crude protein, crude fat, carbohydrate and nutritive value of sage (*Salvia officinalis*), linden (*Tilia platyphyllos*), thyme (*Thymus vulgaris*), daisy (*Matricaria chamomilla*) and ginger (*Zingiber officinale*) plants sold in Bingol herbalists and widely used for treatment among the public were determined by analysis.

Methods: In 2019, 5 different medicinal plant samples were obtained from 3 different herbalists in Bingöl. Afterwards, the nutritional contents of these plants were analyzed using official Association of Official Analytical Chemists (AOAC) methods and different biochemical methods.

Results: Moisture, ash, crude protein, crude fat, crude fiber, carbohydrate percentages and nutritional values (kcal/100g) of the studied plant samples (0.10 %- 5.67, 4.67 - 11.89, 6.59 - 18.22, 2.12 - 6.80, 16.65 - 29.16, 40.18 - 63.68 %and 245.66kcal - 347.49kcal), respectively. The moisture contents of sage, linden and daisy samples were determined as 0.85 % to 4.84 % and they were found safe for consumption according to the Herbal Tea Standard of the TS 12933 Turkish Standards Institute,but ash levels exceeding the limit level of thyme samples (10.78-11.89 %) were found to be unsuitable. The moisture content of the thyme and ginger samples (0.10 - 5.67 %) (maximum 12 % for both), as well as the ash content of the thyme samples (maximum 14 %) and ginger (maximum 12 %) all fall within the Turkish Food Codex limit values.While statistically significant differences were observed in moisture, ash, crude fiber, carbohydrate and nutritional value groups ($p<0.05$), no difference was observed in crude protein and crude fat groups ($p>0.05$). The crude protein content of daisy (D2,D3) and linden (L1,L2) samples, the crude fiber content of daisy (D2,D3) and thyme (T1,T2,T3) samples, the carbohydrate content of ginger (G1,G2,G3) and sage (S1,S3) samples were all found to be high.

Conclusion: Plants such as *Salvia officinalis* and *Zingiber officinale*, which are rich in carbohydrates, crude protein and crude fiber content, are used for medicinal purposes. In addition, plants with high nutritional value can be added to the herbal combination content of individuals following a vegetarian or vegan diet.

Key Words: Nutrient, Medicinal Plant, Herbalist, Bingol

Bingöl'deki Aktarlarda Satılan Bazı Tıbbi Bitkilerin Besin Madde İçeriklerinin Belirlenmesi

Özet

Amaç: Bu çalışmada, Bingöl aktarlarında satılan ve halk arasında yaygın olarak tedavi amacıyla kullanılan adaçayı (*Salvia officinalis*), ıhlamur (*Tilia platyphyllos*), kekik (*Thymus vulgaris*), papatya (*Matricaria chamomilla*) vezencefil (*Zingiber officinale*) bitkilerinin nem, kül, ham lif, ham protein, ham yağ, karbonhidrat ve besin değeri gibi parametreleri tespit edilmiştir.

Metod: 2019 yılında Bingöldeki 3 farklı aktardan 5 farklı tıbbi bitki örnekleri temin edilmiş. Sonrasında bu bitkilerin besin içerikleri resmi AOAC yöntemler ile farklı biyokimyasal yöntemler kullanılarak analiz edilmiştir.

Bulgular: Çalışılan bitki örneklerine ait nem, kül, ham protein, ham yağ, ham lif, karbonhidrat yüzde oranları ve besin değerleri sırasıyla (% 0,10 - 5,67, 4,67 - 11,89, 6,59 - 18,22, 2,12 - 6,80, 16,65 - 29,16, 40,18 - %63,68 ve 245,66kkal - 347,49kkal) olarak belirlenmiştir. Çalışmada adaçayı, ıhlamur ve papatya örneklerinin nem içeriği % 0,85 ile 4,84 arasında, TS 12933 Türk Standartları Enstitüsü'nün Bitkisel Çay Standardı'na göre tüketim için güvenli bulunmuş, ancak kekik örneklerinde (% 10,78-11,89) limiti aşan kül seviyeleri tüketime uygun bulunmamıştır. Kekik ve zencefil numunelerinin nem içeriği (% 0,10 – 5,67) (her ikisi için en fazla % 12), kekik (en fazla % 14) ve zencefil (en fazla % 12) numunelerinin kül içeriğinin tümü, Türk Gıda Kodeksi sınır değerleri arasında bulunmuştur. Nem, kül, ham lif, karbonhidrat ve besin değeri gruplarında istatistiksel olarak anlamlı farklılıklar görülürken ($p<0,05$), ham protein ve ham yağ gruplarında farklılık görülmemiştir ($p> 0,05$). Papatya (D2,D3) ve ıhlamur (L1,L2) örneklerinin ham protein içeriği, papatya (D2,D3) ve kekik (T1,T2,T3) örneklerinin ham lif içeriği, zencefilin (G1, G2, G3) karbonhidrat içeriğizencefil (G1,G2,G3) ve adaçayı (S1,S3) örneklerinin karbonhidrat içeriği yüksek bulunmuştur.

Sonuç: Karbonhidrat, ham protein ve ham lif içeriği bakımından zengin olan *Salvia officinalis* ve *Zingiber officinale* gibi bitkiler tıbbi amaçlı kullanılmaktadır. Ayrıca vejeteryan veya vegan diyeti uygulayan bireylerin bitkisel kombinasyon içeriğine besin değeri yüksek bitkiler de eklenebilir.

Anahtar Kelimeler: Besin Maddesi, Tıbbi Bitki, Aktar, Bingöl

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INTRODUCTION

Natural resources, which have great potential for Turkey due to its rich plant diversity, are becoming increasingly important. It is estimated that Turkey has over 10,000 plant species, with approximately 30% of these species being aromatic plants with their own distinct smell and taste. The general public uses approximately 1,000 plant species grown in Turkey for medicinal purposes. For many years, medicinal and aromatic plants have been cultivated for use in the production of food, condiments, and medicines, and they now have a wide range of applications including food, food additives, medicine, cosmetics, perfumery, spice, beverage, paint, insecticide, antibiotic, and decorative (1, 2). More than 40% of drugs were of herbal origin at the beginning of the twentieth century, but by the mid-1970s, this rate had dropped to less than 5%. However, the emergence of new areas of use for medicinal and aromatic plants, as well as the increasing demand for natural products, has increased the use potential of these plants' day by day since the 1990s. (3).

According to ethnobotanical studies on medicinal plant species commonly used by the Turkish public, approximately 500 species are used for medicinal and aromatic purposes (4). According to reports, there are approximately 140 plant species registered in the codices, and approximately 300 medicinal plants are sold in herbalists (5). When subspecies are included, the number of plants traded internally and externally in Turkey is approximately 350, with approximately 140 of these sold abroad (6).

Each of the plants used in this research has medicinal properties. *Salvia officinalis* is the scientific name for sage, which belongs to the lamiaceae family. Sage (adaçayı in Turkish) has been known to increase appetite due to its bitter taste and to facilitate digestion and remove stomach gases, to reduce sweating and salivation and to clean the pores, to be used in rheumatic pains, and to be used as mouthwash in tonsils, teeth, mouth, throat inflammations, and angina due to its calming and germicidal properties (7,8). Linden (ıhlamur in Turkish), a member of the tiliaceae family with the scientific name *Tilia platyphyllos*, has been used to induce sweating, as a chest softener, as

a sedative and calming agent, to strengthen the heart muscles and nerves, to work and clean the kidneys, to treat epilepsy and migraine, and to have antipyretic, anti-fatigue, and bile-digesting properties (5, 8, 9). *Thymus vulgaris*, also known as thyme or kekik in Turkish, is a plant in the lamiaceae family that has been used to treat a variety of ailments, including headaches, stomachaches, intestinal gas, diuretics, nervous diseases, muscle relaxants, nervous facial pain, typhoid, diarrhea, rheumatism, cough, bronchitis, epilepsy, and other conditions (7,9). *Matricaria chamomilla*, also known as daisy or papatya in Turkish, is a plant in the asteraceae family that has been reported as a diuretic, appetite stimulant, nerve sedative, antipyretic, diarrhea and carminative, wound healing, gallstones, hemorrhoids, and inflamed wounds, as well as for rheumatism, insomnia, flu, anemia, dizziness, eczema (8, 10). *Zingiber officinale*, also known as ginger (zencefil in Turkish), is a member of the zingiberaceae family and is a sedative, antispasmodic, appetizing, anti-nausea, expectorant, reliever of abdominal pain, intestinal irritations, and indigestion. It is also reported to strengthen heart muscles and regulate circulation, lower cholesterol in the liver and blood, have a blood coagulation and blood thinning effect (9).

Polat et al. reported that 15 of 50 medicinal plant species belonging to 25 families were collected from the region in herbalists in the Bingol region. In the study, it was stated that plants such as *Matricaria chamomilla L*. (May Chamomile), *Salvia tomentosa Miller* (sage), *Thymus* sp. (linden), *Tilia* sp. (thyme) and *Zingiber officinale Roscoe* (ginger) were used for infusion by local herbalists (11). Akbulut and Özkan reported in their study that *Thymbra spicata, Tilia tomentosa, Salvia absconditiflorae, Zingiber officinale, Cota altissima* are among the most sold medicinal and aromatic plants in herbalists in Kahramanmaraş (12).

The majority of the nutrients needed by humans for survival are provided by plants. It is a good source of minerals, vitamins, lipids, carbohydrates, and protein. In addition to fulfilling the nutritional requirements of plants, it is crucial in the pharmaceutical industry, food, chemical, cosmetics, and agricultural control industries (13). These plants are frequently employed in the culinary, spice, and tea industries. To create herbal tea, a variety of herbs can be used, such as sage, linden, mint, fennel, chamomile, echinacea, rosehip, apple, mountain tea, lemon balm, rosemary, cassia, thyme, nettle, tarragon, raspberry, basil, and anise (14, 15).

There is no information in the literature about the nutritional composition of medicinal plants in Bingol. The purpose of this study is to determine the nutrient contents, such as

moisture, ash, crude protein, crude fat, crude fiber, carbohydrate and nutritive value in sage, linden, thyme, daisy and ginger plant samples obtained from local herbalists

MATERIALS and METHODS

Herbal Materials

Between the 10th and 11th months of 2019, five different plant species used for therapeutic purposes, such as antipyretic, sedative, muscle relaxant, and tranquilizer, were obtained from three herbalists (H1, H2, H3) in Bingol. Plant species were taxonomically identified by Alpaslan Koçak in a member of Department of Biology, Faculty of Science, Bingol University according to Flora of Turkey and the East Aegean Islands (16, 17). The scientific names, family names, English names, Turkish names, and intended uses of these plants are all listed in Table 1.

Determination of Moisture

Approximately 3 grams of sample were weighed and placed in a 105°C oven (Memmert 100-800) for 6 hours, after which the weight loss was calculated as percentage of moisture content (%)(18).

Determination of Ash

The samples were weighed and recorded in a desiccator at room temperature after being dried in an oven at 105°C for 3-5 hours. To assess ash content, 3 grams of dried sample were burned for 3-4 hours at 550°C in a muffle furnace (Carbolite ELF11/6b) until they turned white or light gray in color (18), and the percentage of ash content (%) was determined over the dry matter (19).

Table 1. Scientific, family, English andTurkish names of medicinal plant used different parts different parts

Scienctific name	Family name	English name	Turkish name	Plant part used
Salvia officinalis	*Lamiaceae*	Sage (S)	Adaçayı	leafy and flowering branches
Tilia platyphyllos	*Tiliaceae*	Linden (L)	Ihlamur	flower and buds
Thymus vulgaris	*Lamiaceae*	Thyme (T)	Kekik	leafy and flowering branches
Matricaria chamomilla	*Asteraceae*	Daisy (D)	Papatya	f lowers
Zingiber officinale	*Zingiberaceae*	Ginger (G)	Zencefil	roots and rhizomes

Determination of Crude Protein

Before being transferred to the device's (Gerhardt Dumatherm) incineration unit, 50 mg of dried plant sample was weighed and placed in a tin foil sample carrier. After sampling at 1200°C with O_2 burning, compounds that pass into the gas phase are kept in filters. The nitrogen content of N_2 carried by He was determined using a thermal conductivity detector (18). The Dumas technique was used to compute the percentage of protein content (%) using the nitrogen protein conversion factor (6.25) (20).

Determination of Crude Fat

The dried sample, weighing roughly 3 grams, was then inserted in the filter paper. After that, cotton was used to cushion the filter papers inside the cartridges before they were

placed in the soxhlet extractor (Velp Scizentifica Ser 148). The balloon weight was recorded and the percentage of fat content (%) was estimated after placing the samples in an oven at 105°C to recover some of the hexane that could not be extracted by this technique (18).

Determination of Crude Fiber

The fat-free samples were weighed 3 grams and placed in a beaker with 50 ml of 5% H_2SO_4 and 150 ml of water. And a magnetic stirrer was used to stir it for 30 minutes. After this, the samples were filtered through filter paper and washed with hot water until the residue was acid-free. 50 ml of 5% NaOH was added to the residue and stirred for another 30 minutes. The residue was then washed with hot water until it was alkali-free. After transferring the total residue to a crucible, it was dried in a hot air oven at 105 °C and weighed. The residue was incinerated for 5 hours in a muffle furnace at 550 °C before being allowed to cool and reweighed. The weight loss due to ignition was used to calculate the crude fiber percentage % (18).

Determination of Carbohydrate

The percentage of carbohydrate content (%) was calculated on the basis of the dry weight using the following formula: Carbohydrate (%) = [100- (% Protein) + % Fat + Fiber + % Ash + % Moisture)] (21).

Determination of Nutritive Value

Nutritional value of plants calculated according to the following formula. Nutritive value (kcal/100 g) = [4x(% Carbohydrate) + 4x(% Protein) + 9x (% Fat)] (22).

Statistical Analysis

The data were calculated as the mean standard deviation of three replicates, and the means were subjected to one way analysis of variance (ANOVA) using the IBM SPSS Statistics 28.0 software program. While the Duncan multiple comparison test was used to determine mean differences at the $p<0.05$ significance level, Pearson correlation analysis was used to determine the relationships between the variables.

RESULTS

The percentages (%) of moisture, ash, crude protein, crude fat, crude fiber, carbohydrate, and nutritional value in medicinal plants are shown in Tables 2 and 3. The moisture, ash, crude fiber, carbohydrate, and nutritive value groups ($p<0.05$), showed statistically significant differences, whereas the crude protein and crude fat groups did not ($p> 0.05$) (Table 2 and 3). According to the tables, the crude protein content of daisy (D2, D3) and linden (L1, L2) samples, the crude fiber content of daisy (D2, D3) and thyme (T1, T2, T3) samples, the carbohydrate content of ginger (G1, G2, G3) and sage (S1, S3) samples were all found to be high. The correlation coefficients between the nutritional parameters

of medicinal plants are shown in Table 4.There was no significant correlation coefficient between the crude protein and crude fat groups, nor between these two groups and the others.

Table 2. Percentages (%) of moisture, ash, crude protein and crude fat (dry weight) in of medicinal plants

	Plant samples	Moisture %	Ash %	Crude protein %	Crude fat %
Herbalist 1 (H1)	S1	2.26±0.10^{bc}	6.39±0.46^{bc}	6.59±0.15^{NS}	4.87±0.22^{NS}
	L1	3.23±0.09^{bc}	9.39±0.35^{bc}	10.38±0.03^{NS}	2.40±0.43^{NS}
	T1	5.24±0.26^{bc}	11.40±0.55^{bc}	9.95±0.10^{NS}	3.94±0.03^{NS}
	D1	1.17±0.02^{a}	8.05±0.33^{d}	9.40±0.23^{NS}	2.80±0.17^{NS}
	G1	0.32±0.01^{bd}	5.75±0.03^{bd}	9.33±0.04^{NS}	4.79±0.22^{NS}
Herbalist 2 (H2)	S2	4.84±0.04^{a}	10.56±0.04^{c}	8.52±0.04^{NS}	5.09±0.03^{NS}
	L2	4.24±0.03^{ad}	8.00±0.04^{ad}	12.16±0.72^{NS}	3.24±0.02^{NS}
	T2	5.67±0.32^{a}	10.78±0.13^{d}	9.28±0.11^{NS}	6.80±0.30^{NS}
	D2	1.78±0.11^{b}	10.00±0.22^{c}	11.11±0.01^{NS}	2.44±0.20^{NS}
	G2	0.17±0.01^{ac}	4.67±0.03^{ac}	10.72±0.02^{NS}	6.69±0.10^{NS}
Herbalist 3 (H3)	S3	3.19±0.03^{bc}	4.96±0.02^{c}	8.83±0.40^{NS}	3.32±0.01^{NS}
	L3	3.11±0.17^{bc}	8.11±0.22^{d}	9.34±0.03^{NS}	2.12±0.00^{NS}
	T3	3.03±0.12^{b}	11.89±0.11^{c}	7.30±0.10^{NS}	4.68±0.03^{NS}
	D3	0.85±0.05^{a}	10.87±0.15^{d}	18.22±0.50^{NS}	3.60±0.01^{NS}
	G3	0.10±0.00^{b}	5.66±0.04^{d}	8.54±0.03^{NS}	4.03±0.05^{NS}

Statistical analyzes were performed using the analysis of variance (ANOVA) and Duncan test. Values were given as mean ± standard deviation of triplicate (n=3) determinations, According to Duncan, the means within each column that are followed by the same letters are not significantly different, NS: Non-significant

Table 3. Percentages (%) of crude fiber, carbohydrate (dry weight) and nutritive value in medicinal plants

	Plant samples	Crude fiber %	Carbohydrate %	Nutritive value (kcals/100g)
Herbalist 1 (H1)	S1	21.23±0.80^{f}	58.66±2.52^{g}	304.83±3.54^{i}
	L1	27.56±0.70^{bce}	47.04±1.06^{h}	251.28±4.20^{j}
	T1	26.81±0.65^{bce}	42.66±1.06^{hj}	245.66±4.10^{hj}
	D1	24.97±0.30^{bce}	53.61±2.17^{gi}	277.24±4.60^{gi}
	G1	19.04±0.30^{f}	60.77±2.09^{g}	323.51±5.40^{i}
Herbalist 2 (H2)	S2	20.05±0.50^{acf}	50.94±2.08^{h}	283.65±5.22^{i}
	L2	23.27±1.09^{e}	49.09±0.66^{h}	274.16±3.14^{j}
	T2	27.00±1.33^{adeh}	40.47±0.15^{adeh}	260.27±3.00^{i}
	D2	28.24±0.09^{e}	46.43±0.20^{hj}	252.12±4.53^{hj}
	G2	16.65±0.10^{fg}	61.10±2.10^{fg}	347.49±5.28^{i}
	S3	17.67±0.10^{bcf}	62.03±2.50^{g}	313.32±5.00^{i}
Herbalist 3 (H3)	L3	25.42±0.10^{e}	51.90±0.75^{g}	264.04±4.53^{j}
	T3	29.16±0.60^{e}	43.94±0.90^{h}	247.17±4.76^{j}
	D3	26.28±0.80^{e}	40.18±0.60^{hj}	262.00±3.31^{hj}
	G3	17.99±0.60^{f}	63.68±2.30^{g}	321.15±5.00^{i}

Statistical analyzes were performed using the analysis of variance (ANOVA) and Duncan test. Values were given as mean ± standard deviation of triplicate (n=3) determinations, According to Duncan, the means within each column that are followed by the same letters are not significantly different

Abbreviations for plants in tables are as follows:

S1, S2, S3: Sage (*Salvia officinalis)* samples obtained respectively from the first, second and third herbalists

L1, L2, L3: Linden (*Tilia platyphyllos)*samples obtained respectively from the first, second and third herbalists

T1, T2, T3: Thyme (*Thymus vulgaris)*samples obtained respectively from the first, second and third herbalists

D1, D2, D3: Daisy (*Matricaria chamomilla)* samples obtained respectively from the first, second and third herbalists
G1, G2, G3: Ginger *(Zingiberofficinale)* samples obtained respectively from the first, second and third herbalists

Table 4. Pearson Correlation relationship of nutritional parameters of medicinal plants

Parametres	Correlation coefficient	p – value
Moisture & Ash	-0.571	(>0.05)
Moisture & protein	-1.99	(>0.05)
Moisture & Fat	0,067	(>0.05)
Moisture & Fiber	0.399	(>0.05)
Moisture & Carbohydrates	-0.557*	(>0.05)
Moisture & Nutritive value	-0.564*	(>0.05)
Ash & Protein	0.231	(>0.05)
Ash & Fat	-0.084	(>0.05)
Ash & Fiber	0.845**	(<0.001)
Ash & Carbohydrates	-0,938	(<0.001)
Ash & Nutritive value	-0.901**	(<0.001)
Protein & Fat	0.445	(>0.05)
Protein & Fiber	0.437	(>0.05)
Protein & Carbohydrate	-0.429	(>0.05)
Protein & Nutritive value	-0.210	(>0.05)
Fat & Fiber	-0.353	(>0.05)
Fat & Carbohydrate	0.089	(>0.05)
Fat & Nutritive value	0.423	(>0.05)
Fiber & Carbohydrate	-0.881**	(<0.001)

Bivariate correlation coefficient was calculated using by using the average of the measurements repeated three times, *Significant at the 0.05 level (2-tailed), ** Significant at the 0.01 level (2-tailed)

DISCUSSION

Moisture content in plants is a potential source of water and is required because it is estimated that food moisture accounts for 20% of total water consumption. Ash content, which is the byproduct of burning, is a measure of a food's overall mineral composition. The amount and composition of ash left over after burning plant material varies greatly depending on plant age, time, and organ to organ (23,24,25). Moisture and ash contents in different samples of sage plants in the range of 8.14 - 9.83% and 11.91 - 12.67%, respectively were found by Amr and Dordevic(26). Moisture and ash contents in sage and thyme (6.4%, 9.1% and 6%, 2.2%, respectively) by Khalil et al.; (3.95%, 4.95%) in white ginger and (4.63%, 7.45%) in yellow ginger by Ajayi et al.; (10.78%, 4.65%) in linden by Farid et al. (2017); (9.75%, 6.77%) in daisy by Farid et al.; (6.32%, 6.57%) in ginger by Ogbuewu et al.; (6.77%, 9.60%) and (8.71%, 8.44%) in sage and thyme by Tomescu et al.; (9.97% and 8.56%, respectively) in daisy (chamomile) by El- Zainy et al. were found (27-33).

When compared to herbalists (H1, H2, H3), linden, thyme and chamomile species are H2>H1>H3 in terms of moisture content; linden and ginger types can be listed as H1>H3>H2 from the largest to the smallest in terms of ash content. According to the chemical properties of herbal teas, which are included in the TS 12933 Herbal Tea Standard of Turkish Standards Institute, the amount of moisture contained in the teas should be at most 10% and the total amount of ash should be at most 9% (34). In the study, it was determined that the moisture content of herbal tea samples such as sage, linden and daisy between 0.85 - 4.84% was found to be safe for consumption, whereas ash levels surpassing of ash exceeding the limit level of sage and daisy

samples (10.56, 10.87) were found to be unsuitable. The moisture content of thyme and ginger samples (0.10% - 5.67) (maximum 12% for both), ash amounts of thyme (maximum 14%) and ginger (maximum 12%) samples, are all within the Turkish Food Codex limit values (35) (Table 2).

Plants contribute to meeting human needs for energy and nutrition. Plants contain carbohydrates, proteins, and fats as nutrients (36). Plants with a high crude protein value may be used as a source of protein in some food formulations. Malnutrition of protein-calories has been identified as a major contributor to nutritional pathology. Food derived from a plant that contains more than 12% of its energy value from protein is a good source of protein. The daily total protein intake is determined by an individual's need for growth and desired weight. According to the World Health Organization (WHO), the protein Recommended Daily Allowances (RDAs) for children, adults, and women are 28g, 63g, and 50g, respectively (37-39). A diet that provides 1-2% of its caloric energy as fat is considered sufficient for humans, as excessive fat consumption causes diseases such as cardiovascular disorders, atherosclerosis, aging, and cancer (40). Fiber in the diet lowers serum cholesterol levels, as well as the risk of cardiovascular disease, colon and breast cancer, and hypertension. A high fiber diet can cause intestinal irritation, decreased digestibility, difficult absorption of minerals found in plants, and decreased nutrient utilization overall according to the American Dietetic Association, 20-30 grams of fiber per day are required for digestion and effective waste elimination (41, 42). Carbohydrate is the primary and necessary source of energy. According to the RDA for carbohydrates is 130g (43). Plants are a good source of energy because they contain a lot of sugar. Adult men's energy requirements ranged from 2300-2900 kcal/day, while adult women's requirements ranged from 1900-2200 kcal/day (44).

When compared to herbalists, linden and ginger types are H2> H1 > H3 in terms of both crude protein and crude fat contents, sage and daisy types in terms of crude protein content; linden and ginger types can be listed in terms of crude fiber content, sage and thyme types can be listed from largest to smallest in terms of carbohydrate content as H3> H1 > H2 (Table 2 and 3).

Moisture and carbohydrate (-0.557), nutritive value (-0.564); crude fiber with ash (0.845), nutritive value (-0.901); crude fiber and carbohydrate (-0.881), nutritive value (-0.951); carbohydrate and nutritive value (0.899) were all found to be statistically significant. There is a significant correlation between carbohydrate and nutritive value groups, with a correlation value of 0.899 (Table 4).

When comparing the results found in the literature with this study, crude protein and carbohydrate contents in sage (6.77%, 67.89%), crude protein and crude fat contents in thyme (7.54%, 5.85%) by Tomescu et al. (32); the crude protein, crude fat and carbohydrate contents in daisy (chamomile) (18.34%, 3.71%, 59.40%) by Al- Zainy et al. (33); crude protein, crude fat and crude fiber contents in linden (15.93%, 2.98%, 28.89%) by Farid et al. (29); crude protein and carbohydrate contents in yellow ginger (11.65%, 58.21%) by Ajayi et al. (28) were found to be close to results of this study. The nutritive values were found lower than those found in the literature for sage (1320 -1735 kj = 315.28 - 414.4 kcals per 100g), thyme (1155 kj = 275.87 kcal/100g), daisy (chamomile) (343.866 kcal/100g) and ginger (375.94 - 396.05 kcal/ 100g)(33, 45, 46).

According to this study, which analyzed at the nutritional content of medicinal plants, sage has a high carbohydrate content, thyme has a high crude fiber content, ginger has a high carbohydrate and crude fat content, and daisy has a high crude protein level. Additionally, the thyme samples effectively satisfy the recommended dietary allowance (RDA) for fiber, while the sage and ginger samples largely satisfy the RDA for carbohydrates (47).

CONCLUSION

In the study, while the moisture contents of herbal teas such as sage, linden and daisy were found to be safe for consumption, the ash levels of thyme samples were not found suitable for consumption. The nutritional values of *Salvia officinalis* and *Zingiber officinale* samples, which have higher carbohydrate percentages than other plants, were also found to be higher. It can be inferred that these samples are carbohydrate-rich based on the statistical significance of the correlation coefficients between carbohydrate and nutritional value.

This study may suggest that plants can be included in various food products to make them more nutritious in terms of important compounds that affect nutritional value, such as crude protein, carbohydrate and crude fiber. These plants can be used in food supplements and animal feed preparation because they contain sufficient crude protein and crude fiber are rich in carbohydrates, and have a high nutritional value. In addition, the nutritional composition data of medicinal plants will be useful for both locals who use these plants for healthy nutrition and local herbalists who promote plant species.

Ethics Committee Approval: Ethics committee approval is not required in this study

Peer-review: Externally peer-reviewed

Author Contributions: Concept: YK. Design: YK, TRK. Literature Search: YK, TRK. Data Collection and Processing: YK, TRK. Analysis or Interpretation: YK, TRK. Written: TRK, YK.

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The Impact of Disease Activity and Obesity on Kinesiophobia in Ankylosing Spondylitis Kinesiophobia and Ankylosing Spondylitis

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Abstract

Objective: This study aims to determine the rate of kinesiophobia in ankylosing spondylitis (AS) patients and to determine the relationship between kinesiophobia and disease activity, obesity, quality of life, functional status, fatigue, and fear of falling.

Methods: The study design is a prospective study. That included 83 ankylosing spondylitis patients and 79 age- and gender-matched healthy controls. Kinesiophobia was evaluated using the Tampa Scale for Kinesiophobia (TSK), disease activity with the Bath AS Disease Activity Index (BASDAI), functional status with the Health Assessment Questionnaire (HAQ) and Bath AS Functional Index (BASFI), fear of falling with the Falls Efficacy Scale International (FES-I) and Fatigue Severity Scale (FSS), Quality of Life Questionnaire (ASQoL), Body Mass Index (BMI). The correlation of outcome measures with kinesiophobia levels was analyzed, and all parameters were compared in patients with (TSK>37) and without kinesiophobia (TSK≤37).

Results: In AS patients, the rate of kinesiophobia was 78.3%, the mean TSK score was 43.85±9.78, while in healthy controls, the kinesiophobia rate was 17.7%, the mean TSK score was 27.07±8.46 (odds ratio (OR)=16.766, 95% confidence interval (CI): 7.697-36.518; p<0.001). TSK was positively correlated with BMI, ASQoL, BASDAI, HAQ, FES-I, FSS, and BASFI (r=0.336, r=0.457, r=0.341, r=0.447, r=0.269, r=0.371, p<0.05 for each). Patients with a BMI>25, and a BASDAI> 4 had higher TSK scores (p=0.041 and p<0.001, respectively).

Conclusion: AS patients have a very high rate of kinesiophobia. Patients with obesity and high disease activity have higher levels of kinesiophobia. Detection of kinesiophobia in patients with AS, control of weight/obesity, and reduction of disease activity should be an important goal.

Key Words: Ankylosing Spondylitis, body mass index, disease activity, kinesiophobia

Ankilozan Spondilitte Hastalık Aktivitesi ve Obezitenin Kinezyofobi Üzerindeki Etkisi

Özet

Amaç: Bu çalışmanın amacı ankilozan spondilit (AS) hastalarında kinezyofobi oranını belirlemek ve kinezyofobi ile hastalık aktivitesi, obezite, yaşam kalitesi, fonksiyonel durum, yorgunluk ve düşme korkusu arasındaki ilişkiyi saptamaktır.

Gereç ve Yöntemler: Çalışma prospektif olarak dizayn edilmiştir. Çalışmaya 83 ankilozan spondilit hastası ve yaş ve cinsiyet açısından eşleştirilmiş 79 sağlıklı kontrol dahil edildi. Kinezyofobi Tampa Kinezyofobi Ölçeği (TSK) ile, hastalık aktivitesi Bath AS Hastalık Aktivite İndeksi (BASDAI) ile, fonksiyonel durum Sağlık Değerlendirme Anketi (HAQ) ve Bath AS Fonksiyonel İndeksi (BASFI) ile, düşme korkusu Uluslararası Düşme Etkinliği Ölçeği (FES-I) ve Yorgunluk Şiddeti Ölçeği (FSS) ile, Yaşam Kalitesi Anketi (ASQoL), Vücut Kitle İndeksi (VKİ) ile değerlendirildi. Sonuç ölçümlerinin kinezyofobi düzeyleri ile korelasyonu analiz edilmiş ve tüm parametreler kinezyofobisi olan (TSK>37) ve olmayan (TSK≤37) hastalarda karşılaştırılmıştır.

Sonuçlar: AS hastalarında kinezyofobi oranı %78,3, ortalama TSK skoru 43,85±9,78 iken, sağlıklı kontrollerde kinezyofobi oranı %17,7, ortalama TSK skoru 27,07±8,46 idi (odds oranı (OR)=16,766, %95 güven aralığı (CI): 7,697-36,518; p<0,001). TSK; VKİ, ASQoL, BASDAI, HAQ, FES-I, FSS, BASFI ile pozitif korelasyon göstermiştir (r=0.336, r=0.457, r=0.341, r=0.447, r=0.269, r=0.371, her biri için p<0.05). VKİ>25 ve BASDAI>4 olan hastaların TSK skorları daha yüksekti (sırasıyla p=0.041 ve p<0.001).

Anahtar Kelimeler: Ankilozan Spondilit, vücut kitle indeksi, hastalık aktivitesi, kinezyofobi

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INTRODUCTION

Ankylosing spondylitis (AS) is a chronic rheumatologic disease that affects the axial skeleton and sacroiliac joints, leading to low back pain, mobility restrictions, and impairments (1). AS is a progressive disease by nature, which complicates the management of treatment. Therapy for AS aims to prevent deformity, reduce pain and morning stiffness, maintain posture, and preserve both physical and psychological well-being. Physiotherapy and exercise are the most often utilized therapeutic adjuncts besides pharmacotherapy (2). Patients with AS, on the other hand, may have a fear of movement, which prevents them from performing the exercises intended to help with disease treatment and daily activities. This condition, known as kinesiophobia, is defined as the fear of performing a physical activity while feeling vulnerable to a painful injury or re-injury (3).

The experience of pain and its impact on a person is influenced by a variety of psychological factors. One of the most important factors is fear (4-7). Numerous studies have identified a link between kinesiophobia and musculoskeletal disability, pain, and quality of life (8-12). Pain and pain-related disabilities have physical, psychological, and social consequences for individuals. Individuals are unable to engage in activities for an extended period because they are concerned activity might aggravate their pain. As a result, motor activity is reduced (13). Kinesiophobia promotes a sedentary lifestyle by avoiding physical activity due to the fear of repetitive injury and pain (14). Inactivity exacerbates conditions such as osteoporosis, muscle atrophy, and falls. On the other hand, these negative clinical conditions enhance inactivity, and this creates a vicious circle.

Understanding kinesiophobia from the patient's point of view and its effects on the disease process is essential for developing treatment strategies and rehabilitative approaches. The study aims to investigate the presence of kinesiophobia in patients with AS and its relationship with body mass index (BMI), disease activity, functionality, quality of life, fatigue, and fear of falling.

METHODS

The study design is a prospective study that included AS patients and age-sex-matched

healthy controls. Various questionnaires and scales were used to assess kinesiophobia, fear of falling, fatigue, disability, disease activity, and quality of life. The following questionnaires were used; Tampa Kinesiophobia Scale (TSK), Bath AS Disease Activity Index (BASDAI), functional status Health Assessment Questionnaire (HAQ), Bath AS Functional Index (BASFI), Falls Efficacy Scale International (FES-I), Fatigue Severity Scale (FSS), Quality of Life Questionnaire (ASQoL), Body Mass Index (BMI). Statistical analysis was performed using IBM SPSS software version 22.0. The study comprised 83 AS patients diagnosed using the 1984 Modified New York Criteria (15) who applied to Mersin University Rheumatology outpatient clinic between July and November 2022, as well as 79 age-sex-matched healthy controls. Patients under the age of 18 and over the age of 70, as well as those with neurological, orthopedic, pulmonary, and cardiac diseases, severe comorbid conditions, diabetic patients, and pregnant women, were excluded from the study. Patients who participated in physical therapy and exercise programs within the last six months, as well as those with peripheral arthritis or who had intra-articular injections within the previous year, were excluded from the study. Those whose cognitive functions could not answer the questions were also excluded, as did those with severe mental disorders. Demographic data of the patients, including age and gender, and other data, such as disease duration, height, weight, BMI, smoking status, and medications used, were recorded. Comorbid diseases and extra-articular involvements were noted.

The study was approved by Mersin University (Date: 06/07/2022, Approval number: 2022/467). All participants were informed about the study's content, and their written consent was obtained. The study was conducted in compliance with the Declaration of Helsinki.

The Tampa Scale for Kinesiophobia (TSK), a 17-item self-report questionnaire, was used to assess the presence of kinesiophobia. TSK was developed to evaluate fear of movement/(re)injury in patients with chronic pain (16). The validity and reliability of the Turkish version of the TSK were evaluated by Tunca et al. (17). Each item is rated on a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). Four questions (4, 8, 12, and 16) were negatively phrased and reverse-scored. The total score ranges from 17 to 68, with higher scores reflecting stronger fear-avoidance beliefs. The scores above 37 were evaluated as the presence of kinesiophobia based on the study of Vlaeyen et al (16).

The Falls Efficacy Scale International (FES-I), a self-reported questionnaire, was used to examine the fear of falling, which measures concern levels about falls during daily activities (18). The questionnaire has 16 items, and each item is scored between 1-4 (1=not at all

concerned, 4=very interested), with a total score ranging from 16 (no concern) to 64 (extreme concern). Scores greater than 24 were considered as the presence of fear of falling. Turkish reliability and validity of the questionnaire conducted by Ulus et al (19).

The Fatigue Severity Scale (FSS) was used to assess the patients' fatigue levels. The FSS consists of nine items designed to assess overall fatigue level (20). The statements in each FSS item are rated on a seven-point Likert-type, scale with 1 being the strongest agreement and 7 being the strongest disagreement. An arithmetic mean is calculated to determine the final score. A score of 4 or above indicates severe fatigue.

The health assessment questionnaire (HAQ) was used to assess disability (21).

The Turkish version of the Ankylosing Spondylitis Quality of Life (AsQoL) Questionnaire was used to assess the quality of life of AS patients (22). The scores in the disease-specific 18-item questionnaire with yes/no answers are calculated by adding up the number of yes answers (Yes: 1 point, No: 0 points). A high score indicates poor quality of life.

The Turkish version of the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) was used to assess disease activity (23). Scores higher than four were considered high disease activity, whereas scores below four were considered low disease activity. The Bath Ankylosing Spondylitis Functional Index (BASFI) was used to assess the functional capacity of AS patients (24).

Statistical Analysis

IBM SPSS for Windows version 22.0 software was used for statistical analysis (SPSS Inc., Chicago, IL, USA). Descriptive data were presented as mean ± standard deviation (SD) or median values, whereas categorical variables were presented as numbers (n) and percentages (%). The Lilliefors test was used to determine whether the numerical data were normally distributed. Differences between groups were evaluated with Student's t-test. Pearson's correlation test was used if the correlation between the data was normally distributed, and Spearman's correlation test was used if it was not normally distributed. A p-value of <0,05 was considered statistically significant.

RESULTS

Table 1. Demographic and clinical characteristics of patients with ankylosing spondylitis and healthy controls

	AS Mean±SD (Min-Max)	Healthy Control Mean±SD (Min-Max)	*p*
Age (year)	43.7±11.6 (19-69)	43±11.9 (20-68)	0.708
BMI	26.8±5 (16.7-42.1)	26.5±4.7	0.723
TAMPA scores	43.9±9.8 (17-68)	27±8.5 (17-52)	<0.001*
Disease duration (year)	7.2±7.2 (0-34)	N/A	
BASDAI	4.8±2.2 (1.2-9.3)	N/A	
FES-I	37.7±15.6 (18-63)	N/A	
FSS	5±1.9 (1.0-6.9)	N/A	
BASFI	2±1.8 (0-8.2)	N/A	
HAQ	0.6±0.6(0-2.35)	N/A	
ASQoL	9.1±5.5 (0-18)	N/A	

Abbreviations: AS: Ankylosing Spondylitis, SD: Standart Deviation, Min: Minimum, Max: Maximum, BMI: Body Mass Index, BASDAI: Bath Ankylosing Spondylitis Disease Activity Index, FES-I: The Falls Efficacy Scale International, FSS: Fatigue Severity Scale, BASFI: The Bath Ankylosing Spondylitis Functional Index, HAQ: Health Assessment Questionnaire, ASQoL: Ankylosing Spondylitis Quality of Life Questionnaire, N/A: Not Available, *p<0.05 (significant)

The baseline demographic and clinical characteristics of AS patients and the healthy control group are shown in Table 1. In the patient group, 53% (n=44) were female, 47% (n=39) were male, and in the healthy control group, 53.2% (n=42) were female, and 46.8% (n=37) were male. There was no difference in gender between the patient and control group. The mean age of the AS patients was 43.66±11.57 (min-max: 19-69), while the mean age of the control group was 42.97±11.84 (min-max: 20-68). There was no difference between the mean age of the patient and the control group (p=0.708). The patient group's mean disease duration was 7.18±7.21 years. The mean BMI of AS patients was 26.79±5.05 and 26.49±4.74 in the control group, and there was no difference between the two groups (p=0.723). The number of patients with AS with a BMI above 25 was 45 (54.2%). 27 (32.5%) of AS patients were smokers. The number of patients using only Non-Steroid Anti-inflammatory Drugs (NSAIDs) and/or Disease Modifying Anti-Rheumatic Drugs (DMARDs) was 36 (43.4%), while the number of patients using biological drugs (Anti-tumor necrosis factor-alpha or Interleukin-17 inhibitors) was 47 (56.6%). Uveitis history was present in 29 (34.9%) AS patients. None of the patients had recent history of peripheral arthritis or active rheumatoid arthritis.

Patients with a TSK score greater than 37 were considered to have kinesiophobia. In AS patients, the incidence of kinesiophobia was 78.3% (n=65), and the mean TSK was 43.85±9.78, while in the healthy control group, 17.7% (n=14) had kinesiophobia, the mean TSK score was 27.07±8.46 (min-max: 17-52). The rate of kinesiophobia was significantly higher in AS patients compared to the healthy controls (odds ratio (OR)=16.766, 95% confidence interval (CI): 7.697-36.518; p<0.001) (Table 1).

TAMPA scores were positively correlated with age, BMI, ASQoL, BASDAI, HAQ, FES-I, FSS, and BASFI (r: 0.237, r=0.336, r=0.457, r=0.341, r=0.441, r=0.447, r=0.269), r=0.371, respectively, p<0.05 for each) (Table 2). No correlation was found with disease duration (r= 0.043, p=0.698).

Patient were divided into two groups according to TSK scores, those with high kinesiophobia (TSK >37) and those with low kinesiophobia levels (TSK ≤37). There was no difference between the two groups regarding age, BMI, FSS, and disease duration (p=0.861, p=0.207, and p= 0.540, respectively). Patients with high kinesiophobia had higher mean ASQoL, HAQ, BASDAI, FES-I, and BASFI values than patients with low kinesiophobia (p=0.001, p=0.002,

p=0.028, p=0.006, p=0.002, respectively) (Table 3).

The difference in mean TSK scores between men and women was not statistically significant (p=0.711).

Table 2- Correlation of TAMPA scores with other parameters

	r	*p*
Age	0.237*	0.031
BMI	0.336**	0.002
ASQoL	0.457**	<0.001
BASDAI	0.341**	0.002
HAQ	0.441**	<0.001
FES-I	0.447**	<0.001
FSS	0.269*	0.014
BASFI	0.371**	0.001
Disease duration	0.043	0.698

Abbreviations: AS: Ankylosing Spondylitis, SD: Standart Deviation, Min: Minimum, Max: Maximum, BMI: Body Mass Index, BASDAI: Bath Ankylosing Spondylitis Disease Activity Index, FES-I: The Falls Efficacy Scale International, FSS: Fatigue Severity Scale, BASFI: The Bath Ankylosing Spondylitis Functional Index, HAQ: Health Assessment Questionnaire, ASQoL: Ankylosing Spondylitis Quality of Life Questionnaire, r:correlation analysis *p<0.05 (significant), **p<0.01

Table 3. Comparison of the difference between TAMPA scores by disease duration, age, BMI, disease activity and other clinical features

	TSK ≤37	**TSK >37**	***p***
Age	43.3±10.9	43.9±12.1	0.861
BMI	25.4±4.5	27.1±5.2	0.207
ASQoL	5.3±4.9	10.2±5.3	0.001*
HAQ	0.3±0.3	0.6±0.6	0.002*
BASDAI	3.9±1.9	5.0±2.3	0.028*
FES-I	29.7±12.2	39.9±15.7	0.006*
FSS	4.4±1.8	5±1.9	0.201
BASFI	1.1±0.9	2.1±1.9	0.002*
Disease duration	8.1±8	6.9±7	0.540

Abbreviations: TSK: Tampa Scale for Kinesiophobia, BMI: Body Mass Index, BASDAI: Bath Ankylosing Spondylitis Disease Activity Index, FES-I: The Falls Efficacy Scale International, FSS: Fatigue Severity Scale, BASFI: The Bath Ankylosing Spondylitis Functional Index, HAQ: Health Assessment Questionnaire, ASQoL: Ankylosing Spondylitis Quality of Life Questionnaire, *p<0.05

Patients with AS were divided into two subgroups: those with BMI<25 (normal and low BMI) and those with BMI>25 (overweight or obese). TSK score was significantly higher in AS patients with a BMI higher than 25 than in those with a BMI below 25 (45.86±10.48 vs. 41.47±8.11, respectively, p=0.041).

There was no statistically significant difference in TSK scores between patients receiving NSAIDs and/or DMARDs and those receiving biological agents (p=0.609).

The TSK scores of smokers and nonsmokers were not statistically different (p=0.234). Patients were divided into two groups based on their BASDAI scores: those with low disease activity/active disease (<4) and those with high disease activity/active disease (≥4). The mean TSK scores in patients with active disease were significantly higher than in patients with low disease activity (47.16±8.03 vs. 39.31±10.25, respectively, p<0.001) (Table 4).

The results indicate that a high percentage of AS patients (78.3%) had kinesiophobia, compared to a lower percentage in the healthy control group. The study found positive correlations between kinesiophobia and age, BMI, disease activity, functionality, fear of falling, fatigue, and lower quality of life. Patients with higher levels of kinesiophobia showed

worse scores in AS-related measures such as quality of life, functionality, and disease activity. Additionally, the study found that patients with a BMI above 25 had higher kinesiophobia scores, suggesting a relationship between weight and kinesiophobia in AS patients. However, there was no significant difference in kinesiophobia scores between patients receiving different treatment protocols.

Table 4. Comparison of mean TAMPA scores by gender, BMI, treatment agent, smoking status and disease activity

	Group 1 TSK	Group 2 TSK	*p*
Sex (1: Female vs. 2: Male)	43.5±9.5	44.8±10.2	0.711
BMI (1:<25 vs 2:>25)	41.5±8.4	45.9±10.5	0.041*
Treatment (1: NSAID or DMARD vs. 2: Biologic)	43.2±8.2	44.3±10.9	0.609
Smoking status (1: No vs. 2: Yes)	43±9.3	45.7±10.6	0.234
BASDAI (1:<4 vs 2: ≥4)	39.3±10.2	47.2±8	<0.001*

Abbreviations: TSK: Tampa Scale for Kinesiophobia, BMI: Body Mass Index, NSAID: Non-Steroid Anti-inflammatory Drug, DMARD: Disease Modifying Anti-Rheumatic Drug, BASDAI: Bath Ankylosing Spondylitis Disease Activity Index, *p<0.05

DISCUSSION

The treatment of ankylosing spondylitis (AS) that affects the spine and sacroiliac joints typically involves a combination of pharmacological intervention and exercise therapy. Nevertheless, the presence of kinesiophobia among patients presents a significant barrier to the implementation of physical activity, a crucial element of the therapeutic protocol. The study revealed a notable prevalence of kinesiophobia among individuals diagnosed with AS. In addition, the incidence of kinesiophobia was found to be significantly higher in patients with a high BASDAI score and a body mass index (BMI) above 25 compared to patients with a low BASDAI score and a BMI<25 and the healthy population.

In the first study evaluating the frequency of kinesiophobia in AS patients, the frequency of kinesiophobia was reported as 66.6% (12). In our study, AS patients had a higher percentage of kinesiophobia, with a rate of 78.3%. TSK was used to assess kinesiophobia in the studies. In a study evaluating the relationship between the respiratory capacity of patients with AS and their kinesiophobia levels, the mean TSK score was reported as 41.65±7.59. In our study, the mean TSK was 43.859.7, which was consistent with the previous findings (25). The high rate of kinesiophobia in patients with AS may be related to the disease's symptoms generating pain memory and a desire to avoid pain. The inflammatory nature of pain in AS gives rise thought that patients would tend to move and engage in the activity; however, the high rate of kinesiophobia in our study suggests that patients can be more concerned about the acute pain they experience at the onset of movement.

There are two studies in the literature that look at the relationship between BASDAI, a disease activity scale, and kinesiophobia in patients with AS (12,25). As a result of their research, Oskay

et al. emphasized that they expected kinesiophobia to be associated with an increase in disease activity and a decrease in mobility, but the results were unrelated (12). The findings of Er et al. were similar, with no significant relationship found between BASDAI and kinesiophobia (25). Kinesiophobia was found to be significantly higher in patients with AS who had a higher BASDAI score in our study. Because AS is a disease that, by nature, affects physical activity and functions, the presence of kinesiophobia is an expected result when the disease is active, for example, when the BASDAI score is high. We believe that functional limitations increase kinesiophobia in patients with AS who have a high BASDAI.

In our study, patients with high levels of kinesiophobia (TSK >37) had higher mean ASQoL, HAQ, FES-I, and BASFI scores than patients with low levels (TSK<37), indicating that deterioration in general health, decreased quality of life, loss of functionality and fear of falling are the factors that predispose to kinesiophobia in patients. Parallel to our study, Oskay et al. reported that kinesiophobia was associated with pain scores, BASFI, and ASQoL scores (12).

A study on kinesiophobia in Achilles tendinopathy patients revealed that those with high TSK scores had a greater BMI, more severe symptoms, and a poorer quality of life (26). Similarly, in our study, TSK was higher in AS patients with a BMI greater than 25. Obese/overweight people are more prone to suffer from musculoskeletal problems such as joint pain, functional impairment, and walking difficulty. Excess weight increases the load on the joints, leading to pain, particularly in load-bearing regions such as the waist (27). It has been shown that high BMI is related to inflammation of the entheses and new bone formation in the axial and peripheral regions (28). As a consequence, it is not surprising that kinesiophobia is high in AS patients who are overweight or obese. Vincent et al. (29) found that obese patients with chronic low back pain had higher TSK scores and Oswestry disability index than non-obese patients.

We found no statistically significant difference in TSK scores between patients treated with NSAIDs and/or DMARDs and those treated with biological agents when AS patients were separated into two groups according to their treatment protocols. To the best of our knowledge, no other study has examined the impact of treatment protocols on kinesiophobia in AS patients except ours. The result shows that patients using biological agents because of higher disease activity, symptom severity, and disease burden do not feel more vulnerable and prone to injury under adequate treatment. This may suggest that if patients receive adequate and appropriate treatment, kinesiophobia may be induced by persistent symptoms, such as

morning stiffness and pain, rather than by the intensity of the treatment they receive.

Our study has some limitations. The outcome measurements such as kinesiophobia, disease activity, quality of life, fear of falling, and fatigue severity may be subjective because they are based on patient self-assessment questionnaires. The patients' current kinesiophobia levels were tested in our study. Because the change in kinesiophobia through time, such as before and after the disease, was not assessed, the results cannot conclusively establish a cause-and-effect relationship between kinesiophobia and AS disease. In addition, the effect of individual factors such as the patient's lifestyle (e.g., active, sedentary) and occupation on kinesiophobia was not evaluated.

CONCLUSION

In conclusion, although it is a subjective self-assessment tool, the BASDAI may be a good predictor of kinesiophobia. Additionally, the fact that a high BMI is related to kinesiophobia demonstrates the significance of reducing weight and disease activity in preventing kinesiophobia. Thus, by minimizing the fear of movement, exercise participation, which is an essential component of the treatment of AS patients, may be achieved, and avoidance of activity can be prevented.

Ethics committee approval: Ethics committee approval for this study was obtained from Mersin University Clinical Research Ethics Committee (Date: 06/07/2022, Approval number: 2022/467).

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Chronic Wound Management in Geriatric Patients; A Case of Home Care Services

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Abstract

Objective: Chronic wounds are a major health problem in the geriatric population and often lead to reduced quality of life and increased healthcare costs. To evaluate the impact of chronic diseases and nutritional status on pressure ulcer development in individuals over 65 years of age enrolled in home care services.

Methods: This study was conducted between 15.12.2022 - 15.01.2023 at Giresun Training and Research Hospital. Individuals registered to the Home Care Services (HCS) and aged 65 years and over were included. Sociodemographic characteristics, medical history, Nutritional Risk Screening (NRS-2002), Visual pain scale, Braden Pressure ulcus risk scale and a scale to analyze wound staging were applied.

Results: The mean age of the 76 patients included in the study was 83.64±8.11 years. 80.3% of the patients were female, 86.8% needed medical care. 52.6% received HCS for neurologic, 36.8% for cardiovascular and 7.8% for respiratory diseases. When nutritional risk status was analyzed, 40.8% had a primary assessment as a result of the preliminary assessment. According to the main assessment result, 97.4% of the patients had nutritional risk. As a result of physical examination, wounds were detected in 16% of the patients. Considering the risk of pressure ulcus development, 6.8% of the patients were at high risk, 21.6% were at medium risk and 35.1% were at low risk. The mean Braden pressure scale score was 16.86±3.03. Only one of the participants described moderate pain.

Conclusion: Effective management of chronic wounds in geriatric patients requires a comprehensive and multidisciplinary approach that addresses the underlying causes, promotes wound healing, and prevents complications.

Key Words: Pressure ulcer, Geriatric individuals, Home care services

Geriatrik Hastalarda Kronik Yara Yönetimi; Bir Evde Sağlık Hizmetleri Örneği

Özet

Amaç: Kronik yaralar geriatrik popülasyonda önemli bir sağlık sorunudur ve sıklıkla yaşam kalitesinin düşmesine ve sağlık bakım maliyetlerinin artmasına neden olur. Evde bakım hizmeti alan 65 yaş üstü bireylerde kronik hastalıkların ve beslenme durumunun bası yarası gelişimine etkisini değerlendirmek.

Gereç ve Yöntem: Bu çalışma 15.12.2022 - 15.01.2023 tarihleri arasında Giresun Eğitim ve Araştırma Hastanesi'nde yapılmıştır. Evde Sağlık Hizmetlerine (ESH) kayıtlı ve 65 yaş ve üstü bireyler dahil edildi. Sosyodemografik özellikler, tıbbi öykü, Nutrisyonel Risk Taraması (NRS-2002), Görsel ağrı skalası, Braden Bası ülseri risk skalası ve yara evrelemesini değerlendirme skalası uygulandı.

Bulgular: Çalışmaya alınan 76 hastanın yaş ortalaması 83,64±8,11 idi. Hastaların %80,3'ü kadındı, %86,8'i tıbbi bakıma ihtiyaç duyuyordu. %52,6'sı nörolojik, %36,8'i kardiyovasküler ve %7,8'i solunum yolu hastalıkları nedeniyle SKS almıştır. Beslenme risk durumu incelendiğinde %40,8'i ön değerlendirme sonucunda birincil değerlendirmeye sahipti. Ana değerlendirme sonucuna göre hastaların %97,4'ünde beslenme riski vardı. Fizik muayene sonucunda hastaların %16'sında yara tespit edildi. Hastaların bası ülseri gelişme riskine bakıldığında %6,8'i yüksek, %21,6'sı orta ve %35,1'i düşük risk taşıyordu. Ortalama Braden basınç skalası skoru 16.86±3.03 idi. Katılımcılardan sadece biri orta derecede ağrı tanımlamıştır.

Sonuç: Geriatrik hastalarda kronik yaraların etkili yönetimi, altta yatan nedenleri ele alan, yara iyileşmesini destekleyen ve komplikasyonları önleyen kapsamlı ve multidisipliner bir yaklaşım gerektirir.

Anahtar Kelimeler: Bası yarası, Geriatrik bireyler, Evde bakım hizmetleri

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INTRODUCTION

The World Health Organization (WHO) defines home care as activities that require the support of family, relatives or health, social and other specialists in using personal preferences and ensuring the continuity of life, who are not capable of providing their own personal care and maintaining their quality of life (1). According to the Regulation on the Provision of HCS in the Republic of Turkey, it is defined as "Providing examination, examination, analysis, treatment, medical care, follow-up and rehabilitation services, including social and psychological counseling services at home and in the family environment to individuals who need home health care services due to various diseases" (2). In addition to geriatric care centers, it is recommended to provide on-site care services to the elderly in the home environment where they live (3). The importance of HCS is increasing due to the increasing number of chronic diseases in the world and in Turkey (4).

Today, chronic wounds are called the "silent epidemic" (5). Chronic wounds can be caused by a range of poor health conditions (cardiovascular disorders, diabetes and cancer etc.).(6) They are classified into four categories: arterial, diabetic, pressure and venous ulcers (7) Impact the quality of life and the management of wounds has a significant economic impact on health care (8).The cost of treatment of pressure ulcers alone in the USA is estimated to be 25 billion dollars per year (6). Economic benefits can be derived from strategies that focus on accurate diagnosis, infection prevention and improving wound healing rates to manage the increasing burden of care (9).

Chronic wounds are a major health problem in the geriatric population, often leading to reduced quality of life and increased healthcare costs. Effective management of chronic wounds in geriatric patients requires a comprehensive and multidisciplinary approach that addresses underlying causes, promotes wound healing, and prevents complications. This article aims to evaluate the impact of chronic diseases and nutritional status on pressure ulcer development in individuals over 65 years of age enrolled in HCS.

METHODS

This descriptive study was conducted with patients aged 65 years and older (n=76) who

received home care in our hospital between December 2022 and January 2023. Patients who received HCS temporarily were not included in the study. No sample selection was made in the study and 76 patients who met the inclusion criteria and volunteered to participate in the study were included in the study.

Data Collection: We collected the demographic (Age, Gender, Medical care needs, Bed dependency, Chronic diseases, Nutritional status, Urinary catheterization, etc.), Braden's Presure sore risk scale(10) and verbal pain scale (11) and Nutritional Risk Screening (NRS-2002)(12). In addition, the presence, stage, appearance and site of the wound were determined by physical examination. The wound condition was assessed. Occipital region, ears, nape of the neck, nose, lips, back, scapula, spinous process, breast, costae, elbow, iliac crest, sacrum, trochanter, ischium, gluteal region, extergenital, uston, external-internal knee, lower leg, Achilles tendon, feet, medial foot, heel, internal-external malleolus, plantar surface, toes, arm, hand and tracheostomy site were evaluated for the presence of wounds.

Braden Pressure ulcer risk assessment scale

The Turkish validity and reliability study of the scale developed by Braden et al. (10) in 1989 was conducted by Oğuz et al. (13) in 1998. The scale evaluates the factors of stimulus perception, humidity, activity, movement, nutrition, friction and irritation, with a minimum score of 6 and a maximum score of 23. Factors other than friction and irritation are scored between 1-4, while the friction and irritation factor is scored between 1-3. A low total score indicates a high risk of developing pressure sores. In addition, ≤12 is classified as high risk; 13-14 as medium risk; 15-16 as low risk (15-18 for those over 75 years of age); >16 as no risk (>18 for those over 75 years of age).

Pressure ulcers are analyzed in 4 stages, ranging from mild redness to complete skin loss (14).

Nutritional Risk Screening (NRS-2002) (12) is a screening system developed by Kondrup et al. based on retrospective analysis of randomized controlled trials. It was developed based on the fact that the indication for nutritional support is related to the severity of the disease and the degree of malnutrition. In addition to weight loss, body mass index and oral intake, it is a system that questions the severity of the disease and includes age in the scoring. NRS-2002 is a screening test recommended for use in inpatients by the European Society for Clinical Nutrition and Metabolism.

In 2014, Bolayır B. conducted the Turkish validity and reliability of the scale (15). This screening tool aims to determine the malnutrition levels and malnutrition risk rates of individuals. In this scale, a preliminary screening test is first applied to individuals. In the main screening part of the scale, the irregularity in the nutritional

status of individuals and the severity of the disease are measured. According to the percentage of weight loss, irregularity in nutritional status is evaluated as none (0 points), mild (1 point), moderate (2 points) and severe (3 points). The severity of the disease is assessed in a similar way to dietary irregularity: none (0 points), mild (1 point), moderate (2 points) and severe (3 points). The scores from the main screening section are summed and if the individual is over 70 years of age, an additional 1 point is added due to age to obtain a total score. If the total score is 3 or above, the patient is considered to have a nutritional risk and a nutritional plan is implemented; if the total score is below 3, the screening test is repeated periodically.

The visual pain scale (11) is based on a variety of visually depicted facial expressions. The use of facial expressions to measure pain intensity was first developed for use among children. It was later validated for use in adults, the elderly and the cognitively impaired patient population.

Statistical Analysis: The obtained data were analyzed in the Statistical Package for the Social Sciences (SPSS) version 25.0 package program. Descriptive findings were presented with frequency and percentage distributions n (%). Chi-square test was used in the analysis of qualitative data. Statistical significance was evaluated at the $p<0.05$ level.

RESULTS

The mean age of the 76 patients included in the study was 83.64±8.11 years. 80.3% of the patients were female and 86.8% needed medical care. When bed dependency rates were analyzed, 46.1% were fully dependent and 48.7% were semi-dependent. Of the elderly, 52.6% receive home health care services for neurological, 36.8% for cardiovascular and 7.8% for respiratory diseases. 6.6% of the patients were fed by peg, 5.3% by nasogastric feeding and 17.1% used urinary catheters. Only one of the participants described moderate pain (Table 1).

According to the results of the main assessment, the person with nutritional risk was found to be 97.4% (Table 2).

Physical examination revealed wounds in 16% of the patients. The integrity of 73.1% of the wounds was intact and 66.7% had a pink appearance. When the risk of pressure sore development was analyzed, 6.8% of the patients were at high risk, 21.6% were at medium risk and 35.1% were at low risk. The mean score on the Braden pressure scale was 16.86±3.03 (minimum 10, maximum 23) (Table 3).,

When the wound sites were evaluated, there was one person with a wound on the scapula (stage 3), one person with a wound on the sacrum (stages 1 and 2), two people with a wound on the trochanter region (stages 1 and 3), four people with a wound on the gluteal region (two in stage 1 and two in stage 3), two people with a wound

on the feet (stage 1), and two people with a wound on the heels (stages 1 and 2).

Table 1. Socio-demographic, nutritional and chronic disease characteristics of the patients

Socio-demographic of the patients	**n (%)**
Age *(ort.±ss=83,64±8,11)*	
≤83	34 (44,7)
>83	42 (55,3)
Gender	
Woman	61 (80,3)
Male	15 (19,7)
Medical care needs	
Yes	66 (86,8)
No	10 (13,2)
Bed dependency	
Fully dependent	35 (46,1)
Semi-dependent	37 (48,7)
Independent	4 (5,3)
Chronic disease requiring home health care services	
Neurological diseases	40 (52,6)
Cardiovascular diseases	28 (36,8)
Chest diseases	6 (7,8)
Other	18 (23,6)
Nutrition	
Oral	71 (93,4)
Peg	5 (6,6)
Nasogastric	4 (5,3)
Urinary catheter	
Yes	13 (17,1)
No	63 (82,9)
Services provided within the scope of home health	12 (15,8)
Catheter application	8 (10,5)
Catheter maintenance	4 (5,3)
Hygiene	52 (68,4)
Other	
Drug use	
1	3 (3,9)
2	6 (7,9)
3	6 (7,9)
4	8 (10,5)
>4	50 (65,7)
Pain status	
No	75 (98,7)
Present (moderate pain)	1 (1,3)

Table 2. Nutritional risk assessment results of the participants

Nutritional Risk Score	n (%)
Pre-assessment	
Yes	45 (59,2)
No.	31 (40,8)
Main assessment	
≥3 points	74 (97,4)
<3 points	0

Table 3. Characteristics related to wound conditions

Wound conditions	n (%)
Wound presence	
Yes	13 (17,10)
No	63 (82,9)
Wound Degree	
1. Reddened area	3 (23,1)
2. Leather opened	9 (69,2)
3. Subcutaneous destruction	1 (7,7)
4. Muscle and bone tissue damage	
Wound Observation	
Pink	10 (66,7)
Granulation tissue	3 (33,3)
Risk of pressure sore development (mean ±ss.=16.86±3.03)*	5 (6,8)
High risk	16 (21,6)
Medium risk	26 (35,1)
Low risk	27 (36,5)
No risk	
Wound sites	
Scapula (stage 3)	1 (1,3)
Sacrum (stage 1 and 2)	2 (2,6)
Trochanter (stages 1 and 3)	2 (2,6)
Gluteal region (stages 1 and 3)	4 (5,2)
Feet (stage 1)	2 (2,6)
Heel (stages 1 and 2)	2 (2,6)

* It was assessed with the Braden Pressure sore risk scale.

DISCUSSION

As the elderly population increases, the clinical and socioeconomic burden of non-healing skin wounds also increases, thus increasing the importance of studies on how aging affects wound healing (8). Delayed wound healing in an aging population, especially since most chronic wounds occur in this population, more emphasis should be placed on understanding the causes and preventing them

(16). After a skin injury, a complex process involving biochemical and mechanical events begins to coordinate the stages of hemostasis, inflammation, proliferation and remodeling that must occur for the wound to heal (17). Chronic and non-healing wounds, if left untreated and not managed appropriately, can lead to significant medical problems such as infection, sepsis, the need for limb amputation and even death (18).

The reasons for impaired skin integrity and increased incidence of pressure sores in elderly patients are decreased turgor tone, loss of skin elasticity, changes in immunologic mechanisms and decreased sensitivity to touch (17). In a study conducted in Kayseri province, the mean age of people receiving home care services was reported as 76±18.4 years. Patients aged 65 years and over (78.9%) were the most common (18). In our study, the mean age of the patient was 83.64±8.11 years. Similar to the literature, the proportion of elderly patients was higher in our study. This may be related to the long-life expectancy and the advanced age of the patients receiving HCS.

In accordance with the literature, pressure ulcers were observed in the gluteal and sacrum region in most of our patients (19). When the bed dependency rates of our patients were analyzed, 46.1% were fully dependent and 48.7% were semi-dependent. It may be due to the lack of mobility that occurs due to cerebrovascular events or in many conditions such as dementia (20). In our study, it was found that the majority of pressure sores were Stage 1 (73.1%) with redness that did not fade with pressure but skin integrity was intact. It shows the importance of home health services in taking precautions by determining the risk factors against pressure ulcer in the early period.

Special attention should be paid to geriatric health in order to maintain proper nutritional habits, the health status of the elderly population and to reduce the prevalence of chronic diseases (21). Elderly individuals at risk of pressure ulcers or with pressure ulcer who have developed malnutrition and/or are at risk of malnutrition should be evaluated with multidisciplinary teamwork (22). In a multicenter cross-sectional study of 1412 patients aged 70 years and older with pressure injury (risk), it was reported that nutritional care was inadequate in elderly patients (23). In our study, in accordance with the literature, 40.8% of elderly individuals were found to be at risk of malnutrition in the preliminary evaluation of nutritional risk status and 97.4% of the elderly who were found to develop malnutrition in the main evaluation were provided with nutritional support. If the daily calorie requirements of elderly individuals cannot be met orally and the existing pressure sores in the individual cannot be closed, enteral or parenteral nutrition interventions should be considered. Pressure ulcer can be defined as wounds that progress to skin, tissue and even

bone as a result of decreased blood circulation due to immobility and constant pressure, leading to skin necrosis. (23). In a study evaluating the risk of pressure ulcer in patients with cerebrovascular disease using the Braden Risk Assessment Scale, it was reported that 51.9% of the patients had a very high risk of pressure ulcer and 22.1% had a borderline risk (24). When pressure ulcer were evaluated in this study, it was found that 6.8% were at high risk, 21.6% were at moderate risk, and 35.1% were at low risk, which is consistent with the literature. Nutritional support and timely identification of the factors that cause pressure ulcer formation and taking preventive measures are important in the monitoring of elderly and frail individuals.

CONCLUSION

The management of chronic wounds in geriatric patients requires a comprehensive and individualized approach that addresses the unique challenges faced by this population. By combining assessment, appropriate wound care techniques, infection control, nutritional optimization, pain management and regular monitoring, healthcare providers can improve wound healing, reduce complications and improve the overall well-being of geriatric patients.

Ethical Committee Aproval: The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Ethics Committee of the University of Health Sciences, Ordu, Turkey (date of approval: 09/12/2022 and decision no: 285). Permission was obtained from the provincial Health Directorate (E-53593568-929-9505) Informed consent was obtained from all subjects involved in the study.

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Investigation of Information, Attitudes and Behaviors About Sunglasses and Ultraviolet Light Protection Sunglasses Wearing Behavior

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Abstract

Objective: The aim of the study is to determine the sunglasses-wearing habits, the level of knowledge about the purpose of wearing sunglasses and the awareness of the effects of sunlight on ocular tissues among patients attending the outpatient clinic.

Methods: Between January and March 2023, a questionnaire was administered to people who visited the ophthalmology clinic at the Elbistan State Hospital. 250 people who volunteered to participate in the survey were included in this cross-sectional study. The questionnaire consisted of 10 questions.

Results: The mean age of the 250 participants (56% female and 44% male) was 41.94±15.31 years. 90.5% of the villagers, all the illiterate participants and 54.1% of the unemployed participants stated not to know about UV. 82.9% of the university graduates and 80% of the office workers reported knowing about UV. Illiterate participants reported buying sunglasses based on brand and price; most university graduates reported buying sunglasses based on UV protection. When asked about the purpose of wearing sunglasses, most men reported it was to prevent glare, while most women reported it was for aesthetic and cosmetic reasons. 90.5% of villagers and 83.8% of illiterates reported wearing sunglasses for aesthetic and cosmetic reasons. 84.2% of university graduates reported that it was used to protect the eye tissues from the harmful rays of the sun.

Conclusion: The study highlights the lack of awareness of sunlight in society and the general lack of sun protection, suggesting the need for health education programs. Informative public service announcements and videos on the topic have been suggested.

Key Words: Sunglasses, sun rays, ultraviolet

Ultraviyole Işınlardan Korunma ve Güneş Gözlüğü ile İlgili Bilgi, Tutum ve Davranışların İncelenmesi

Özet

Amaç: Bu çalışmanın amacı, polikliniğe başvuran hastaların güneş gözlüğü kullanma alışkanlıklarını, güneş gözlüğü kullanma amacına ilişkin bilgi düzeylerini ve güneş ışığının oküler dokular üzerindeki etkileri konusundaki farkındalıklarını belirlemektir.

Yöntemler: Ocak-Mart 2023 tarihleri arasında Elbistan Devlet Hastanesi göz polikliniğine başvuran kişilere anket uygulandı. Bu kesitsel çalışmaya ankete katılmaya gönüllü olan 250 kişi dahil edilmiştir. Anket 10 sorudan oluşmaktadır.

Bulgular: 250 katılımcının (%56'sı kadın ve %44'ü erkek) yaş ortalaması 41,94 ± 15,31'idi. Köyde kalanların %90,5'i, okuma yazma bilmeyenlerin tamamı ve çalışmayanların %54,1'i ultraviyole hakkında bilgilerinin olmadığını belirtmiştir. Üniversite mezunlarının %82,9'u ve memurların ise %80'i UV hakkında bilgi sahibi olduklarını bildirdi. Okuma yazma bilmeyen katılımcılar, marka ve fiyata göre güneş gözlüğü satın aldıklarını; üniversite mezunlarının çoğu güneş gözlüklerini ultraviyole koruyucu özellikleri nedeniyle satın aldıklarını bildirdi. Güneş gözlüğü takmanın amacı sorulduğunda, erkeklerin çoğu parlamayı önlemek için taktıklarını söylerken, kadınların çoğu ise estetik ve kozmetik nedenlerle taktıklarını bildirdi. Köyde yaşayanların %90,5'i ve okuma yazma bilmeyenlerin %83,8'i estetik ve kozmetik nedenlerle güneş gözlüğü taktıklarını bildirdi. Üniversite mezunlarının %84,2'si oküler dokularını güneşin zararlı ışınlarından korumak için kullanıldığını bildirmiştir.

Sonuç: Toplumdaki güneş ışığı farkındalığının eksikliğini ve genel olarak güneş gözlüğü ile güneş ışınlarından korunma eksikliğini vurgulanmıştır. Çalışma sonucu sağlık eğitimi programlarına ihtiyaç olduğunu düşündürmektedir. Konuyla ilgili toplumu bilgilendirici kamu spotları ve videolar önerilmektedir.

Anahtar Kelimeler: Güneş gözlüğü, güneş ışınları, ultraviyole

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INTRODUCTION

Many studies have reported that exposure to low doses of UV, especially UVB, is a risk factor for the development of many ocular diseases. These include cataracts, pinguecula, pterygium, squamous cell carcinoma of the cornea and conjunctiva (1-3). Evidence shows a strong correlation between UVR exposure and skin and eye diseases (3,4). Neale et al. found an association between exposure to sunlight at younger ages and nuclear cataracts in adult life (5,6).

To protect the eyes and surrounding tissues from the harmful effects of the sun, some measures can be taken, such as staying outdoors under an umbrella or in the shade, wearing a wide-brimmed hat, using UV-protective sunglasses to protect the eyes, avoiding being outdoors between 10:00 and 16:00 when the sun is strong and using regular sunscreen (7). This study was conducted to assess the relationship between people's socio-demographic characteristics and whether they wear sunglasses, people's opinions about why they wear sunglasses, what they look for when buying sunglasses and UV information.

Table 1: Survey of knowledge, attitudes and behaviours towards sunglasses use among patients attending the outpatient clinic

1. Your name and surname:
2. Your age:
3. Your gender:
4. Where do you live?
a) City centre, district centre b) Village
5) What is your level of education?
a) Illiterate b) Primary school c) Secondary school - high school d) University
6) What is your occupation?
a) Unemployed b) Student c) Retired, self-employed d) Officer
7) Do you wear sunglasses?
a) Yes b) No
8) Why do you think people wear sunglasses?
a) To prevent the sun's rays from dazzling the eyes b) To protect the eye tissues from the sun's harmful rays c) For aesthetic/cosmetic reasons
9) What do you look for when buying sunglasses?
a) Brand and price b) Level of protection from ultraviolet rays
10) Do you know anything about the harmful rays of the sun - the UV rays?
a) I do not know anything about it b) I know that the sun's rays are harmful to the skin, but I do not think they are harmful to the eyes. c) I know that some of the sun's rays are harmful to the eyes.

METHODS

Patients who applied to the Elbistan State Hospital Ophthalmology Clinic between January and March 2023 and volunteered to participate in the survey were included in this cross-sectional survey study. The study was conducted according to the tenets of the Helsinki

Declaration and was approved by the ethical committee of Kahramanmaraş Sütçüimam University's Medical Faculty (Number: 2022/23-88/06). Verbal and written consent was obtained from all patients who participated in the study. The study was conducted in accordance with the Declaration of Helsinki. To ensure privacy and confidentiality, participants' personal information was protected. A 9-question questionnaire was prepared and administered to the patients (Table 1). It takes approximately 5 minutes to complete the survey. All questionnaires were administered by the doctor in a face-to-face interview with the patients. The questionnaire was designed to assess the knowledge, attitudes and behaviors of people attending the ophthalmic polyclinic regarding the use of sunglasses. First, questions 1-6 were designed to determine the socio-demographic characteristics of the people. The next 7-10 questions asked whether they used sunglasses, why they thought sunglasses were used in society, what they looked for when buying sunglasses and finally whether they had any knowledge about the sun's harmful UV rays.

Statistical Analysis

The relationship between people's socio-demographic characteristics and whether they wear spectacles, what they think people wear sunglasses for, what they look for when buying spectacles and their knowledge of UV were assessed. Cross-tables were created for related variables and their joint distribution was examined. SPSS 17.0 package program was used for statistical analysis. Descriptive statistics of the study include frequency and percentage for categorical variables, mean and standard deviation for continuous variables. The relationship between categorical variables (independence) was assessed using Chi-square analysis. The significance level of the relationship between the results obtained was accepted as $p<0.05$.

RESULTS

The mean age of the participants was 41.94±15.31 years. The age range of the participants was 18 - 80 years. The frequency distribution of categorical variables is presented in Table 2.

Looking at the other variables of sunglasses-wearing; 79.7% of those under the age of 45, 67.1% of women, 64.2% of people living in the city/district center and 97.4% of university graduates reported that they wear sunglasses. 81% of villagers, 94.6% of illiterates and 63.4% of those aged over 45 reported that they did not wear sunglasses. The relationship between sunglasses wearing and age, place of living, education level and occupation was found to be statistically significant ($p<0.05$) (Table 3).

While 48.6% of people under the age of 45 believed that sunglasses are used to protect the eye tissue from the harmful rays of the sun, 40.9% of men believed that sunglasses are used

to prevent dazzle, 54.5% of people over the age of 45, 46.4% of women, 90.5% of people living in villages, 83.8% of illiterate people, 56.8% of unemployed people stated that they believed that sunglasses are worn for aesthetic and cosmetic reasons. 84.2% of university graduates and 86% of officials stated that they were worn to protect their eye tissues from the sun's harmful rays. Statistically significant ($p<0.05$) changes were observed in the wearing of sunglasses according to age, gender, educational status and occupational groups (Table 4).

Table 2. Frequency distribution of categorical variables

Variable	Category	Number	Percentage
Age	Under 45 years old	138	55,2
	Over 45 years old	112	44,8
Gender	Male	110	44,0
	Female	140	56,0
Living place	City centre / District	229	91,6
	Village	21	8,4
Education	Illiterate	37	14,8
	Primary school	48	19,2
	Middle school / High school	89	35,6
	University	76	30,4
Occupation	Unemployed	111	44,4
	Student	27	10,8
	Retired / Self-employed	62	24,8
	Officer	50	20,0
Do you wear sunglasses?	Yes	151	60,4
	No	99	39,6
What do you think the sunglasses are used for?	To prevent dazzling from sunlight	79	31,6
	To protect the tissues of the eye from the harmful rays of the sun	76	30,4
	For aesthetic and cosmetic reasons	95	38,0
What do you look for when buying sunglasses?	Brand and price	194	77,6
	Level of protection against UV rays	56	22,4
What do you know about the sun's harmful UV rays?	I am not knowledgeable about this.	128	51,2
	I know that the sun's rays are harmful to the skin, but I do not think they are harmful to the eyes.	56	22,4
	I know that some rays of the sun are harmful to the eyes.	66	26,4

Table 3. Relationship of eyewear use with other variables (Chi-square analysis findings)

			Do you wear sunglasses?			
			Yes	No	Total	p value
Age	Under 45 years old	N	110	28	138	0,000
		%	79,7%	20,3%	100,0%	
	Over 45 years old	N	41	71	112	
		%	36,6%	63,4%	100,0%	
	Total	N	151	99	250	
		%	60,4%	39,6%	100,0%	
Gender	Male	N	57	53	110	0,014
		%	51,8%	48,2%	100,0%	
	Female	N	94	46	140	
		%	67,1%	32,9%	100,0%	
	Total	N	151	99	250	
		%	60,4%	39,6%	100,0%	
Living Place	City centre/District	N	147	82	229	0,000
		%	64,2%	35,8%	100,0%	
	Village	N	4	17	21	
		%	19,0%	81,0%	100,0%	
	Total	N	151	99	250	
		%	60,4%	39,6%	100,0%	
Education	Illiterate	N	2	35	37	0,000
		%	5,4%	94,6%	100,0%	
	Primary school	N	23	25	48	
		%	47,9%	52,1%	100,0%	
	Middle school / High school	N	52	37	89	
		%	58,4%	41,6%	100,0%	
	University	N	74	2	76	
		%	97,4%	2,6%	100,0%	
	Total	N	151	99	250	
		%	60,4%	39,6%	100,0%	
Occupation	Unemployed	N	58	53	111	0,000
		%	52,3%	47,7%	100,0%	
	Student	N	25	2	27	
		%	92,6%	7,4%	100,0%	
	Retired / Self-employed	N	19	43	62	
		%	30,6%	69,4%	100,0%	
	Officer	N	49	1	50	
		%	98,0%	2,0%	100,0%	
	Total	N	151	99	250	
		%	60,4%	39,6%	100,0%	

Looking at the distribution of sunglasses purchase criteria (Table 5), 94.6% of participants over 45, 78.2% of males, 77.1% of females, 76% of those living in the city/district center, 95.2% of those living in villages, all illiterate participants and 88.3% of the unemployed reported that brand and price were the most important criteria when buying sunglasses. However, 68.4% of university graduates and 60% of officials said they would look for the level of UV protection when buying sunglasses. It was found that there was an association between education level, occupation, age and place of living and what is considered when buying sunglasses ($p<0.05$).

Tablo 4. The relationship between the purpose of use of sunglasses and other variables (results of the chi-square analysis)

			What do you think the sunglasses are used for?				
			to prevent dazzling from sunlight	to protect the eye tissues from the sun's harmful rays.	for aesthetic and cosmetic reasons	Total	p value
Age	Under 45 years old	N	37	67	34	138	0,000
		%	26,8%	48,6%	24,6%	100,0%	
	Over 45 years old	N	42	9	61	112	
		%	37,5%	8,0%	54,5%	100,0%	
	Total	N	79	76	95	250	
		%	31,6%	30,4%	38,0%	100,0%	
Gender	Male	N	45	35	30	110	0,003
		%	40,9%	31,8%	27,3%	100,0%	
	Female	N	34	41	65	140	
		%	24,3%	29,3%	46,4%	100,0%	
	Total	N	79	76	95	250	
		%	31,6%	30,4%	38,0%	100,0%	
Living Place	City centre/District	N	78	75	76	229	0,000
		%	34,1%	32,8%	33,2%	100,0%	
	Village	N	1	1	19	21	
		%	4,8%	4,8%	90,5%	100,0%	
	Total	N	79	76	95	250	
		%	31,6%	30,4%	38,0%	100,0%	
Education	Illiterate	N	5	1	31	37	0,000
		%	13,5%	2,7%	83,8%	100,0%	
	Primary school	N	19	0	29	48	
		%	39,6%	0,0%	60,4%	100,0%	
	Middle school / High school	N	47	11	31	89	
		%	52,8%	12,4%	34,8%	100,0%	
	University	N	8	64	4	76	
		%	10,5%	84,2%	5,3%	100,0%	
	Total	N	79	76	95	250	
		%	31,6%	30,4%	38,0%	100,0%	
Occupation	Unemployed	N	33	15	63	111	0,000
		%	29,7%	13,5%	56,8%	100,0%	
	Student	N	9	13	5	27	
		%	33,3%	48,1%	18,5%	100,0%	
	Retired / Self-employed	N	32	5	25	62	
		%	51,6%	8,1%	40,3%	100,0%	
	Officer	N	5	43	2	50,0	
		%	10,0%	86,0%	4,0%	100,0%	
	Total	N	79	76	95	250	
		%	31,6%	30,4%	38,0%	100,0%	

The relationship between society's level of UV knowledge and other categorical variables and the p-values for chi-square analysis are shown in Table 6. 76.8% of people over the age of 45 said they had no information about UV rays. The relationship between age and the level of UV knowledge was found to be statistically significant ($p<0.05$). Looking at the level of knowledge about UV by gender, 54% of those who have no knowledge are men and 46% are women. In the study based on place of residence, 90.5% of the participants living in the village stated that they did not know about UV. Looking at the level of UV knowledge by education level,

all illiterate participants reported having no knowledge of the subject. 82.9% of graduates answered, "I know that the sun's rays are harmful to the eyes". It was observed that 80% of officials selected the option "I know that the sun's rays are harmful to the eyes" (Table 6).

Table 5. Relationship between factors to consider when buying sunglasses and other variables

			What do you look for when buying sunglasses?			
			Brand and price	Level of protection against UV rays	Total	P value
Age	Under 45 years old	N	88	50	138	0,000
		%	63,8%	36,2%	100,0%	
	Over 45 years old	N	106	6	112	
		%	94,6%	5,4%	100,0%	
	Total	N	194	56	250	
		%	77,6%	22,4%	100,0%	
Gender	Male	N	86	24	110	0,845
		%	78,2%	21,8%	100,0%	
	Female	N	108	32	140	
		%	77,1%	22,9%	100,0%	
	Total	N	194	56	250	
		%	77,6%	22,4%	100,0%	
Living Place	City centre/ District	N	174	55	229	0,029
		%	76,0%	24,0%	100,0%	
	Village	N	20	1	21	
		%	95,2%	4,8%	100,0%	
	Total	N	194	56	250	
		%	77,6%	22,4%	100,0%	
Education	Illiterate	N	37	0	37	0,000
		%	100,0%	0,00%	100,0%	
	Primary school	N	48	0	48	
		%	100,0%	0,00%	100,0%	
	Middle school / High school	N	85	4	89	
		%	95,5%	4,5%	100,0%	
	University	N	24	52	76	
		%	31,6%	68,4%	100,0%	
	Total	N	194	56	250	
		%	77,6%	22,4%	100,0%	
Occupation	Unemployed	N	98	13	111	0,000
		%	88,3%	11,7%	100,0%	
	Student	N	16	11	27	
		%	59,3%	40,7%	100,0%	
	Retired / Self-employed	N	60	2	62	
		%	96,8%	3,2%	100,0%	
	Officer	N	20	30	50	
		%	40,0%	60,0%	100,0%	
	Total	N	194	56	250	
		%	77,6%	22,4%	100,0%	

DISCUSSION

This study provides an insight into the wearing habits of sunglasses in society, the reasons for wearing sunglasses and the awareness of the damage caused by the sun's rays to the eye tissues. It was found that the relationship between the wear of sunglasses, age, place of living, level of education and occupation was statistically significant ($p<0.05$). It was found that participants who were older, lived in the village, were illiterate and were unemployed did not wear sunglasses. When asked about the

purpose of wearing sunglasses, the majority of participants over the age of 45, women, villagers, the illiterate and the unemployed reported that they used sunglasses for aesthetic and cosmetic reasons. Most of the participants aged over 45, living in the village, illiterate and unemployed were careful about the brand and price options when buying sunglasses. Most of the participants over 45 years of age, living in the village, illiterate and unemployed reported that they did not know anything about UV. However, 82.9% of university graduates reported that "I know that the sun's rays are harmful to the eyes".

Tablo 6. Relationship between the knowledge of UV radiation and other variables

			What do you know about the sun's harmful UV rays?				
			I am not knowledgeable about this.	I know that the sun's rays are harmful to the skin, but I do not think they are harmful to the eyes.	I know that some rays of the sun are harmful to the eyes.	Total	p value
Age	Under 45 years old	N	42	35	61	138	0,000
		%	30,4%	25,4%	44,2%	100,0%	
	Over 45 years old	N	86	21	5	112	
		%	76,8%	18,8%	4,5%	100,0%	
	Total	N	128	56	66	250	
		%	51,2%	22,4%	26,4%	100,0%	
Gender	Male	N	69	9	32	110	0,000
		%	62,7%	8,2%	29,1%	100,0%	
	Female	N	59	47	34	140	
		%	42,1%	33,6%	24,3%	100,0%	
	Total	N	128	56	66	250	
		%	51,2%	22,4%	26,4%	100,0%	
Living place	City centre/ District	N	109	55	65	229	0,001
		%	47,6%	24,0%	28,4%	100,0%	
	Village	N	19	1	1	21	
		%	90,5%	4,8%	4,8%	100,0%	
	Total	N	128	56	66	250	
		%	51,2%	22,4%	26,4%	100,0%	
Education	Illiterate	N	37	0	0	37	0,000
		%	100,0%	0,0%	0,0%	100,0%	
	Primary school	N	40	8	0	48	
		%	83,3%	16,7%	0,0%	100,0%	
	Middle/High school	N	49	37	3	89	
		%	55,1%	41,6%	3,4%	100,0%	
	University	N	2	11	63	76	
		%	2,6%	14,5%	82,9%	100,0%	
	Total	N	128	56	66	250	
		%	51,2%	22,4%	26,4%	100,0%	
Occupation	Unemployed	N	60	38	13	111	0,000
		%	54,1%	34,2%	11,7%	100,0%	
	Student	N	11	5	11	27	
		%	40,7%	18,5%	40,7%	100,0%	
	Retired / Selfemployed	N	54	6	2	62	
		%	87,1%	9,7%	3,2%	100,0%	
	Officer	N	3	7	40	50	
		%	6,0%	14,0%	80,0%	100,0%	
	Total	N	128	56	66	250	
		%	51,2%	22,4%	26,4%	100,0%	

There are several ways to protect the eye from UV rays and prevent ocular diseases caused by UV exposure. The most common method is to wear sunglasses with a UV filter that filters out 99-100% of UV rays (8). In a South African study, most participants were aware that the sun's

rays have negative effects on the eyes (9). Similarly, a high level of awareness of exposure to UV rays during outdoor activities has been reported in Australia (10). In our study, we found that awareness of the negative effects of sunlight on the eyes was very low among illiterate people, primary school graduates, people living in villages and participants over the age of 45. However, it was found that awareness of UV was quite high among officials and university graduates.

In our study, the wearing of sunglasses was quite high among university graduates. In a similar survey of academic members of staff on 'sun protection attitudes and behaviors', 77% of respondents used sunscreen, 45% used hats and 74% used sunglasses (11). Similar to what we found, one study from China reported that while the majority of people surveyed were aware of the harmful effects of UV rays on the skin, only a small percentage of people were able to identify the harmful effects of UV rays on the eye (12).

Various studies have shown that women are more adaptable and knowledgeable about using UV-protective eyewear. This can be explained by the fact that through women's magazines and the media, women are aware of protective sunglasses, sunscreen and skin care (13,14).

60.4% of participants in our study reported wearing sunglasses. Similar to what we found, In studies, 60.2% of adults in Saudi Arabia (15) and 80% of adults in Kuwait (16) reported the use of sunglasses. One study found that the age group most likely to wear sunglasses was 31-50 years old (17). In our study, 79.7% of people aged under 45 and 36.6% of people aged over 45 reported wearing sunglasses. According to the survey, the reason for the lower wear of sunglasses among the elderly may be due to their lower awareness of the need for sunglasses to protect their eyes from the sun's rays.

It was found that only 26.4% of participants in the survey study were aware that the sun's rays can damage both skin and eye tissue. In another study, most people knew about the effects of UV on skin cancer (95.6%) and sunburn (92.2%). However, few people knew that UV can cause eye damage. For this reason, various activities should be carried out to raise awareness of the need to protect eye tissue from the sun's rays (13). Public service announcements or social media can be used to raise public awareness of sun exposure and explain how to protect against it.

Study Limitations

The limitations of our study were as follows: 1) the cross-sectional design of our study did not allow us to specify the causality of the relationships that were identified; 2) the research data were based on the statements of the participants; 3) the high number of illiterate people in the study; and 4) as the survey was conducted between January and March, examining information from the summer may

have been the source of various information errors.

CONCLUSION

Exposure to UV rays is a risk factor for ocular disease. This study assessed awareness, knowledge and protective behaviors regarding UV rays, the habit of wearing sunglasses in society and ocular damage associated with exposure to UV rays. Awareness of UV rays, associated ocular diseases and behaviors to protect against UV rays was low. Awareness of UV rays and UV protection behaviors were higher among younger people and women. These findings suggest that more efforts should be made to promote the use of protective sunglasses.

Ethics Committee Approval: This prospective, cross-sectional study was conducted in Elbistan State Hospital Clinic of Ophthalmology and adhered to the principles of the Declaration of Helsinki. Ethics committee approval for the study was obtained from the Clinical Research Ethics Committee of the Kahramanmaraş Sütçüimam University Faculty of Medicine (Number: 2022/23-88/06).

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Evaluation Of Perceived Stress and Depression Levels and Medication Adherence of Hypertension and Diabetes Patients

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Abstract

Objective: The aim of this study was to determine the perceived stress and depression level of diabetes and hypertension patients who applied to the family medicine outpatient clinic and to investigate its relationship with the treatment compliance of the patients.

Methods: A total of 201 people over the age of 18 who were followed up in the family medicine outpatient clinic with the diagnosis of Hypertension and Diabetes were included in the study. The study consisted of three different groups of hypertension patients, diabetes patients and healthy volunteers. Beck Depression Scale, Perceived Stress Scale, Morisky Medication Adherence Scale-8 and sociodemographic data questionnaire were administered to the participants by face-to-face interview technique.

Results: In our study, depression and perceived stress scores were lower in the healthy group compared to the other groups ($p<0.05$). Morisky medication adherence scale scores were 5.7±2.18 and 5.39±2.29 in the HT and DM patient groups, respectively, and 46.3% had a low compliance score. Factors such as education level, presence of additional disease, dietary compliance, physical activity status, and smoking were found to play an active role in medication compliance ($p<0.05$). It was observed that patients with high depression and stress scores had low adherence to medication adherence ($p<0.001$).

Conclusion: Hypertensive and diabetic patients with high depression and perceived stress scores were found to have low adherence to medication adherence.

Key Words: Diabetes Mellitus, Hypertension, Medication Adherence

Hipertansiyon ve Diyabet Hastalarının Algılanan Stres ve Depresyon Düzeyleri ile İlaç Uyumlarının Değerlendirilmesi

Özet

Amaç: Bu çalışmada; aile hekimliği polikliniğine başvuran diyabet ve hipertansiyon hastalarının algılanan stres ve depresyon düzeyini belirleyerek, bunun hastaların tedavi uyumu ile olan ilişkisini araştırmak amaçlanmıştır.

Metod: Çalışma, Ekim-Aralık 2022 tarihleri arasında Aile Hekimliği polikliniğine başvuran 201 kişi ile gerçekleştirilmiştir. Hipertansif hastalar, diyabetik hastalar ve sağlıklı gönüllülerden oluşan üç farklı grup çalışmaya dahil edilmiştir. Katılımcılara Beck Depresyon Ölçeği, Algılanan Stres Ölçeği, Morisky İlaç Uyum Ölçeği-8 ve sosyodemografik veri anketi yüz yüze görüşme tekniği ile uygulanmıştır.

Bulgular: Çalışmamızda sağlıklı grupta depresyon ve algılanan stres skoru diğer gruplara göre düşük bulundu ($p<0,05$). Morisky tedavi uyum ölçeği puanları HT ve DM hasta grubunda sırasıyla 5,7±2,18 ve 5,39±2,29 olup, %46,3'ünün uyum skoru düşük bulundu. Eğitim düzeyi, ek hastalık varlığı, diyet uyumu, fiziksel aktivite yapma durumu, sigara kullanımı gibi faktörlerin bireylerde tedavi uyumunda etkin rol aldığı saptandı ($p<0,05$). Depresyon ve stres skoru yüksek olan hastaların ilaç tedavisine düşük uyum gösterdikleri görüldü ($p<0,001$).

Sonuç: Depresyon ve algılanan stres skoru yüksek olan hipertansif ve diyabetik bireylerin ilaç tedavisine uyumunun düşük olduğu saptanmıştır. Bu nedenle özellikle birinci basamakta tedavi uyumunu etkileyebilecek olası depresyon, stres gibi durumların sorgulanması açısından ruhsal tarama ölçeklerinin kullanılması büyük önem arz etmektedir.

Anahtar Kelimeler: Diabetes Mellitus, Hipertansiyon, Depresyon, Algılanan Stres, Tedavi Uyumu

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INTRODUCTION

Diabetes mellitus (DM) is a chronic disease that develops when the pancreas cannot secrete enough insulin or the insulin hormone it secretes cannot be used by the body (1). This causes the level of glucose in the blood to increase, and in the long run, high blood glucose causes damage to various organs and tissue (1). At the same time, diabetes causes some psychological, emotional and social problems in the patient (2).

Arterial blood pressure greater than 140/90 mmHg on repeated measurements is defined as hypertension. Hypertension (HT) is an important health problem due to the fact that it is a systemic disease with constant high blood pressure, it causes serious complications and is frequently seen in the community (3).

Since chronic diseases such as diabetes and hypertension cause various organ and tissue damage in the long term, they also cause some psychological diseases. The most common psychiatric disorders accompanying chronic physical diseases are depression, anxiety and stress (4). It is important to recognize and treat depression accompanying chronic physical illness, as it may affect the course of the disease (4).

In addition, inadequate adherence to treatment in chronic diseases is an increasing problem worldwide. Psychological problems such as depression and stress also affect adherence to treatment. Due to insufficient adherence, effective efficiency cannot be obtained from drugs, and this causes biopsychosocial complications, a decrease in the quality of life of the patient, an increase in the possibility of drug resistance, and a waste of health resources (5).

Human is a biopsychosocial being with both biological, psychological and social aspects, and all these complete the human being as a whole. These factors are in an ongoing interaction and change within themselves. In order to speak of a healthy individual, these factors must be in balance with each other (6). In this direction, family medicine, with its unique core competencies, should approach patients in a holistic and patient-centered manner, provide comprehensive care, and address patients not only biologically but also psychologically and socially (6).

In this study, we aimed to determine the perceived stress and depression level of diabetes

and hypertension patients who applied to the family medicine outpatient clinic, and to determine its relationship with the treatment compliance of the patients.

METHODS

The study protocol was approved by the Ordu University Faculty of Medicine Clinical Research Ethics Committee (14.10.2022 - 2022/223), Giresun Provincial Health Directorate gave approval on 24.11.2022 with decision number E- 53593568-8818 and the study complied with the principles of the Declaration of Helsinki.

The study was conducted with 201 participants who applied to the Family Medicine outpatient clinic between October and December 2022. In the study, there are 3 groups consisting of 67 people each, diabetes patients, hypertension patients and healthy volunteers. Among the people who applied to the polyclinic, the first 67 people who met the criteria for inclusion in the groups were included in the study, respectively, and the research was conducted. The research was conducted by face-to-face interview method.

Beck Depression Inventory (BDI)

It is a self-assessment scale in terms of depression that can be applied to healthy individuals and psychiatric patient groups and is used to determine the level of depression risk and to measure the severity of depressive symptoms. Each item of this form, which consists of 21 questions in total, is scored between 0-3 according to the intensity of attitudes (7).

Perceived Stress Scale (PSS14)

PSS-14 is designed to measure the level of stress perceived by individuals in certain situations in their lives. Individuals evaluate each item on a 5-point Likert-type scale ranging from “Never (0)” to “Very often (4)”. The scores of PSS-14 are between 0 and 56, and a high score indicates the excess of stress perceived by the individual (8).

Morisky Medication Adherence Scale-8 (MMAS-8)

The scale consists of 8 questions in total, and the patient's compliance with the treatment is evaluated with the answers given to these questions. The total score obtained from the scale questions is calculated and treatment compliance is evaluated. 8 points indicate high compliance, 6 or 7 points indicate medium compliance, and <6 points indicate low compliance (9).

Statistical analysis

The IBM SPSS-29 (Statistical Package for Social Sciences, Chicago, IL, USA) package program was used for statistical analysis. Compliance of numerical data with normal distribution was examined by Kolmogorov-Smirnov and Shapiro Wilk tests. Numerical data, on the other hand, were specified with median (minimum-maximum) values, since they did not provide the assumption of normality. The data were analyzed using the Chi-Square ($\chi 2$) test to

compare categorical data, the Mann-Whitney U test in case of two independent groups, the Kruskal-Wallis test in the comparison of more than two independent groups, and the Pearson Chi-Square Correlation Test to look at the relationship between numerical variables. In cases where more than two independent variables were compared, necessary post-hoc analyzes were performed in order to determine which variable was the source of the difference in results that were found to be statistically significant. The statistical significance level for all tests was accepted as $p<0.05$

RESULTS

It was observed that 106 (52.7%) of the 201 people included in the study were female, 95 (47.3%) were male, and the mean age was 55.5±10.05. In our study, the scores obtained from the depression and perceived stress scale were 10.78±7.64 and 22.19±12.12 in the hypertensive group, 13.51±8.42 and 26.66±12.18 in the diabetic group, 7.63±6.61 and 18.82±9.99 in the healthy group. Depression and perceived stress scores were lower in the healthy group compared to the other groups ($p<0.05$). A significant difference was found between the DM patient group and the HT patient group in terms of perceived stress scale. ($p<0.05$) The perceived stress scale score was found to be higher in the DM patient group. When the medication adherence scores were examined, no significant difference was found between the two groups. It was observed that 43.3% of the DM patient group and 49.3% of the HT patient group had low compliance. (Table 1)

The MMAS-8 score was found to be low in both hypertensive and diabetic groups with poor dietary adherence, no physical activity, smokers and those with comorbidities ($p<0.05$). It was observed that the medication adherence score decreased as the disease year increased in both groups ($p<0.05$). The medication adherence score was found to be low in diabetic patients who used oral antidiabetic drugs and insulin together. It was observed that the medication adherence score increased as the education level increased in hypertensive patients. ($p<0.05$).

Table 1. The Relationship Between Disease Type and Scores from Beck Depression Scale, Perceived Stress Scale and Morisky Medication Adherence Scale-8.

		Healthy Group (ort±ss)	Diabetes Patients (ort±ss)	Hypertension Patients (ort±ss)	p value
BDI		7,63±6,61 5(0-38)	13,51±8,42 10(2-32)	10,78±7,64 11(0-38)	<0,00001
PSS-14		18,82±9,99 15(5-39)	26,66±12,18 32(6-43)	22,19±12,12 18(6-46)	0,001
MMAS-8		-	5,39±2,29 5(2-8)	5,7±2,18 5(2-8)	0,406
MMAS-8 Categorical	• Low Adherence	-	29 (43,3)	33 (49,3)	0,685
	• Medıum Adherence	-	18 (26,9)	14 (20,9)	
	• High Adherence	-	20 (29,9)	20 (29,9)	

A highly positive correlation was found between BDI and PSS (p<0.001). It was observed that as the scores obtained from the depression scale increased, the scores obtained from the stress scale also increased. When the relationship between BDI, PSS and MMAS-8 was examined, a moderate negative relationship was found (p <0.001). It was observed that as both the depression score and the stress scale score increased, the score obtained from the medication adherence scale decreased. (Table 2)

Table 2. Correlation Results of the Relationship Between the Perceived Stress Scale and the Beck Depression Scale and Morisky Medication Adherence Scale-8

		BDI	PSS-14	MMAS-8
BDI	Correlation Coefficient	1	,728**	-,614**
	p value		<,001	<,001
PSS-14	Correlation Coefficient	,728**	1	-,539**
	p value	<,001		<,001
MMAS-8	Correlation Coefficient	-,614**	-,539**	1
	p value	<,001	<,001	

DISCUSSION

It has been reported that many mental disorders, especially depression, are more common in people with certain chronic diseases such as hypertension and diabetes compared to healthy people. The increase in the patient's depression and stress also negatively affects the patient's compliance with treatment and recommendations, response to treatment, and ultimately the prognosis of the disease (10).

In this study using Morisky Medication Adherence Scale (MMAS-8); Compliance with medication was high in 29.9% of the DM patient group, moderate in 26.9%, and low in 43.3%. In the HT patient group, 29.9% had high adherence to medication, 20.9% had moderate, 49.3% had low compliance, and no significant difference was found between the two groups. Olmez et al. In the study that investigated drug compliance in diabetes patients, it was found that 24% of the patients had high drug compliance, 31.3% of them moderate and 44.7% of them low (11). The rate of adherence to antihypertensive medication shown in our review of the literature ranged from 26.9% to 88.1% and was found to be consistent with our findings (12,13).

In this study, there was no significant difference between medication adherence scores in both HT and DM patient groups in terms of gender and marital status. When we examined the literature, no significant effect of gender and marital status on medication adherence was found in patients with HT and DM, and the findings we found in the study were similar to these studies (14,15).

In this study, when the relationship between the education status of the patients and the MMAS-8 score was examined, it was observed that medication adherence increased as the education level increased in hypertensive

patients, while education did not affect medication adherence in diabetic patients. Studies in diabetic patients in the literature also show that education level does not affect medication adherence, which is consistent with our study (16). Many studies conducted in hypertensive patients have found results that support our research (17).

In this study, when the duration of the disease and medication adherence were evaluated, it was found that medication adherence was statistically higher in the first years of the disease. Arulmozhi et al. In his study with DM patients, it was shown that medication adherence was better in the first years of the disease (18). Al-Mehza et al. In their study, it was found that the duration of treatment did not significantly affect medication adherence (19). In the study conducted by Gün et al. in hypertensive patients, it was shown that compliance increased as the treatment period extended (20). When we examined the literature, different results were found regarding the relationship between the year of illness and drug compliance. In our study, we thought that the decrease in medication adherence as the disease year increased may be due to the complications that occur in the later disease stages and the increase in the number of drugs used due to additional diseases.

In this study, when MMAS-8 score and comorbid disease status were examined, it was seen that medication adherence was lower in patients with comorbidity in both HT and DM patient groups. In a study conducted by Sweileh et al. on diabetic patients, medication adherence was found to be lower in individuals with comorbidities (16). In a study conducted by Shaya et al. on hypertensive patients, similar to our study, it was found that people who do not have an additional disease had higher medication adherence, and as the number of additional diseases increased, adharance decreased (21).

In this study, we found statistically significant results when we compared the MMAS-8 score with the diet compliance, physical activity and smoking status of the patients. Sahin et al. in his study on hypertension patients, similar to our study, it was found that those who exhibited behaviors in accordance with their nutritional habits had good drug compliance (15). In the study of Görürgöz et al., the compliance scores of the patients who were fed appropriately for diabetes and who regularly went to their controls were found to be high (22). In studies in the literature, unlike our study, it was observed that the habit of exercising was not effective on medication adherence (15,23). In our study, medication adherence was found to be low in those who did not do physical activity. In studies in the literature, similar to our study, it is stated that smoking makes it difficult to comply with medication adherence (24). From these studies, we can conclude that patients who adapt to

lifestyle changes have better medication adherence.

In this study, it was determined that patients with high depression and stress scores showed low compliance with medication adherence. When we examine the literature, it has been observed that depression is associated with medication non-adherence in many studies conducted in chronic patients such as HT and DM, similar to our study, and medication adherence decreases as the level of depression increases (4,10,14). Although there are not many studies in the literature comparing perceived stress and medication adherence, some studies have found similar results to our study, and it has been observed that as stress increases, medication adherence decreases (10,25).

CONCLUSION

Based on a biopsychosocial approach, family medicine practitioners play a particularly important role in chronic disease management. Family medicine practitioners take an active role in the disease management platform. In this regard, chronic disease management can be strengthened with motivational interviewing technique.

In our study, not using laboratory tests, not evaluating the blood pressure of hypertensive patients, not including HbA1c and plasma glucose levels in diabetic patients can be counted among the limitations.

Ethics Committee Approval: Approval was obtained from Ordu University clinical research ethics committee (14.10.2022 /223).

Peer-review: Externally peer-reviewed.

Authors' Contributions

Concept: AA, Design: AA, MG, Literature Search: AA, MG, Data Collection and Processing: AA, MG, Analysis and interpretation: AA, MG, Writing: AA, MG,

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Determination of Genetic Alteration in Pancreatic Ductal Adenocarcinoma Tissues by Analysis of Gene Expression Data

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Abstract

Objective: It is very important to determine the molecular infrastructure of pancreatic ductal adenocarcinoma, which has a very high mortality rate, limited treatment options, and does not have an option for targeted therapy, and to understand the disease by clinicians. Therefore, in this study, the gene expression dataset was used to determine the differences in transcriptome levels between tissues with pancreatic ductal adenocarcinoma and normal tissues.

Methods: In the current study, gene expression data set obtained from 10 pancreatic ductal adenocarcinoma tissues and 5 normal tissues were used. The limma package available in the R programming language was used to identify transcripts with differential expression in pancreatic ductal adenocarcinoma compared to normal tissues. The log2FC and adj-p values were used to identify genes that showed differential (up or down) regulation.

Results: According to the results of gene expression analysis, 7098 transcripts showed different regulation in pancreatic ductal adenocarcinoma tissue compared to normal tissue. With the UMAP graph, normal and pancreatic ductal adenocarcinoma tissues are distributed differently from each other, indicating that there is a difference in transcript between these two tissues.

Conclusion: As a result of the gene expression analysis performed in the study, transcripts differing between pancreatic ductal adenocarcinoma tissues and normal tissues were found. With the help of studies with these transcripts, targeted treatment strategies can be developed for the treatment of the disease, and the status of this disease, which has a very high mortality rate, can be changed.

Keywords: Pancreatic ductal adenocarcinoma, gene expression, differential expression

Pankreatik Duktal Adenokarsinom Dokularında Genetik Değişikliklerin Gen Ekspresyon Verileri Analizi ile Belirlenmesi

Özet

Amaç: Ölüm oranı çok yüksek, tedavi seçenekleri kısıtlı ve hedefe yönelik tedavi seçeneği bulunmayan pankreatik duktal adenokarsinomun moleküler altyapısının belirlenmesi ve hastalığın klinisyenler tarafından anlaşılması oldukça önemlidir. Bu nedenle, bu çalışmada, pankreatik duktal adenokarsinomlu dokular ile normal dokular arasındaki transkriptom seviyelerindeki farklılıkları belirlemek için gen ekspresyon veri seti kullanılmıştır.

Metod: Bu çalışmada, 10 pankreatik duktal adenokarsinom dokusu ve 5 normal dokudan elde edilen gen ekspresyon veri seti kullanılmıştır. R programlama dilinde bulunan limma paketi, normal dokulara kıyasla pankreatik duktal adenokarsinomda diferansiyel ekspresyona sahip transkriptleri tanımlamak için kullanılmıştır. Log2FC ve adj-p değerleri, diferansiyel (yukarı veya aşağı) düzenleme gösteren genleri tanımlamak için kullanılmıştır.

Bulgular: Gen ekspresyon analizi sonuçlarına göre, 7098 transkript pankreatik duktal adenokarsinom dokusunda normal dokuya kıyasla farklı düzenleme göstermiştir. UMAP grafiği ile normal ve pankreatik duktal adenokarsinom dokularının birbirinden farklı dağılım göstermesi, bu iki doku arasında transkript farklılığı olduğunu göstermektedir.

Sonuç: Çalışmada yapılan gen ekspresyon analizi sonucunda pankreatik duktal adenokarsinom dokuları ile normal dokular arasında farklılık gösteren transkriptler bulunmuştur. Bu transkriptler ile yapılacak çalışmalar sayesinde hastalığın tedavisi için hedefe yönelik tedavi stratejileri geliştirilebilir ve ölüm oranı çok yüksek olan bu hastalığın durumu değiştirilebilir.

Anahtar kelimeler: Pankreatik duktal adenokarsinom, gen ekspresyonu, diferansiyel ekspresyon

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INTRODUCTION

Pancreatic cancer has a 5-year overall survival (OS) rate of approximately 10%, and is the cancer with the worst prognosis among commonly known solid malignancies (1). With this survival rate, it is observed that the chance of survival of the patients is very low and the number of deaths from this disease continues to increase day by day. It has also been reported that the recent increase in pancreatic cancer overshadows breast cancer, which ranks third in cancer deaths (2). The most common type of pancreatic cancer is pancreatic ductal adenocarcinomas (PDAC) with a rate of 95%. PDACs are exocrine cell tumors and are known for their high mortality rates. Endocrine pancreatic cancers, on the other hand, are slower-growing tumors that generally have a better prognosis than exocrine pancreatic cancers (3).

There are 4 main factors underlying the high mortality rate observed in PDAC. The first has to do with the location of the pancreas. The pancreas is an organ located deep in the upper abdomen, behind the stomach, between the aorta and the upper abdominal branches. Not only does its location make tumors difficult to detect, but because the cancerous area mostly develops around these vessels, only 15%-20% of cases are suitable for surgical resection based on curative therapy (4). The second reason is that PDAC metastasizes early and exhibits aggressive biology. More than half of the patients have distant metastatic disease at the time of admission to the hospital, and most of the patients undergoing resection have metastases within 4 years following surgery. In this case, it is thought that individuals with apparently localized tumors may actually have micrometastases (1, 5, 6). The third reason is that the physiological effects of PDAC greatly weaken patients by limiting their resistance to withstand aggressive treatment. Up to 80% of patients with PDAC have cachexia exhaustion syndrome at the time of diagnosis, which is further complicated by exocrine and endocrine pancreatic dysfunction (7-9). The last major factor is that PDAC can progress very rapidly even in the treatment with the most effective systemic agents and in the application of radiotherapy, and it shows high resistance to many antineoplastic treatments with very low response rates (10). Taken together these 4 main elements, PDAC, as with other tumor types, is

suitable for multiple trials using targeted agents gave unsuccessful results (11, 12). With the development of effective targeted therapy approaches on PDAC, this tumor, which is quite aggressive, may result in fewer deaths in the future. Better elucidation of PDAC biology, molecular development, and underlying genetic basis with various studies will lead to the understanding of the disease by clinicians and may encourage the emergence of new targeted and immune-based therapies that may be available for patients with PDAC in the near future (13). Therefore, the need for genetic-based studies on PDAC is increasing day by day.

In the current study, it was aimed to determine the differences in the transcription level in patients with Pancreatic Ductal Adenocarcinoma. For this reason, open access gene expression data obtained from patients with pancreatic ductal adenocarcinoma and normal tissue were used in the study. With the data set used, the transcripts that created expression differences in pancreatic ductal adenocarcinoma tissues compared to normal tissues were determined as a result of bioinformatic analysis.

METHODS

Dataset

Within the scope of the current study, gene expression sequence analyses were performed in order to examine the factors that may be associated with pancreatic cancer at the transcriptomic level. Therefore, by determining the expression differences between 10 pancreatic ductal adenocarcinoma samples and 5 normal tissue samples, the most expressed (up-down) RNAs were determined. Affymetrix HTA2.0 Array was used to determine expression differences. Afterward, bioinformatic analyzes were performed. The data set used in the study was obtained from the National Center for Biotechnology Information (NCBI). Data were obtained from Gene Expression Omnibus (GEO) with the code "GSE132956".

Bioinformatics and gene expression analysis

Bioinformatics is the collection, storage, organization, archiving, analysis, and presentation of results based on theory and practice in a discipline such as biology, medicine, behavioral, or health sciences. Furthermore, it is focused on the research and development of computational tools and methodologies to broaden the use and processing of data obtained through studies or the application of recognized procedures. Obtained as a consequence of research or the use of well-known methodologies. Analyses in bioinformatics are performed by selecting a database and a program that allows bioinformatic analysis to be performed in accordance with the biological question, molecule, or structure to be analyzed. The data and results obtained as a result of the analyzes are brought together and the evaluations are analyzed analytically in the light of the previous information in the literatüre (14).

Changes in an organism's or cell's physiology will be accompanied by changes in the pattern of gene expression, making gene expression analysis important in many fields of biological research. The still-in-development DNA microarray method is used to study gene expression by hybridizing mRNA to a high-density array of immobilized target sequences, each corresponding to a specific gene. The effect of chemicals on gene expression, for example, can reveal functional and toxicological qualities. Expression studies on clinical samples, both healthy and sick, may lead to the identification of novel biomarkers (15).

Bioinformatics analysis phase

In this study, gene expression analyses were performed on trancriptomic data obtained from 10 pancreatic ductal adenocarcinoma samples and 5 normal tissue samples. In the investigation, the limma package, which is accessible in the R programming language and permits expression analysis, was employed (16). Limma (Linear Models for Microarray Analysis) is a library for evaluating gene expression microarray data, with a focus on the use of linear models for analyzing specified experiments and determining differential expression. The packet's functions are applicable to all gene expression technologies, such as microarrays, RNA-seq, and quantitative PCR. With the Limma package, it is also possible to provide stable results even when the number of sequences is low, thanks to Empirical Bayes methods. As a result of the bioinformatic analysis, Lof2FC was obtained, which shows the fold change of expression differences of the genes listed in order of importance. Up-regulated genes are identified using log2FC>1 while down-regulated genes are identified using log2FC<-1.

Box-plot graphs and expression density graphs were used to see the distribution of the data used in the study. In the graphs used samples with the same characteristics are shown with the same color. Uniform Manifold Approximation and Projection (UMAP) graph was preferred in order to visualize the relations of the samples in the study with each other. Finally, the volcano plot was preferred to show differentially expressed genes (up and down). The volcano graph depicts significance vs fold-change in log2 base on the y- and x-axes to quickly identify differentially expressed genes. In the graph, the red color indicates the genes that are up-regulated, the blue color the down-regulated genes, while the black color indicates the genes that do not differ.

RESULTS

Distribution graphs for 10 pancreatic ductal adenocarcinoma samples and 5 normal tissue samples used in the study are given in Figure 1 and Figure

The UMAP graph, where we can see the relationships of the samples with each other, is given in figure 3. With this graph, it is seen that

the samples with the same characteristics are clustered together. In the graph, green dots show pancreatic ductal adenocarcinoma samples, while purple dots show normal tissues.

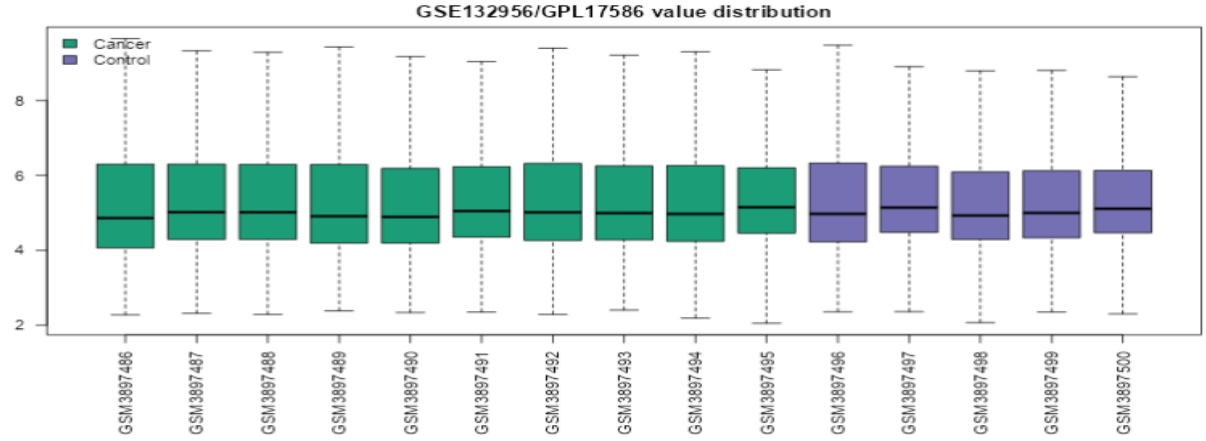

Figure 1: The distribution of the values of the selected samples.

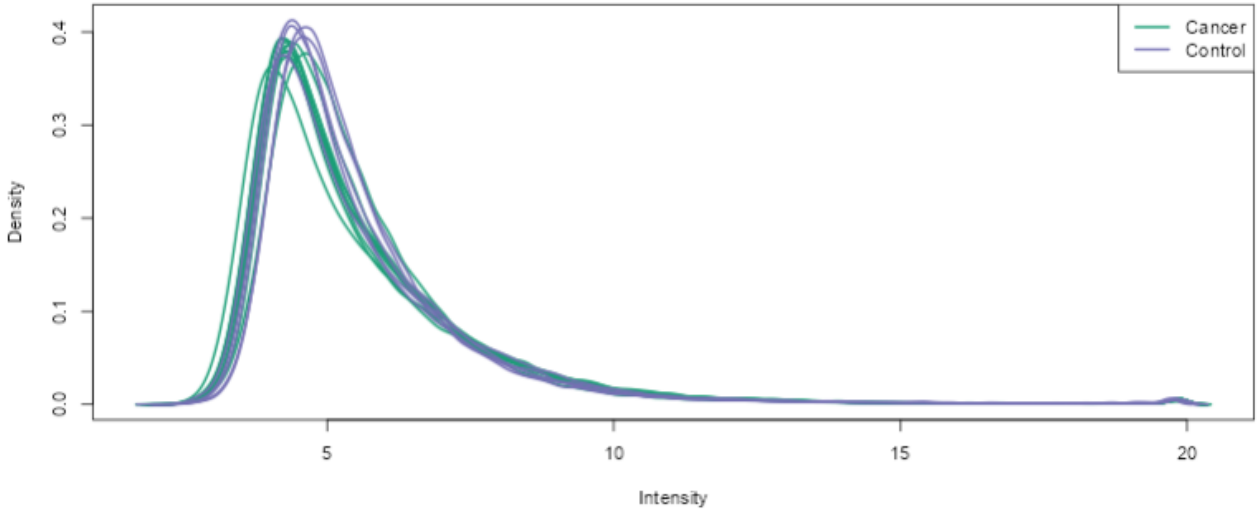

Figure 2: The expression density graph of the selected samples.

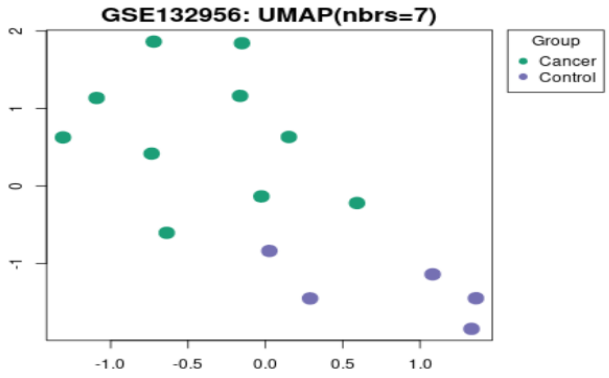

Figure 3: UMAP plot of the samples

According to gene expression analysis, 7098 expressions with statistically significant differences in gene expression levels were found between the two groups.(|log2FC| > 1.0, P 0.05). Information on the first 15 genes showing up-regulate and down-regulate in expression between the two groups are given in Table 1 and Table 2.

Table 1: Transcripts whose expression level is up-regulated in pancreatic ductal adenocarcinoma samples relative to normal tissue

ID	Adj.P Val	P Value	t	B	Log2FC
TC10001390.hg.1	0,014861	5,32E-04	4,39	-0,06672	9,124919
TC03003290.hg.1	0,002162	4,51E-06	6,97	4,476732	8,975542
TC21000141.hg.1	0,000359	5,32E-08	9,96	8,497688	8,647183
TC03003289.hg.1	0,002117	4,11E-06	7,03	4,565055	8,199274
TC05001556.hg.1	0,00234	5,23E-06	6,89	4,3384	7,586244
TC15000461.hg.1	0,00775	1,11E-04	5,19	1,436824	7,446171
TC07002463.hg.1	0,00299	1,04E-05	6,48	3,688199	7,267876
TC17001751.hg.1	0,010834	2,48E-04	4,77	0,666021	7,264719
TC12002256.hg.1	0,005437	4,77E-05	5,64	2,247014	6,828612
TC07003086.hg.1	0,006079	6,11E-05	5,5	2,010041	6,756634
TC05002808.hg.1	0,016737	7,10E-04	4,24	-0,34377	6,679631
TC10001389.hg.1	0,033297	3,20E-03	3,51	-1,78341	6,630858
TC21000779.hg.1	0,014837	5,30E-04	4,39	-0,06279	6,593831
TC12000365.hg.1	0,006259	6,69E-05	5,45	1,923044	6,218943
TC19000584.hg.1	0,010548	2,31E-04	4,81	0,736559	6,149568

Table 2: Transcripts whose expression level is down-regulated in pancreatic ductal adenocarcinoma samples relative to normal tissue

ID	Adj.P Val	P Value	t	B	Log2FC
5	0,004437	2,85E-05	-5,92	2,736069	-10,5878
TC09000767.hg.1	0,006627	7,52E-05	-5,39	1,81114	-10,0377
TC07000780.hg.1	0,002918	9,94E-06	-6,51	3,735494	-9,65693
TC07000809.hg.1	0,01186	3,01E-04	-4,67	0,48041	-9,62033
TC16000923.hg.1	0,009443	1,64E-04	-4,98	1,061781	-9,5312
TC10000844.hg.1	0,021786	1,27E-03	-3,96	-0,90177	-9,35428
TC01000277.hg.1	0,001332	1,04E-06	-7,89	5,837119	-9,32311
TC01000278.hg.1	0,001795	2,84E-06	-7,26	4,910037	-9,17262
TC01003928.hg.1	0,003291	1,43E-05	-6,3	3,393631	-8,99115
TC10000845.hg.1	0,013219	4,04E-04	-4,53	0,199158	-8,93247
TC10000846.hg.1	0,012668	3,65E-04	-4,58	0,296364	-8,85196
TC19001513.hg.1	0,004477	2,97E-05	-5,89	2,697251	-8,71258
TC12002042.hg.1	0,010591	2,34E-04	-4,8	0,721621	-8,6297
TC06003618.hg.1	0,016431	6,73E-04	-4,27	-0,29121	-8,52873
TC01000188.hg.1	0,002392	5,45E-06	-6,86	4,299571	-8,42689

Figure 4 depicts the volcano plot used to visualize the differentially expressed genes between groups.

DISCUSSION

Pancreatic cancer is a well-known fatal disease with similar mortality and morbidity. While its incidence continues to increase with each passing year, the 5-year survival rate is the lowest among all cancers (about 10%) (17). In addition, because pancreatic cancer can usually be detected at an advanced stage, treatment options are limited, and most patients experience recurrence and metastasis after curative resection. This increases the lethality of the disease. Recent advances in surgical approaches and various new chemotherapy regimens have not improved the poor prognosis of the disease in recent years (18, 19). PDAC, the most common type of pancreatic cancer, is one of the deadliest malignancies among all cancers and has a worse prognosis than other types of pancreatic cancer (20). Treatment options for this aggressive cancer type, which can be diagnosed most often

at an advanced stage, are quite limited, sometimes even surgery cannot be applied, and it is limited to systemic chemotherapy with modest clinical responses (13).

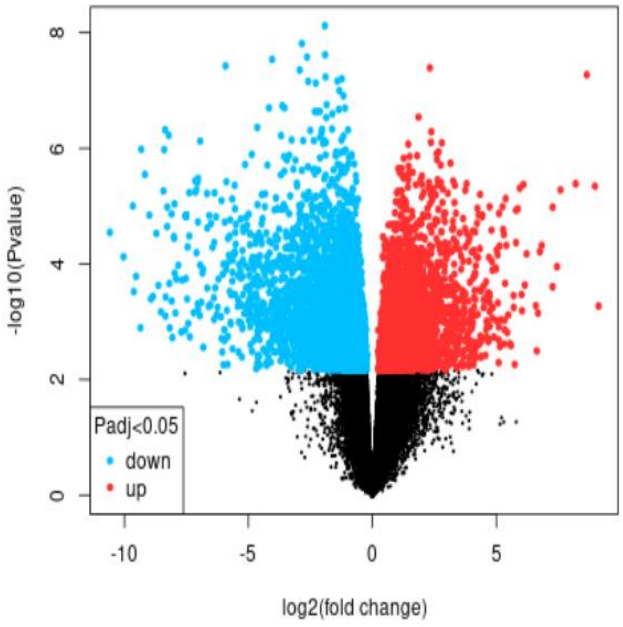

Figure 4: Volcano plot of genes with up-regulated (red dots) and down-regulated (blue dots) gene expression among the group of pancreatic ductal adenocarcinoma samples and normal tissue

For this reason, there is a great need for up-to-date studies investigating new therapeutic methods for this cancer type with a very high mortality rate. The relationship between neoplastic characteristics and individual treatment responses is highlighted by targeted therapy. It is based on genetics and biomarker expression, implying that genomic alterations, as well as their changed downstream pathways, might be relevant pharmaceutical targets or prognostic indications. Researchers can now quickly discover genetic variations between tumor cells and normal cells because of advances in genome sequencing (18).

The aim of this study is to perform bioinformatic analyzes with open access gene expression dataset to determine the expression differences between tissue samples with pancreatic ductal adenocarcinoma and normal tissue samples. Thus, with the results obtained, transcripts with different expressions in tissue with pancreatic ductal adenocarcinoma compared to normal tissues will be determined.

According to the results obtained from the bioinformatic analysis, 7098 transcripts showed different expression in pancreatic ductal adenocarcinoma tissues compared to normal tissues. Information on how much fold the most expressed (up or down) transcripts fold differ is the following.

When the p values of the transcripts are examined, it is seen that these transcripts differ in pancreatic ductal adenocarcinoma samples and normal tissue samples. These transcripts are also transcripts with log2FC values greater than 1 and less than -1, with different regulation in pancreatic ductal adenocarcinoma samples and normal tissue samples. The transcript with id TC10001390.hg.1 showed 556.40 fold up-regulation in pancreatic ductal adenocarcinoma samples compared to normal tissue samples. Likewise, the transcripts with id TC03003290.hg.1, TC21000141.hg.1, TC03003289.hg.1, TC05001556.hg.1,

TC15000461.hg.1, TC07002463.hg.1, TC17001751.hg.1, TC12002256.hg.1, TC07003086.hg.1, TC05002808.hg.1, TC10001389.hg.1, TC21000779.hg.1, TC12000365.hg.1, and TC19000584.hg.1 had up-regulated gene expression of 501.46, 398.93, 292.03, 191.34, 173.64, 154.02, 153.27, 112.98, 107.63, 101.82, 99.04, 96.33, 74.02, 70.52 fold, respectively. Moreover the transcript with id TC09002315.hg.1 showed 1530.72 fold down-regulation in pancreatic ductal adenocarcinoma samples compared to normal tissue samples. Likewise, the transcripts with id TC09000767.hg.1, TC07000780.hg.1, TC07000809.hg.1, TC16000923.hg.1, TC10000844.hg.1, TC01000277.hg.1, TC01000278.hg.1, TC01003928.hg.1, TC10000845.hg.1, TC10000846.hg.1, TC19001513.hg.1, TC12002042.hg.1, TC06003618.hg.1, and TC01000188.hg.1 had down-regulated gene expression of 1045,51, 803.41, 786.88, 739.29, 652.57, 639.14, 576.02, 508.46, 487.75, 461.44, 418.76, 393.44, 367.09, 342.50 fold, respectively.

Transcripts with this expression difference obtained show that there are genetic changes in pancreatic ductal adenocarcinoma tissues compared to normal tissues. Targeted treatment strategies can be developed and overall survival may be increased for this highly lethal type of cancer, by examining the background of these differences and addressing them with further analyses such as determining which pathway/pathway they are associated with. Or, metastases after treatment with surgery can be reduced and mortality rates can be reduced in the same way by controlling the patients.

As a result, it has been determined that the genetic structure changes in the case of PDAC with the information obtained, and it may be possible to increase the therapeutic efficacy of the disease with comprehensive and various genetic studies to be carried out considering these changes. Appropriate treatment for PDAC can be developed and the disease can be treated before it progresses with biomarkers used in the diagnostic phase of the disease. With the new oncological treatment selection developed in this way, the treatment may reach the target, and mortality rates can be reduced.

Ethics Committee Approval: Ethics committee approval is not required in this study

Peer-review: Externally peer-reviewed

Author Contributions: Concept: ZK, İPÇ, Design: ZK, İPÇ, Literature Search: ZK, İPÇ, Data Collection and Processing: ZK, İPÇ, Analysis or Interpretation: ZK, İPÇ, Written: ZK, İPÇ.

Conflict of Interest: The authors declared no conflicts of interest.

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A Case of Adult-onset Still's Disease Complicated with Macrophage Activation Syndrome and Diffuse Alveolar Hemorrhage

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Abstract

Adult-onset Still's Disease (AOSD) is a rare inflammatory disease of unknown etiology characterized by high fever, skin rash, arthritis, elevated ferritin and organ involvement. Macrophage Activation Syndrome (MAS) can be seen as a rare, potentially fatal complication in AOSD. Here, we presented a case who was diagnosed with MAS due to general condition disorder, increased ferritin and cytopenia while being followed up with the diagnosis of chronic articular form ESH, and then developed diffuse alveolar hemorrhage (DAH) after a short time. We aimed to draw attention to rare complications after AOSD with this case report that showed a dramatic response to corticosteroid and tocilizumab treatment.

Key Words: Adult-onset Still's Disease, Diffuse alveolar hemorrhage, Macrophage Activation Syndrome, tocilizumab

Makrofaj Aktivasyon Sendromu Ve Difüz Alveolar Hemoraji ile Komplike Olan Erişkin Still Hastalığı Olgusu

Özet

Erişkin Still Hastalığı (ESH) yüksek ateş, deri döküntüsü, artrit, ferritin yüksekliği ve organ tutulumuyla karakterize etyolojisi tam olarak bilinmeyen, nadir görülen inflamatuar bir hastalıktır. ESH'de nadirde olsa, potansiyel olarak ölümcül bir komplikasyon olarak Makrofaj Aktivasyon Sendromu (MAS) görülebilir. Biz burada kronik artiküler form ESH tanısıyla takip edilirken genel durum bozukluğu, ferritin artışı ve sitopeni gelişmesi üzerine MAS tanısı alan ve kısa bir süre sonra da Diffüz alveoler hemoraji (DAH) gelişen bir olguyu sunduk. Kortikosteroid ve tosilizumab tedavisine dramatik cevap veren bu olgu sunumu ile ESH sonrası gelişen nadir komplikasyonlara dikkat çekmeyi amaçladık.

Anahtar Kelimeler: Erişkin Still Hastalığı, Diffüz alveoler hemoraji, Makrofaj Aktivasyon Sendromu, tosilizumab

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INTRODUCTION

Adult-Onset Still's Disease is a systemic inflammatory disease characterized by high fever, transient salmon-colored skin rash, arthritis, leukocytosis, and elevated ferritin. Although the etiology of ESR is not clear, it is thought that viral infections may be the trigger. The diagnosis of the disease is clinical, with patients most commonly having a fever and typically rising in the evening (>39ºC) (1).

Macrophage Activation Syndrome (MAS), also known as Hemophagocytic lymphohistiocytosis (HLH), can be seen as a rare but serious, potentially fatal complication in the course of Adult Still's Disease (2). MAS is a clinical syndrome characterized by systemic hyperinflammation in which histiocyte proliferation cannot be controlled. High fever, hepatosplenomegaly, pancytopenia, deterioration in liver function tests are among the important clinical and laboratory features of MAS (3).

Diffuse alveolar hemorrhage (DAH) is a clinicopathological syndrome, which is defined as the passage of erythrocytes from alveolar capillaries into the alveoli, often leading to acute respiratory failure. The classic triad includes anemia, hemoptysis, and newly revealed bilateral alveolar infiltrates on chest X-ray (4).

We wanted to present the our case, which was complicated with MAS while being followed up with the diagnosis of AOSD and developed DAH after a short time. We aimed to draw attention to rare complications that showed a dramatic response to tocilizumab treatment.

CASE REPORT

A 69-year-old female patient, who was followed up with the diagnosis of chronic articular form AOSD, was hospitalized and followed closely due to increased joint pain, dyspnea, and general condition deterioration while continuing the maintenance treatment (40 mg/day methylprednisolone and methotrexate 15 mg/week). C-reactive protein (CRP): 84 mg/L and Ferritin > 40000ng/mL were found in routine blood tests performed at an external hospital. In our clinic, laboratory tests revealed hemoglobin (Hb): 8.7 g/dL platelets: 24000/mm3 Total Leucocyte count: 950/mm3, CRP: 259 mg/L.No atypical cells were seen in the peripheral blood smear test. After exclusion of infectious pathologies and malignancy, MAS as a complication of AOSD was diagnosed. Posteroanterior (PA) chest X-ray of the patient at the first presentation was given (Figure-1). In the treatment of the patient, 250 mg iv pulse steroid was initiated for 3 days, and then anti-IL-6 receptor antibody (tocilizumab) treatment at 8 mg/kg was planned. The patient, whose general condition and laboratory tests results improved after the tocilizumab treatment.

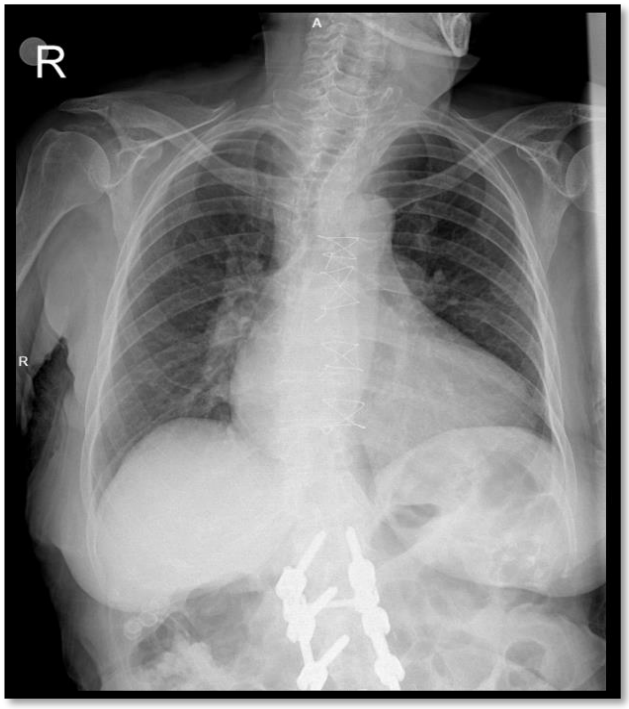

Figure-1. Posteroanterior chest X-ray of the patient at the first presentation

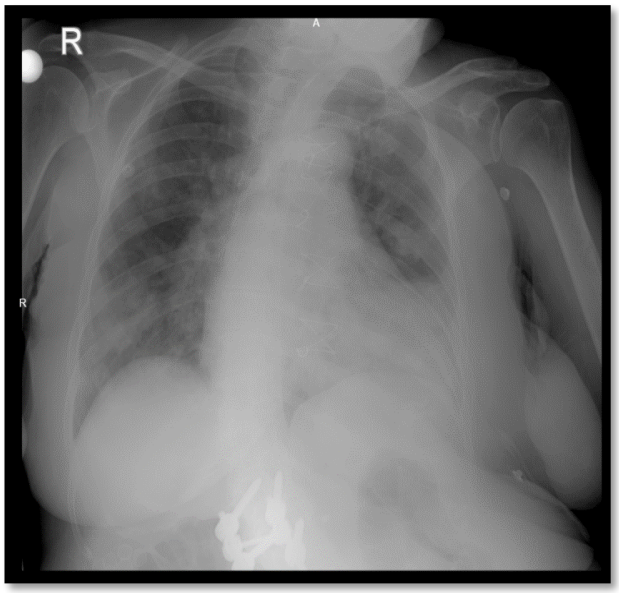

Figure-2. PA chest X-ray shows increased opacity in the middle-lower zone of the right lung and the middle-upper zone of the left lung after intro alveolar hemorrhage.

Ten days after discharge, the patient had a sudden onset of cough and shortness of breath. PA chest X-ray showed diffuse, patchy infiltration in both lung parenchyma, which was more prominent on the left (Figure-2). In the laboratory tests revealed, Hb: 6.7 g/dL platelet: 82000 / mm3. DAH was considered in the patient because of the sudden decrease in Hb and the patient's lung involvement. In her treatment, pulse steroid was given for 3 days and then 1 mg/kg per day oral dose was given. There was no decrease in the Hb value of the patient who was clinically stable in the follow-ups. It was observed that the opacities on the PA chest X-ray regressed (Figure-3).

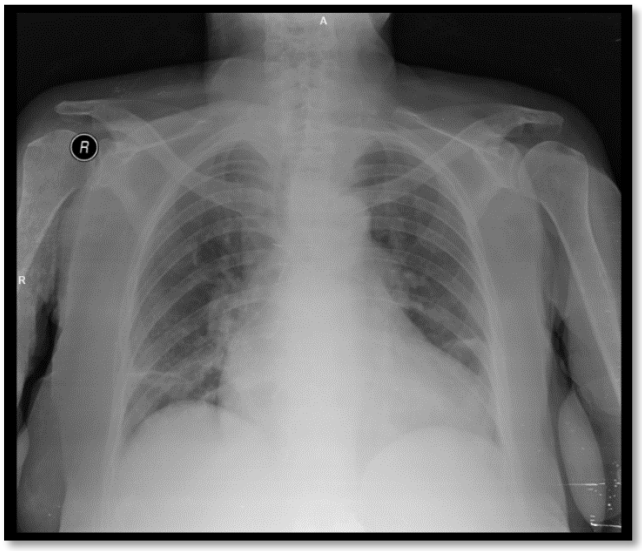

Figure -3. After the treatment, it is seen that the opacity in the middle lower zone of the right lung and the upper zone of the left lung disappeared.

Tocilizumab treatments were continued in the following months. Her disease responded well with those treatments; she achieved remission.

DISCUSSION

Adult-Onset Still's Disease is a rare systemic inflammatory disease of unknown origin, mostly seen in young adults. AOSD is a diagnosis of exclusion. Although there is no specific diagnostic

test, the diagnosis is made according to the Yamaguchi criteria (5). She was diagnosed to have AOSD based on Yamuguchi criteria after the exclusion of other potential diagnoses. Serum ferritin level is a useful tool for diagnosis.

Although macrophage activation syndrome has been reported during the course of many rheumatological diseases, it is a rare complication that can occur in AOSD MAS is a condition that can progress to multi-organ failure and can be fatal. Although bone marrow data are significant in the diagnosis of MAS, it was seen in 70% of the retrospective series (3,6).

Diffuse Alveolar Hemorrhage is a medical emergency that can also be seen in systemic vasculitis, drug-related factors and infections. Cough, hemoptysis, fever and dyspnea are common initial symptoms. However, hemoptysis may not be present in one third of the patients. In DAH, chest X-ray is nonspecific, and most usually show newly formed patchy or diffuse alveolar opacities (7). In the pathogenesis of DAH, IL-6 is believed to be overproduced in the acute phase of the disease. It is also thought that increased IL-18 levels in both blood and lungs may cause lung damage (8). In our patient, low hemoglobin level, dyspnea and cough were prominent. There were also patchy infiltrates in the chest X-ray. Initiation of systemic glucocorticoid therapy in DAH due to rheumatic disease is part of the accepted regimens (9). In our patient, a significant regression was observed in the clinic and X-ray after iv pulse steroid treatment.

Adult-Onset Still's Disease, generally responds well to nonsteroidal anti-inflammatory drugs and corticosteroids. Disease-modifying antirheumatic drug (DMARD) should be used in patients dependent or resistant to glucocorticoids. The greatest experience has been with methotrexate, it has been observed in studies that it is effective in reducing the steroid dose (10). In patients who do not respond to other treatments, anti-tumor necrosis factors such as IL-1 blocking anakinra, and sometimes infliximab and etanercept are also included in the treatment (11). In the literature, tocilizumab has shown benefit in a small randomized trial compared to placebo in AOSD. In resistant cases, tocilizumab can be used at an initial dose of 4 to 8 mg/kg every two to four weeks. The efficacy and safety of tocilizumab in patients with resistant AOSD, improvement was observed in the majority of patients in the fourth week (12). We also applied tocilizumab treatment at similar doses and intervals in our case.

CONCLUSION

Although Adult Still's Disease should be kept in mind in terms of making a differential diagnosis from other diseases and iniating treatment quickly. In this case, we presented a case of resistant AOSD that was resistant to systemic corticosteroids and complicated by MAS and DAH. The use of tocilizumab after corticosteroids in the treatment of such complicated cases seems promising.

Ethics Committee Approval: Case report

Informed Consent: Verbal and written consent was obtained from the patient who participated in this study

Author Contributions:

Concept: KAA, ÖSG, Design: KAA, Supervision: KAA, ÖSG, Data Collection and/or Processing: KAA, ÖSG Analysis and/or Interpretation: KAA, Writing: KAA, ÖSG.

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