



Comparison of Self-Esteem and Social Anxiety Levels of Adolescents Who Wear Spectacles and Who Do Not

Gözlük Kullanan ve Kullanmayan Adölesanların Benlik Saygısı ve Sosyal Kaygı Düzeylerinin Karşılaştırılması

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ABSTRACT

Introduction: Self-esteem and social anxiety could affect both the social life and school success of adolescents. Wearing spectacles in adolescence may be related to self-esteem and social anxiety. Therefore, in this study, we aimed to compare the level of self-esteem and social anxiety between adolescents who wear spectacles and those who do not. **Methods:** This comparative descriptive study which was conducted in Sivas Cumhuriyet University Ophthalmology outpatient clinic between March-July 2021, consisted of 108 adolescents who have been wearing spectacles for at least one year, and age and sex-matched, 150 healthy adolescents. Self-esteem was measured by Rosenberg Self-esteem Scale and social anxiety was measured by Social Anxiety Scale for Children-Revised. The socio-demographic characteristics of the participants and clinical data on spectacle were evaluated via a sociodemographic data form. **Results:** 69 (63.9%) of the study group were girls, and the mean age was 12.92±1.55 years. For the right eyes, the mean spherical equivalent (SE) value was -1.10±3.23 D and it was -1.15±3.39 D for the left eyes. The mean self-esteem scores of the spectacle wearers were significantly lower (22.53±4.60 vs. 25.50±2.05, p<0.001), and the mean social anxiety scale scores were significantly higher (40.23±10.90 vs. 36.13±7.57, p=0.006) compared the control group. When the patients were evaluated as myopic (n=78) and hyperopic (n=30) regarding the SE, even though there was an increase in the social anxiety score as the degree of myopia increased for both eyes (for right, r=-.280, p=0.01, and for left, r=-.235, p=0.04), there was no significant correlation with self-esteem scores (p>0.05). **Conclusion:** Wearing spectacles in adolescence seems to be related to self-esteem and social anxiety. An appropriate approach would be to perform a thorough psychological evaluation of adolescents who wear spectacles.

Keywords: Self-esteem, social anxiety, wearing spectacles, adolescent

ÖZET

Giriş: Benlik saygısı ve sosyal kaygı, adölesanların hem sosyal yaşamını hem de okul başarısını etkileyebilir. Adölesan döneminde gözlük takmak benlik saygısı ve sosyal kaygı ile ilişkili olabilir. Bu nedenle bu çalışmada gözlük kullanan ve kullanmayan adölesanların benlik saygısı ve sosyal kaygı düzeylerini karşılaştırmayı amaçladık. **Yöntem:** Mart-Temmuz 2021 tarihleri arasında Sivas Cumhuriyet Üniversitesi Göz Hastalıkları polikliniğinde yürütülen bu karşılaştırmalı tanımlayıcı çalışmanın örneklemini, en az bir yıldır gözlük takan 108 adölesan ile yaş ve cinsiyet açısından eşleştirilmiş 150 sağlıklı adölesan oluşturdu. Benlik saygısı Rosenberg Benlik Saygısı Ölçeği ile ve sosyal kaygı, Çocuklar İçin Sosyal Kaygı Ölçeği- Yenilenmiş Biçim ile ölçüldü. Katılımcıların sosyo-demografik özellikleri ve gözlükle ilgili klinik verileri, bir sosyodemografik veri formu aracılığıyla değerlendirildi. **Bulgular:** Çalışma grubunun 69'u (%63,9) kız olup, yaş ortalaması 12,92±1,55 yıl idi. Sağ göz için ortalama sferik eşdeğer (SE) değeri -1.10±3.23 D, sol göz için -1.15±3.39 D idi. Kontrol grubu ile karşılaştırıldığında gözlük kullananların ortalama benlik saygısı puanları anlamlı olarak daha düşük (22,53±4,60'a karşı 25,50±2,05, p<0,001) ve ortalama sosyal kaygı ölçeği puanları anlamlı olarak daha yüksekti (40,23±10,90'a karşı 36,13±7,57, p=0,006). Hastalar SE açısından miyop (n=78) ve hipermetrop (n=30) olarak değerlendirildiğinde her iki gözde miyopi derecesi arttıkça sosyal anksiyete puanında artış olmasına rağmen (sağ için, r=-.280, p= 0.01 ve sol için, r=-.235, p=0.04), benlik saygısı puanları ile anlamlı bir ilişki yoktu (p>0.05). **Sonuç:** Adölesan döneminde gözlük takmanın benlik saygısı ve sosyal kaygı ile ilişkili olduğu görülmektedir. Gözlük takan adölesanların kapsamlı bir psikolojik değerlendirmesini yapmak uygun bir yaklaşım olabilir.

Anahtar kelimeler: Benlik saygısı, Sosyal kaygı, Gözlük kullanma, Adölesan.

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INTRODUCTION

Undercorrected refractive error is one of the most common causes of visual impairment in all age groups and it influences approximately 88.4 million individuals with moderate or severe distance vision impairment or blindness.¹ The distribution of the frequency of refractive errors such as myopia, hyperopia, and astigmatism differs between countries and age groups. Ethnic, genetic, environmental factors and lifestyle changes play a role in this context.²

The progression and frequency of myopia have been increasing recently due to increased screen time, long periods of near working, and a decrease in the time spent outdoors. The increase in the onset and progression of myopia in the pediatric age group together with the increase in the use of digital devices due to the restrictions for the COVID-19 pandemic also supports this.³ Spectacle use is the preferred treatment method in the correction of refractive errors in children since it is a low-risk intervention and more cost-effective compared to contact lenses or surgical intervention.⁴ Along with the increase in refractive error, the frequency of spectacle use increases in children and adolescents. The estimated frequency of spectacle use in childhood ranges from 6% to 35%.⁵

Physical appearance and attractiveness are important factors for having high self-esteem in childhood and adolescence. In previous studies, conditions affecting appearances such as obesity and facial malformations are determined to be substantial on self-esteem.⁶ ⁷ Spectacle use in children also affects appearance for a long period. Studies conducted in adults report that people who wear spectacles are appraised as more intelligent, hardworking, authoritative, but less attractive.⁵ Studies evaluating the relationship between spectacle use and self-concept and esteem in children and adolescents demonstrated controversial findings. Odedra et al. reported that 15% of children with correctable vision problems felt that their spectacles made them look silly.⁸ In another study, the authors reported that children who wear spectacles are appraised as more intelligent than those who do not wear spectacles.⁹ Lyon et al., on the other hand, stated that there was no difference in terms of self-perception between children who wear spectacles and those who do not.¹⁰

Self-esteem is a positive state that provides self-confidence by confirming one's worth.¹¹ Far beyond shyness, social anxiety is a fear of excessive worrying about social situations that impacts daily activities, especially social activities, self-confidence, relationships, work, or school life. It is known that children and adolescents with high social

anxiety levels also have lower self-esteem.¹² Studies conducted in children and adolescents with a social anxiety disorder (social phobia) reported that these children may have lower self-confidence, higher level of anxiety and depression, and experience peer and school problems more frequently.¹³ In addition, a negative relationship between self-esteem and social anxiety disorder has been reported where children with high self-esteem had lower social anxiety level.¹⁴ A perception or thought that the use of spectacles during adolescence, where physical appearance becomes important, impairs physical attractiveness and is embarrassing may negatively affect self-esteem and cause over worrying and anxiety in social situations. Unfortunately, few studies investigate the relationship between wear spectacles and self-esteem in the adolescent population and, as outlined above, these have yielded conflicting findings. Again, to our knowledge, there are limited published data in the field on social anxiety for adolescents who wear spectacles. Given that adolescence is a critical period of development in the life course and wearing spectacles in this population is common, it is possible that wearing spectacles may affect adolescent's thoughts about himself/herself positively or negatively. Therefore, it is of utmost importance for parents, teachers and health professionals to be aware of whether wearing spectacles has an impact on adolescent self-esteem and social anxiety.

In the present study, we sought to address the limitations of previous studies. Thus, the purpose and the outcomes of the present study are twofold and may further bridge this gap. The primary aim is to compare the level of self-esteem and social anxiety between adolescents who wear spectacles and those who do not. The secondary aim is to reveal/determine the self-perception of adolescents who wear spectacles and the difficulties they may experience due to wearing spectacles.

MATERIALS AND METHODS

Study Design and Participants

This comparative descriptive study was conducted in the outpatient clinic of the Department of Ophthalmology, Sivas Cumhuriyet University between March and July 2021. The subjects for this study consisted of 108 adolescents between the ages of 11-16 who have been wearing spectacles for at least one year, and age and sex-matched, 150 adolescents with similar sociodemographic features who never wore spectacles and had no ocular or visual complaints. Initially, 154 adolescents were enrolled, but 46 adolescents were dropped out for the following reasons: 28 adolescents/parents refused to participate (22 of them due to parents' shortage of

time and 6 adolescents/parents declared that the study is useless for themselves) and 18 adolescents were excluded because they did not meet the inclusion criteria. Adolescents in the control group were randomly selected from adolescents who applied to the outpatient clinic of the Department of Pediatrics of the same hospital for healthy child follow-up and from relatives of hospital staff.

Data Collection and Procedure

Participants potentially eligible for participation were identified by a trained and certified child and adolescent psychiatrist and two ophthalmologists. All questionnaires and scales were collected face-to-face from the participants. All participants underwent a complete ophthalmic examination including pupil reactions, intraocular pressure measurement, best-corrected visual acuity (BCVA) assessment (measured by Snellen), slit-lamp biomicroscopy, dilated fundus examination, and cycloplegic refraction measurements by an auto refractometer, Tonoref II (Nidek Co. Ltd, Gamagori, Japan). Then, Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) criteria were used to determine whether any present or past psychopathology is present via face-to-face interviews with all participants and their parents.¹⁵ The best estimate DSM-5 diagnoses were based on in-depth and unstructured personal interviews as well as interviews with family members conducted by trained and certified child and adolescent psychiatrists which typically lasts about half an hour. Patients with a history of psychiatric disorders that is determined by a child and adolescent psychiatrist, any chronic disease collected from adolescents' own and parents' anamnesis and medical records, who have a major physical disability affecting physical appearance (such as using a wheelchair, loss of limb, and significant facial malformations, etc.), and obesity were excluded from the study. We also excluded adolescents with a history of ocular diseases (except refractive errors) such as strabismus, glaucoma, uveitis, optic neuropathies, retinopathy, usage of ocular drugs, ocular trauma, and ocular surgery.

Ethical Principles

Parents/legal guardians of the adolescents were verbally informed about the purpose and procedure of the study. Written and verbal informed consent was obtained from legal guardians. This study was approved by the Sivas Cumhuriyet University Faculty of Medicine Local Ethics Committee (Date: 10.02.2021, No: 2021-02/23) and was in accordance with Good Clinical Practice guidelines and the current revision of the Declaration of Helsinki.

Data Collection Tools

Sociodemographic Data Form: The form is specifically designed by the authors, considering the literature data regarding the purpose of the study. The form includes questions evaluating the socio-demographic characteristics of the participants including age, gender, place of residence, age and levels of education of the parents, family income, academic performance of participants. This questionnaire also includes questions that evaluate the clinical data on the spectacle wear, such as the duration of spectacle wear, how a refractive error was detected, type of the refractive error, presence of amblyopia, presence of individual(s) wearing spectacles in the close social circle, enjoying wearing spectacles, difficulties wearing spectacles, difficulties due to spectacles while playing sports, thinking spectacles suit one's self, thinking that spectacles distort one's facial appearance, being ridiculed for spectacle use, seeing better with spectacles, wearing a mask makes it difficult to use spectacles, increased prescription in the last year, enjoying having their eyes checked, the frequency of having eyes checked. These parameters were evaluated by the researchers via ophthalmic examination of the participants and during interviews with adolescents and their parents.

Rosenberg Self-esteem Scale (RSES): The Rosenberg self-esteem scale consists of 63 items. In this study, the first 10 items were used. This scale developed by Rosenberg¹⁶ was adapted and validated for Turkish adolescents by Çuhadaroğlu.¹⁷ It is a scale used to evaluate the positive and negative aspects of self-esteem. The validity coefficient was found as 0.71 and the reliability coefficient as 0.75, and the Cronbach alpha reliability coefficient of the scale was .76 in this study. In this study, we utilized the self-esteem subtest, which is a 4-point Likert scale (0=strongly disagree, 1=disagree, 2=agree, 3=strongly agree) consisting of 10 items and measuring the positive and negative aspects of self-esteem. The scale ranges from 0-30 and a high score indicates high self-esteem.

Social Anxiety Scale for Children-Revised (SASC-R): This 10-item scale, whose original form was developed by La Greca et al. in 1988, was based on self-report and was revised in 1993 and the number of questions was increased to 18.¹⁸ Two components are evaluated in the scale: fear of negative evaluation and social distress. The score that can be obtained from the five-point Likert-type scale varies between 18-90. The Turkish adaptation, validity, and reliability of the scale were performed by Demir et al. in 1998.¹⁹ Internal consistency and test-retest correlations for the Turkish version of the scale were found to be high ($\alpha=0.813$, $r=0.8096$, respectively). The Cronbach

alpha reliability coefficient of the scale was 0.80 in this study.

Statistical Analysis

Analyses were performed using Statistical Package for the Social Science software for Windows (SPSS version 26.0, IBM Corporation, Armonk, NY, USA), and quantitative data were given as arithmetic mean and standard deviation (SD), qualitative data as number and percentage (n,%). Kolmogorov-Smirnov test was used to test the compatibility of the data to normal distribution. Categorical variables were analyzed with the chi-square (χ^2) test, and the Kruskal Wallis Test and Mann-Whitney U test were used to compare the measurement variables between groups. Spearman correlation analysis was used to evaluate the relationship between refractive error and RSES and SASC-R scores. A p-value of <0.05 was considered statistically significant.

RESULTS

Sociodemographic Characteristics of the Sample

The study sample consisted of 108 adolescents aged 11-16 years who wore spectacles for at least one year (study group) and 150 adolescents who never wore spectacles (control group). Of all the participants in the study group, 63.9% were girls (n=69), 36.1% were boys (n=39), and the mean age was 12.92±1.55 years (min-max: 11-16 years). Of the adolescents in the control group 58% (n=87) were girls and 42% were boys (n=63), and the mean age was 13.04±1.84 years (min-max: 11-16 years). There was no significant difference between the two groups in terms of age, gender, parental education level, family income, place of residence, and academic performance (p>0.05 for all). The sociodemographic characteristics of the participants are given in Table 1.

The study variables	Study group (n=108)	Control group (n=150)	p-value*
Age (mean-years±SD)	12.92±1.55	13.04±1.84	0.889
Gender (n,%)			0.340
Boys	39 (36.1)	63 (42)	
Girls	69 (63.9)	87 (58)	
Place of residence (n,%)			0.776
Urban	73 (67.6)	104 (69.3)	
Rural	35 (32.4)	46 (30.7)	
Level of Education of the Mother (n,%)			0.500
Primary education and lower	47 (43.5)	59 (39.3)	
Upper primary education	61 (56.5)	91 (60.7)	
Maternal age (mean-years±SD)	39.35±5.17	39.52±4.84	0.455
Level of Education of the Father (n,%)			0.834
Primary education and lower	24 (22.2)	35 (23.3)	
Upper primary education	84 (77.8)	115 (76.7)	
Paternal age (mean-years±SD)	42.15±5.43	42.88±5.24	0.296
Family Income Level (n,%) [†]			0.712
The minimum wage/less than minimum wage	28 (25.9)	42 (28)	
Above the minimum wage	80 (74.1)	108 (72)	
Academic performance (n,%)			0.819
High level (grade point average ≥85)	69 (63.9)	91 (60.7)	
Medium-level (grade point average 50-84)	32 (29.6)	50 (33.3)	
Low (grade point average ≤49)	7 (6.5)	9 (6)	

*The chi-square test for categorical variables and the Mann-Whitney U test for continuous variables were used to test group differences. Data were given as mean±standard deviation or number (%).
Bold font indicates statistical significance: $p < 0.05$.
 Abbreviations: SD: Standard Deviation.
[†]The level of income was established by the minimum wage value on the date of the study.

Clinical Features Regarding Eye Disorder and Wearing Spectacles

The mean duration of wearing spectacles was 4.12±2.52 years (min-max: 1-12 years) and the average age of onset for wearing spectacles was 8.9±2.8 years (min-max: 1-15) years. Of those with vision problems, 38.9% (n=42) were noticed by parents, 31.5% (n=34) by teachers or by a doctor at school screening, 21.3% (n=23) by themselves, and 8.3% (n=9) by doctors during an ophthalmic examination. In addition to refractive error, amblyopia was present in 22 (20.4%) of the adolescents who used spectacles. All but two of the

adolescents with amblyopia had mild to moderate amblyopia and none of them were being treated with patching. Refractive error of spectacle wearers were as follows: myopia (35.2%, n=38), myopia + astigmatism (33.3%, n=36), hyperopia + astigmatism (19.4%, n=21), astigmatism (6.5%, n=7), and hyperopia (5.6%, n=6).

For the right eyes; the mean spherical power was -0.97±2.8 diopters (D), the mean cylindrical power was -0.25±1.35 D and the mean spherical equivalent (SE) value was -1.10±3.23 D. For the left eyes; the mean spherical power was -0.98±2.99 D, the mean cylindrical power was -

0.37±1.33 D and the mean SE value was -1.15±3.39 D. The mean BCVA was 0.95±0.13 (min: 0.30, max: 1.0) in the right eye and 0.93±0.17 (min: 0.10,

max: 1.0) in the left eye (Table 2). Clinical features regarding the refractive error and wearing spectacles were summarized in Table 2.

	Number (%) or mean±SD
Spectacle wear duration (mean-years±SD)	4.12±2.52 (min: 1, max: 12)
How was the refractive error detected? (n,%)	
Self	23 (21.3)
Screening at school/Teacher	34 (31.5)
Ophthalmic examination	9 (8.3)
Parents	42 (38.9)
Presence of amblyopia (n,%)	22 (20.4)
Refractive error (n,%)	
Myopia	38 (35.2)
Hyperopia	6 (5.6)
Astigmatism	7 (6.5)
Myopia + Astigmatism	36 (33.3)
Hyperopia + Astigmatism	21 (19.4)
Right Spherical power (D) (mean±SD)	-0.97±2.8 (range: -8.50 to 8.0)
Right Cylindrical power (D) (mean±SD)	-0.25±1.35 (range: -3.5 to 5.25)
Right Spherical Equivalent (D) (mean±SD)	-1.10±3.23 (range: -9.25 to 9.0)
Left Spherical power (D) (mean±SD)	-0.98±2.99 (range: -8.0 to 9.75)
Left Cylindrical power (D) (mean±SD)	-0.37±1.33 (range: -5.0 to 3.75)
Left Spherical Equivalent (D) (mean±SD)	-1.15±3.39 (range: -9.0 to 10.75)
BCVA-Right (mean±SD)	0.95±0.13 (min: 0.30, max: 1.0)
BCVA-Left (mean±SD)	0.93±0.17 (min: 0.10, max: 1.0)

BCVA: Best-corrected visual acuity, D: Diopters

Other Clinical Features and Difficulties Associated with Wearing Spectacles

There was at least one more individual wearing spectacles in the close social circle of 65.4% (n=68) of those who wore spectacles. Of those who wear spectacles, 61.1% (n=66) declared that they do not enjoy wearing spectacles, 59.3% (n=64) had problems with wearing spectacles, 68.5% (n=74) asserted that spectacles cause problems while doing sports, and 83.3% (n=90) complained about the difficulty to wear spectacles while using a mask within the scope of COVID-19 measures. Among those who wear spectacles, 63.9% (n=69) think that spectacles don't suit them, 41.7% (n=45) think that spectacles distort their facial features aesthetically, while 31.5% (n=34) of them are ridiculed for wearing spectacles. Of those who wear spectacles, 4.6% (n=5) reported that their vision did not improve with spectacle use, and 39.8% (n=43) reported that their prescription increased in the last year. Of the who wear spectacles, 46.3% (n=50) had their eyes checked once every 6 months, 47.2% (n=51) once a year, and 6.5% (n=7) at least three times a year. 61.1% (n=66) reported that they did not like eye examination. Other clinical features and difficulties associated with wearing spectacles are given in Table 3.

	Number (%)
Individual wearing spectacles in the close social circle (n,%)	
Yes	68 (65.4)
No	36 (34.6)

Enjoying wearing spectacles (n,%)	
Yes	42 (38.9)
No	66 (61.1)
Difficulties wearing spectacles (n,%)	
Yes	64 (59.3)
No	44 (40.7)
Difficulties due to spectacles while playing sports (n,%)	
Yes	74 (68.5)
No	34 (31.5)
Thinking spectacles suit one's self (n,%)	
Yes	39 (36.1)
No	69 (63.9)
Thinking that spectacles distort one's facial appearance (n,%)	
Yes	45 (41.7)
No	63 (58.3)
Being ridiculed for spectacle use (n,%)	
Yes	34 (31.5)
No	74 (68.5)
Seeing better with spectacles (n,%)	
Yes	103 (95.4)
No	5 (4.6)
Wearing a mask makes it difficult to use spectacles (n,%)	
Yes	90 (83.3)
No	18 (16.7)
Increased prescription in the last year (n,%)	
Yes	43 (39.8)
No	65 (60.2)
Enjoying having their eyes checked (n,%)	
Yes	42 (38.9)
No	66 (61.1)
Frequency of having eyes checked (n,%)	
Once every 6 months	50 (46.3)
Once a year	51 (47.2)
At least three times a year	7 (6.5)

Comparison of the Mean Scores of Rosenberg Self-Esteem Scale (RSES) and the Social Anxiety Scale for Children-Revised (SASC-R) Between the Study and Control Group

The comparison of the self-esteem scale and social anxiety scale scores between the spectacle wearers and the control group revealed that the mean self-esteem scores of the spectacle wearers obtained from the Rosenberg Self-Esteem Scale were significantly lower (22.53 ± 4.60 vs. 25.50 ± 2.05 , $p < 0.001$) and the

mean social anxiety scale scores obtained from the Social Anxiety Scale for Children-Revised were significantly higher (40.23 ± 10.90 vs. 36.13 ± 7.57 , $p = 0.006$) than the control group. The comparison of the mentioned scales between groups is given in Table 4.

	Study group (n=108)	Control group (n=150)	p-value*
RSES Score (mean±SD)	22.53±4.60	25.50±2.05	<0.001
SASC-R Score (mean±SD)	40.23±10.90	36.13±7.57	0.006

*Mann-Whitney U test. Data were given as mean±standard deviation. **Bold font** indicates statistical significance: $P < 0.05$
 Abbreviations: RSES: Rosenberg Self-Esteem Scale; SASC-R: Social Anxiety Scale for Children-Revised; SD: Standard Deviation.

Association of the Scores of Rosenberg Self-Esteem Scale and Social Anxiety Scale for Children-Revised with Clinical Variables in the Cohort of Wearing Spectacles Patients

Analysis of the clinical variables associated with RSES and SASC-R scores revealed that those who did not enjoy wearing spectacles, had difficulties while wearing, who thought that spectacles did not suit them and that spectacles distorted their facial features had significantly lower RSES scores and significantly higher SASC-R scores ($p < 0.001$, for all). Those who were ridiculed for wearing spectacles also had significantly lower RSES scores ($p = 0.007$) and significantly higher SASC-R scores ($p < 0.001$). Similarly, those who did not enjoy getting their eyes checked had significantly lower RSES scores ($p = 0.001$) and significantly higher SASC-R scores ($p = 0.004$). The association of the scores with clinical variables is presented in Table 5. On the other hand, there was no significant

correlation between age, the onset age of spectacle wear, RSES, and SASC-R scores ($p > 0.05$).

When the adolescents were evaluated as myopic ($n = 78$) and hyperopic ($n = 30$) regarding the SE even though there was an increase in the SASC-R scores as the degree of myopia increased for both eyes (for right, $r = -.280$, $p = 0.01$, and for left, $r = -.235$, $p = 0.04$) (Diagram 1), there was no significant correlation with RSES scores ($p > 0.05$). No correlation was observed in terms of both SASC-R and RSES scores regarding hyperopia degree ($p > 0.05$). In addition, no significant difference was found between adolescents with myopia and hyperopia regarding SE in terms of RSES and SASC-R scores (22.45 ± 4.8 vs. 22.8 ± 4 , $p = 0.74$ and 40.63 ± 11.65 vs. 39.22 ± 9.16 , $p = 0.55$, for the right eyes, respectively; 22.49 ± 4.79 vs. 22.48 ± 4.32 , $p = 0.9$ and 40.3 ± 11.63 vs. 39.65 ± 9.04 , $p = 0.75$, for the left eyes, respectively)

	RSES (mean±SD)	Scores	p-value*	SASC-R (mean±SD)	Scores	p-value*
Presence of amblyopia (n,%)			0.665			0.526
Refractive error (without amblyopia)	22.44±4.63			40.64±11.29		
Refractive error + Amblyopia	22.86±4.60			38.64±9.22		
Refractive error (n,%)			0.085			0.075
Myopia	23.87±4.14			37.26±11.06		
Hyperopia	21.83±5.19			40.33±10.15		
Astigmatism	22.57±3.69			39.14±9.04		
Myopia + Astigmatism	20.83±5.08			44.50±11.43		
Hyperopia+ Astigmatism	23.19±4.08			38.62±8.77		
Individual wearing spectacles in the close social circle			0.414			0.385
Yes	22.72±4.75			39.59±11.06		
No	22.31±4.45			41.06±10.62		
Enjoying wearing spectacles			<0.001			<0.001
Yes	24.90±3.29			32.79±8.14		
No	21.02±4.70			44.97±9.74		
Difficulties wearing spectacles (n,%)			<0.001			<0.001
Yes	20.47±4.57			45.88±10.25		
No	25.52±2.60			32.02±4.99		
Difficulties due to spectacles while playing sports			0.902			0.992
Yes	22.39±4.88			40.31±10.99		
No	22.82±4.00			40.06±10.83		
Thinking spectacles suit one's self			<0.001			<0.001
Yes	25.10±3.27			32.49±6.46		
No	21.07±4.63			44.61±10.47		

Thinking that spectacles distort one's facial appearance				
Yes	20.41±4.66	<0.001	46.54±9.74	<0.001
No	24.10±3.91		35.55±9.26	
Being ridiculed for spectacle use				
Yes	20.74±5.05	0.007	45.85±10.07	<0.001
No	23.35±4.16		37.65±10.32	
Seeing better with spectacles				
Yes	22.72±4.54	0.163	39.78±11.03	0.072
No	20.13±5.08		45.88±7.24	
Increased prescription in the last year				
Yes	22.95±4.06	0.726	39.92±9.81	0.968
No	22.02±5.18		40.61±12.16	
Enjoying having their eyes checked				
Yes	24.26±4.03	0.001	36.26±8.23	0.004
No	21.42±4.63		42.76±11.66	
Frequency of having eyes checked (n,%)				
Every 6 months	22.56±4.01	0.867	40.32±9.68	0.775
Once a year	22.55±5.04		40.33±12.12	
At least three times a year	22.14±5.92		38.86±11.11	

*The Kruskal Wallis Test and the Mann-Whitney U Test was used to test group differences. Data were given as mean±standard deviation. **Bold font** indicates statistical significance: P < 0.05. *Abbreviations:* RSES: Rosenberg Self-Esteem Scale; SASC-R: Social Anxiety Scale for Children-Revised; SD: Standard Deviation.

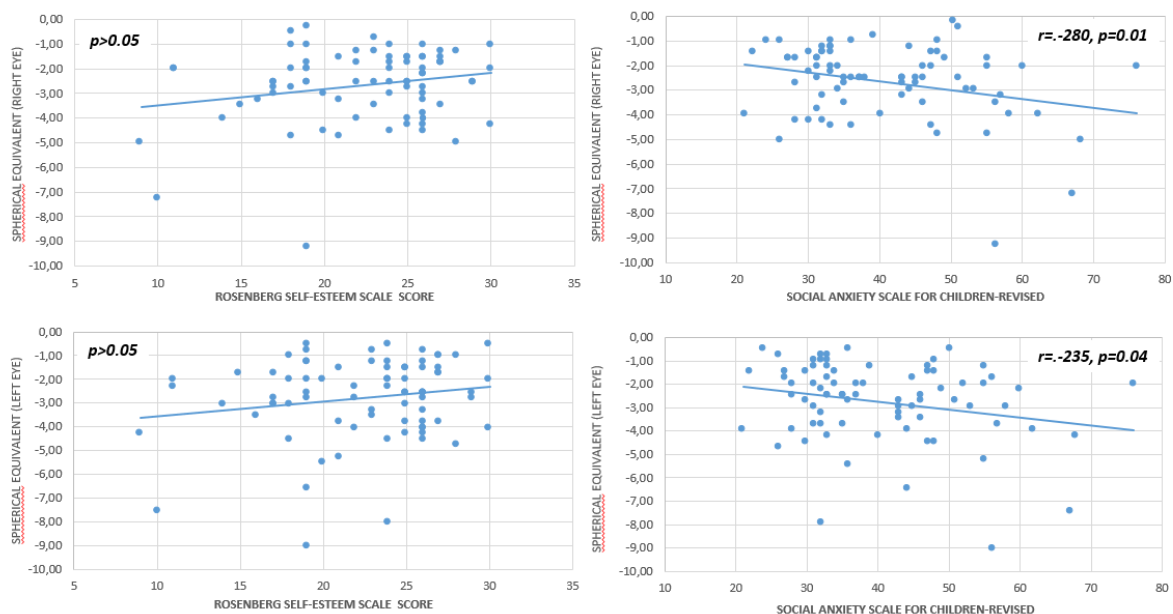


Diagram 1: Correlation between the degree of myopia and Rosenberg Self-Esteem Scale score and Social Anxiety Scale for Children-Revised

DISCUSSION

In this study, the social anxiety level and self-esteem of adolescents who wear and do not wear spectacles were investigated and we observed that adolescents who wore spectacles had lower self-esteem and higher social anxiety level than those who did not. Furthermore, we found that those who do not enjoy wearing spectacles, having their eyes checked, who have difficulties wearing them, who are ridiculed for using spectacles, who think that spectacles do not suit them and distort their facial features, have lower self-esteem and higher social anxiety scores compared to their peers. In addition, sole evaluation of the adolescents with myopia revealed that alongside the increase in the degree of myopia social anxiety levels were also increased, however, self-esteem was not affected.

Studies are demonstrating that wearing spectacles is associated with low self-esteem regarding physical appearance and social interactions.⁴ Spectacle use in children and adolescents is reported to arouse negative emotions, ridicule, and emotional problems related to physical appearance.²⁰ Tuncer et al. compared adolescents wearing spectacles with those who did not according to Piers-Harris Children's Self-concept Scale and reported lower physical appearance scores in adolescents wearing spectacles.¹¹ Spectacles prescribed at a younger age and therefore worn longer may be associated with low self-esteem since childhood is the developmental period in which self-esteem is formed.⁴ Terry et al. reported that wearing spectacles for the first time in childhood (younger than 13 years of age) or adulthood will affect self-

esteem more negatively than wearing spectacles in adolescence, and children who wear spectacles may experience more social problems than adolescents.²¹ In our study, the onset of spectacle wear for the majority (91.6%) was childhood (younger than 13 years of age). This may explain why adolescents who wear spectacles in our study have lower self-esteem. However, there was no significant correlation between age, the onset age of spectacle wear, RSES, and SASC-R scores.

Studies conducted in children with amblyopia reported that children who were treated with patching or spectacle use are particularly embarrassed by the reaction of their peers, and children who wear spectacles or eye patches are exposed to physical or verbal bullying approximately 35% more.²² Webber et al. reported that patching, not spectacle use, was associated with a low social acceptance score related to self-esteem in children treated for amblyopia.²³ In our study, we found that 31.5% of the adolescents were bullied by their peers due to spectacle use. Furthermore, no relationship was found between the presence of amblyopia and self-esteem and social anxiety scores, but none of the adolescents in our study were being treated with patching. Therefore, the efficacy of patching could not be evaluated. In addition, all but two of the adolescents with amblyopia had mild to moderate amblyopia in our study group.

There are controversial studies about one's self-perception and perception of others who wear spectacles. In previous studies, spectacle use was associated with unattractiveness as well as a more intelligent appearance.² Walline et al. reported improvements in appearance, satisfaction with correction, activities, and peer perceptions in children and teens with wearing contact lenses. In addition, 71.2% of children and 78.5% of teens indicated that they liked wearing contact lenses a little or a lot better than spectacles.²⁴ In another study, Walline et al. evaluated children aged 8-11 years, who wore spectacles or contact lenses for 3 years and demonstrated that although there was no alteration regarding children's global self-esteem, children using contact lenses showed an improvement in self-perception regarding physical appearance, athletic competence, and social acceptance.²⁵ The biggest difference between contact lens wearers and spectacle wearers was in physical appearance scores regardless of whether or not they enjoyed wearing glasses initially. Spectacle wear has been associated with disfigurement and less attractiveness, therefore it's not surprising that children's self-perception of their physical appearance benefits from contact lens wear.²⁵ In our study, adolescents who thought that spectacle use affects their appearance had lower self-esteem scores and higher social anxiety scores. Also, adolescents

who do not enjoy wearing spectacles had lower self-esteem and higher social anxiety scores compared to the ones who enjoy. In addition, 68% of our participants wearing spectacles stated that they had difficulties while playing sports. One of the greatest improvements in quality of life was demonstrated in the athletics area in children and teens who switched from spectacle wear to contact lens wear.²⁴ In this age period, in particular, team sports support social development and affect self-esteem positively. Teamwork promotes building a truly collaborative environment and developing feelings such as empathy. Moreover, being together with people who enjoy doing the same thing improves communication skills and other skills related to establishing social relationships. Consequently, having difficulties while participating in sports due to spectacle use may cause children and adolescents to avoid these activities that will greatly contribute to their mental, emotional and social development. This, in turn, will deprive the child and adolescent of the opportunity to test themselves, compare themselves with their peers, and may affect their psychosocial well-being, such as the development of positive self-esteem, self-perception, and mental resilience.²⁶

Terry et al. divided 125 spectacle-wearing children between the ages of 10-13 into two groups as those who continue to wear spectacles or those who have switched to contact lenses and evaluated their self-esteem at the end of a 3-year follow-up. The children's self-concepts after wearing contact lenses revealed that all children felt better about their appearance and popularity over time, but there was no difference regarding self-esteem between the two groups after 3 years.²⁷ This may be due to patients getting used to their vision correction and the benefits become less pronounced over time.²⁴ Nonetheless, they found a relationship between higher degrees of myopia and lower self-esteem.²⁷ Dias et al. reported that self-esteem was related to visual symptoms but not with refractive error severity in myopic children wearing spectacles.⁴ In a study conducted in China, similar to our findings children who wear spectacles due to myopia were found to have a high level of social anxiety, and a high degree of myopia, prolonged spectacle use (>2 years), and low self-esteem were related with social anxiety.²⁸ The increase in social anxiety scores with the degree of myopia may be due to higher myopia requiring thicker lenses, more noticeable spectacles, and lower visual acuity without spectacles.²⁷ In our study, adolescents who wore spectacles had lower self-esteem scores and higher social anxiety scores. Besides, there was no relationship between self-esteem and the degree of myopia, while social anxiety score was found to be higher as the degree of myopia increased.

The strengths of this study are that the psychopathology of all participants was comprehensively evaluated with the detailed psychiatric interview by a trained and certified child and adolescent psychiatrist, all ocular and visual disorders were examined in detail, and the sample was chosen from those without psychiatric disorders to be more representative of the general population.

Limitations of the Study

However, this study has some limitations. Since the data were collected through self-report questionnaires as subjective assessments it may have caused response bias. Our study sample size was relatively small, based on a population derived from a single hospital. These weaknesses intercept the generalization of our results and the determination of precise causality. In addition, the inclusion of adolescents with amblyopia may be another limitation. However, none of the adolescents with amblyopia were being treated with patching. With these limitations in mind, the results of this study should be interpreted with caution and validated by further studies.

CONCLUSION

In adolescence, wearing spectacles seems to be related to self-esteem and social anxiety. Adolescents who wore spectacles had lower self-esteem and higher social anxiety level than those who did not. Self-esteem is paramount in terms of adapting to wearing spectacles. In case adolescents who wear spectacles think negatively about themselves and their appearance, they will poorly adapt to wearing spectacles, which will affect both their social life and school success together with low visual acuity. Also, social anxiety may lead to withdrawal from social situations. Thereby, an appropriate approach would be to perform a thorough psychological evaluation of adolescents who wear spectacles, transform negative perceptions about spectacles into positive ones with the help of role models, and provide the necessary support.

Conflict of Interest

All authors declare that they have no conflict of interest

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Contribution of the authors

DYY: Idea generation, study design, data collection, writing

EB: Draft of the manuscript, correction

AUC: Study design, statistics, review and editing

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