



Comparison of Sociodemographic Features Between Behçet Uveitis and Other Non-infectious Uveitis

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Abstract

Objectives: To analyze and compare sociodemographic features between Behçet uveitis and other non-infectious uveitis.

Materials and Methods: The data of adults with non-infectious uveitis in the nationwide uveitis database were analyzed and the sociodemographic features of patients with and without Behçet disease were compared.

Results: This study included data of 4,978 eyes of 3,363 patients from 33 centers. The mean age at presentation was 38.7 ± 13.3 (17-87) years. The mean age was 34.3 ± 10.5 years in the Behçet uveitis group and 41.1 ± 14.0 years in the other non-infectious uveitis group ($p < 0.001$). Male predominance was seen in the Behçet uveitis group (67.7% vs. 32.3%) while female patients were more common in the other non-infectious uveitis group (54.4% vs. 45.6%, $p < 0.001$). Regarding education level, the proportion of patients with low education was higher in the Behçet uveitis group than the other non-infectious uveitis group (49.6% vs. 43.4% in males, $p = 0.004$; 61.5% vs. 59.2% in females, $p = 0.021$). Having a low-income job or being currently unemployed, indicators of poor income, were more frequent in the Behçet uveitis group than in the other non-infectious uveitis group (32.0% vs. 22.8%, $p < 0.001$). In the comparison of places of residence, the proportion of patients who lived in cities with low gross national product was 37.0% in the Behçet uveitis group and 31.1% in the other non-infectious uveitis group ($p < 0.001$).

Conclusion: Patients with Behçet disease had lower education level and socioeconomic status than patients with other non-infectious uveitis entities.

Keywords: Behçet uveitis, non-infectious uveitis, sociodemographic, uveitis

Introduction

Uveitis is an important cause of visual impairment and vision loss in Western societies, accounting for approximately 10% of blindness.^{1,2} Limitations associated with visual impairment can adversely affect patients' ability to work and may lead to absenteeism or loss of workforce. It can occur at all ages, but due to the generally early onset, it especially affects the working age group and creates a serious personal and economic burden.^{3,4}

Although uveitis may develop due to infectious and non-infectious causes, it is often observed due to non-infectious causes.⁵ Non-infectious uveitis may be idiopathic or occur due to systemic disease, and Behçet disease remains the most common non-infectious uveitis etiology in our country.⁶ The aim of this study was to analyze and compare sociodemographic characteristics between Behçet uveitis and other non-infectious uveitis.

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Materials and Methods

The Behçet Uveitis Screening Trial (BUST), planned by the Uvea-Behçet Unit of the Turkish Ophthalmological Association, was initiated in November 2008 to determine the demographic and clinical characteristics of non-infectious uveitis patients presenting to secondary and tertiary health centers in Turkey. It is a multicenter, observational, national registry study with a total of 33 participating centers, including 21 university hospitals and 12 training and research hospitals. The study protocol was approved by the İstanbul University İstanbul Faculty of Medicine Ethics Committee and the Ministry of Health and was carried out in accordance with the Declaration of Helsinki. All patients included in the study provided informed consent.

During the study, the investigators were asked to include all patients with active or inactive uveitis who were presenting to their centers for the first time. Patients with masquerade syndromes such as lens-associated uveitis, postoperative or posttraumatic inflammation, exogenous endophthalmitis, and intraocular malignancies were excluded from the study. An electronic data collection system consisting of standard questions was created specifically for the registry and used to record the data online. The online registration system enabled duplicate registrations to be detected and prevented. Monitoring visits were made to all centers and patient records were checked by an external auditor to ensure data reliability and validity. Data collection was terminated at the end of October 2011 and the data of the patients who were registered between November 2008 and October 2011 were analyzed.

The general demographic and clinical characteristics of uveitis in Turkey according to the results of the BUST study have been published.⁶ The present study analyzes data not included in that report and compares the sociodemographic characteristics of adult patients with Behçet uveitis and non-Behçet non-infectious uveitis.

Statistical Analysis

Data were analyzed using SPSS for Windows version 15.0 (SPSS Inc., Chicago, IL). Data distributions were calculated using analytical methods. Pearson's chi-square test was used in cross tabulation analysis. The Mann-Whitney test was used for nonparametric data. A *p* value <0.05 was considered statistically significant.

Results

The study included 4,978 eyes of 3,363 patients with non-infectious uveitis in 33 centers. Of these, 1,170 (34.8%) of the patients had Behçet uveitis and 2,193 (65.2%) had non-Behçet non-infectious uveitis.

Of the patients with non-infectious uveitis, 1,791 (53.3%) were male and 1,572 (46.7%) were female. The male to female ratio was 1.14:1. When the two groups were compared, males comprised 67.7% of the Behçet uveitis group (male to female

ratio 2.09:1) and 45.6% of the other non-infectious uveitis group (male to female ratio 0.83:1) (*p*<0.001).

The mean age of the patients was 38.7 (17-87) years. However, there was a statistically significant difference in mean age between the two groups. The mean age was 34.3±10.5 years in the Behçet uveitis group and 41.1±14 years in the non-infectious uveitis group (*p*<0.001).

Of all non-infectious uveitis patients, 1615 (48%) had bilateral involvement and 1748 (52%) had unilateral involvement. When the two groups were compared, the rate of bilateral involvement was significantly higher in the Behçet uveitis group (65.6%, *n*=768) than in the other non-infectious uveitis group (38.6%, *n*=847 cases) (*p*<0.001). When involvement was compared within the 1,791 male patients, the rate of bilateral involvement was 65.9% (*n*=522) in the Behçet group and 32.3% (*n*=323) in the non-Behçet non-infectious uveitis group (*p*<0.001). Among female patients, the rate of bilateral involvement was 65.1% (*n*=246) in the Behçet group and 43.9% (524 cases) in the non-Behçet non-infectious uveitis group (*p*<0.001). The patients' education level, occupation, place of residence according to gross national product (GNP), and mode of presentation are summarized in Table 1. When all patients were evaluated together, there was no significant difference in education level between the Behçet uveitis and non-Behçet non-infectious uveitis groups (*p*>0.05). Low income indicators such as having a low-income job or being currently unemployed were more frequent in the Behçet uveitis group than in the other non-infectious uveitis group (32.0% vs. 22.8%, *p*<0.001). When the patients' places of residence were compared, the proportion of patients living in cities with low GNP was 37.0% in the Behçet uveitis group and 31.1% in the other non-infectious uveitis group (*p*<0.001) (Table 1).

Sociodemographic characteristics of male and female patients were compared between the Behçet uveitis and non-Behçet non-infectious uveitis groups. In males, the proportion of patients with low education (uneducated or primary school graduate) was higher in the Behçet uveitis group than in the other non-infectious uveitis group (49.6% vs. 43.4%), while a moderate to high education level (high school and university) was more common in the other non-infectious uveitis group than in the Behçet uveitis group (55.2% vs. 47.7%) (*p*=0.004). Similarly, low education level was more prevalent among women in the Behçet uveitis group than the other non-infectious uveitis group (61.5% vs. 59.2%), whereas moderate to high education level was more common in the other non-infectious uveitis group than in the Behçet uveitis group (39.8% vs. 32.8%) (*p*=0.021) (Table 1).

In addition, education level in the Behçet uveitis and non-Behçet non-infectious uveitis groups was evaluated according to male and female gender. When the patients were evaluated as a whole and separately in the Behçet and non-Behçet non-infectious patient groups, low education level was more common in females and a moderate to high education level was more common in males (*p*<0.001).

Low income indicators such as having a low-income job or being currently unemployed were more frequent among men in the Behçet uveitis group than in the other non-infectious uveitis group (37.5% vs. 31.3%, $p < 0.001$). Similarly for women, having a low-income job, being unemployed, or being a homemaker were more common in the Behçet uveitis group than in the other non-infectious uveitis group (77.2% vs. 71.6%, $p = 0.018$) (Table 1).

When we compared places of residence, the proportion of patients living in cities with low GNP was higher in the Behçet uveitis group compared to the other non-infectious uveitis group (38.3% vs. 30.0%, $p < 0.001$). However, there was no statistically significant difference between the two groups in terms of GNP in women ($p > 0.05$) (Table 1).

When patients' mode of presentation to the secondary and tertiary care centers was evaluated, it was determined that most patients presented by their own volition (48.2%). However, presentation by consultation was significantly more common in the Behçet uveitis group than in the other non-infectious uveitis group (28.7% vs. 13.7% in all patients; 28.9% vs. 13.2% in males; 28.3% vs. 14.2% in females, $p < 0.001$) (Table 1).

Discussion

As opposed to causes of vision loss such as cataract and age-related macular degeneration that are associated with advanced age, uveitis is the fifth most common cause of vision loss in middle-aged adults.⁷ According to the 2010 age and frequency table of the Turkish Statistical Institute (TSI) (<http://www.tuik.gov.tr>), 3% of individuals in the 35-44 year age range had vision problems. Non-infectious uveitis is also one of the potential etiologies included in this percentage. With national multicenter studies, standardization of diagnosis and data recording systems can provide a more comprehensive view of uveitis cases. As a result of the BUST study initiated for this purpose, a database has been established for uveitis cases in our country. According to the initial results of this study, Behçet uveitis is still the most common non-infectious cause of uveitis in our country.⁶ Therefore, we decided to conduct further subanalyses of the data pertaining to Behçet patients. With better elucidation of the demographic and socioeconomic factors of the disease, more appropriate social, psychological, medical, and economic approaches to these patients can be planned.

The distribution and etiology of uveitis types are influenced by genetic, geographic, social, and environmental factors. The prevalence of Behçet uveitis is known to be high in Asian and Mediterranean countries.⁸ Behçet uveitis also occurs more frequently in males.⁹ In our study, Behçet uveitis was more common in men (67.7%). Similarly, in a large study of Behçet uveitis patients conducted in our country, the proportion of male patients was found to be 68%.¹⁰ Although there has been no change in the incidence of Behçet disease in our country over the years, recent publications based in Japan have reported a decrease in incidence.^{11,12} Similarly, a decrease in some clinical signs related to genital ulceration, ocular involvement, and skin lesions

and a lower annual incidence of Behçet disease were reported in Korea.^{13,14} This suggests that the etiology of the disease may be related to environmental factors. Of the environmental factors, two possible mechanisms for this epidemiological change are a change in the balance of atopy/allergy or a decrease in the frequency of infection.¹⁵ Infections have long been proposed to be a triggering factor in the pathogenesis of Behçet disease.¹⁶ Activation of stable Behçet disease has been reported after dental treatments and streptococcal antigen skin testing.¹⁷ Poor oral health has been reported in Behçet patients and associated with more severe course.¹⁸ Considering all of these mechanisms together, the decrease in incidence in Japan may be associated with improved oral hygiene. In a recent publication, a mouse model was developed to explain the relationship between gut microbiome composition and the pathogenesis of Behçet disease.¹⁹ Further evidence supporting the hypothesis that Behçet disease develops due to environmental factors is its higher prevalence at lower socioeconomic levels. A study comparing socioeconomic status and personal hygiene habits of people with multiple sclerosis, headache, and neuro-Behçet disease showed that patients with neuro-Behçet disease had lower socioeconomic level and poorer hygiene habits.²⁰ In our study, the proportion of patients living in cities with low GNP was found to be higher in the Behçet uveitis group than in the other group. Having a low socioeconomic level may also be one of the potential risk factors for Behçet disease.

According to TSI data, the unemployment rate in our country was reported as 9.1% in 2011, the year in which this study was completed. In our study, the unemployment rate was 8.9% among all patients with non-infectious uveitis and 7.6% among all male patients. However, the actual unemployment rate in uveitis patients may be higher than that found in this study because unemployed patients may lose their health insurance and therefore not seek medical care unless they have very serious complaints. The unemployment rate among men was 8.5% in the Behçet group and 7% in the other non-infectious uveitis group. Among women, the unemployment rate was higher (10.2%) and showed no difference between the two groups. Being employed as a civil servant, which requires a higher education level, was lower in both male and female Behçet patients compared to the other group. In contrast, the frequency of being a laborer or self-employed was higher in the Behçet uveitis group compared to the other non-infectious uveitis group. There may be several explanations for these findings. Firstly, Behçet uveitis has earlier onset than uveitis of other non-infectious etiologies, so patients dealing with Behçet disease in their most active age period may have difficulty participating in employment. Secondly, since Behçet disease is actually a multisystemic obstructive vasculitis, they may lag in employment due to complications associated with other system involvement. According to TSI 2018 statistics, 14.2% of people who are not included in the workforce are unable to participate in employment due to disability. Some of our patients may also be included in this group. In addition, patients with Behçet uveitis have worse visual prognosis than patients with

Table 1. Information regarding educational background, occupation, place of residence according to gross national product (GNP), and mode of presentation for male, female, and all patients

	Male patients				Female patients				All patients										
	Non-Behçet non-infectious (n=999)		Behçet disease (n=792)		Total (n=1,791)		Non-Behçet non-infectious (n = 1194)		Behçet disease (n=378)		Total (n=1,572)		Non-Behçet non-infectious (n=2,193)		Behçet disease (n=1,170)		Total (n=3,363)		
	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	
Education level																			P value
Uneducated/primary education	434	43.4	393	49.6	827	46.2	706	59.2	246	65.1	952	60.6	1140	52.0	639	54.6	1779	52.9	>0,05
Secondary education/university	551	55.2	378	47.7	929	51.9	475	39.8	124	32.8	599	38.1	1026	46.8	502	42.9	1528	45.4	
Unknown	14	1.4	21	2.66	35	1.9	13	1.0	8	2.1	21	1.3	27	1.2	29	2.5	56	1.7	
Occupation																			P value
Retired	131	13.1	37	4.7	168	9.4	60	5.0	9	2.4	69	4.4	191	8.7	46	3.9	237	7.0	<0.001
Homemaker	-	-	-	-	-	-	668	55.9	226	59.8	894	56.8	668	30.5	226	19.3	894	26.6	
Laborer	243	24.3	230	29.0	473	26.4	67	5.6	25	6.6	92	5.9	310	14.1	255	22.8	565	16.8	
Unemployed	70	7.0	67	8.5	137	7.6	120	10.1	41	10.8	161	10.2	190	8.7	108	9.2	298	8.9	
Civil servant	146	14.6	78	9.8	224	12.5	122	10.2	22	5.8	144	9.2	268	12.2	100	8.5	368	10.9	
Student	77	7.7	47	5.9	124	6.9	61	5.1	16	4.2	77	4.9	138	6.3	63	5.4	201	6.0	
Freelance/self-employed	320	32.0	319	40.3	639	35.7	90	7.5	35	9.3	125	8.0	410	18.7	354	30.3	764	22.7	
Unknown	12	1.2	14	1.8	26		6	0.5	4	1.1	10	0.6	18	0.8	18	1.5	36	1.1	
GNP																			P value
Low	300	30.0	303	38.3	603	33.7	382	32.0	130	34.4	512	32.6	682	31.1	433	37.0	1115	33.2	>0.05
High	697	69.8	480	60.6	1177	65.7	807	67.6	244	64.6	1051	66.9	1504	68.6	724	61.9	2228	66.3	
Unknown	2	0.2	9	1.1	11	0.6	5	0.4	4	1.1	9	0.6	7	0.3	13	1.1	20	0.6	
Mode of presentation																			P value
Referral	290	29.0	272	34.3	562	31.4	421	35.3	115	30.4	536	34.1	711	32.4	387	33.1	1098	32.7	<0.001
Consultation	132	13.2	229	28.9	361	20.2	169	14.2	107	28.3	276	17.6	301	13.7	336	28.7	637	18.9	
Patient's request	577	57.8	285	36.0	862	48.1	603	50.5	156	41.3	759	48.3	1180	53.8	441	37.7	1621	48.2	
Unknown	-	-	6		6	0.3	1	0.08	-	-	1	0.06	1	0.05	6	0.5	7	0.2	

GDP: Gross national product

non-infectious uveitis without systemic association, even when intensive therapy is initiated in the early stages of the disease.⁴ Moreover, because these patients are followed by numerous specialists in branches such as dermatology, rheumatology, and ophthalmology, their frequent hospital visits may make them less desirable to potential employers. A study evaluating the risk of leaving the workforce over time for patients with non-infectious intermediate, posterior, and panuveitis showed that this rate was 11% for year 1, 31% for year 5, and 44% for year 10, and was significantly higher than the control group ($p=0.007$).²¹ Similarly, the presence of systemic disease and relatively poor visual prognosis are potential factors that may affect patients' education. In this study, the proportion of patients who were unschooled or primary school graduates was also higher in the Behçet uveitis group than in the other non-infectious uveitis group. This finding may be important in explaining why patients with Behçet uveitis are more frequently unemployed, self-employed, or working as laborers.

In a study from the United States, it was reported that monthly health costs due to non-infectious uveitis varied by treatment method and were \$935 in the corticosteroid group, \$1,738 in the immunosuppressant group, and \$1,439 in the biological agent group.²² In fact, in cases of blindness due to non-infectious uveitis, annual health expenditures can be up to \$17,846.²³ Considering both job loss and treatment costs together provides a better understanding of the socioeconomic dimension of the disease. Uveitis is also a disease that impacts quality of life. In a study conducted in patients with intermediate uveitis, a direct interaction between vision-related quality of life and general health-related quality of life was reported.²⁴ Especially in Behçet patients, it has been shown that general health status is more affected by visual function.²⁵ As expected, patients with systemic disease associated with non-infectious uveitis were found to have poorer quality of life scores than patients with only ocular findings.²⁶ In a study conducted in our country, it was shown that Behçet patients with ocular involvement were susceptible to psychosocial disorders such as anxiety and depression.²⁷ Moreover, in another study conducted in our country, general health sub-scales were examined in patients with active uveitis according to etiology, and scores were found to be significantly lower in Behçet uveitis than HLA-B27-associated uveitis.²⁸ Fatigue, depression, and anxiety scores were also reported to be higher in Behçet disease compared to healthy controls, and advanced regression analysis revealed a significant association between fatigue and anxiety, depression, and physical dysfunction.²⁹ Stressful life events have been shown to have an important role in leading to secondary problems in periods of relapse and remission in Behçet disease, with 79.4% of patients associating disease activation with a stress factor.³⁰ All these findings demonstrate the socioeconomic and psychological dimensions of the disease.

Study Limitations

In our study, the proportion of patients who were seen for consultation was higher in the Behçet uveitis group compared to

the other non-infectious uveitis group. Behçet disease is common in our country, so this result may be because clinicians have high awareness of the disease and its ocular morbidity is well known. Since Behçet disease is a multisystemic obstructive vasculitis, a comprehensive interdisciplinary approach is essential for disease management.

Conclusion

In conclusion, Behçet uveitis is still the most common non-infectious uveitis etiology in Turkey. Patients with Behçet disease had lower education and socioeconomic levels than those with other non-infectious uveitis. Early diagnosis, early and adequate treatment, and preventing complications are essential to enable these patients to receive better education, remain employed, and work in better conditions. In addition, socioeconomic models can be developed to provide employment to patients already suffering from this disease, which has a high prevalence in our country. As patients reach a higher socioeconomic level, follow-up continuity and treatment adherence may improve, breaking the vicious cycle between disease, disease-related job loss, and treatment nonadherence due to job loss and thereby enabling these patients, most of whom are in their productive years, to be reintegrated into society.

Ethics

Ethics Committee Approval: The study protocol was approved by the İstanbul University İstanbul Faculty of Medicine Ethics Committee and the Ministry of Health and was carried out in accordance with the Declaration of Helsinki.

Informed Consent: Obtained.

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Authorship Contributions

Concept: F.N.Y., İ.T.T., Design: F.N.Y., Y.Ö., F.B., İ.T.T., Data Collection or Processing: F.N.Y., P.Ç.Ö., Y.Ö., F.B., İ.T.T., BUST Study Group, Analysis or Interpretation: F.N.Y., İ.T.T., Literature Search: F.N.Y., İ.T.T., Writing: F.N.Y., İ.T.T.

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