The Relation Between Quality of Life and Visual Functioning in Patients with Glaucoma

Glokomlu Hastalarda Yaşam Kalitesi ve Görme Fonksiyonunun İlişkisi

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ABSTRACT Objective: To assess visual functions and quality of life (QoL) in patients with glaucoma. **Material and Methods:** The sample consisted of 103 patients with primary open angle glaucoma and 50 controls. Each subject underwent bilateral ophthalmologic examination and was then evaluated by a psychiatrist. QoL was assessed using the 36-Item Short-Form Health Survey (SF-36). **Results:** SF-36 physical functioning, role limitation due to physical health (role-physical), bodily pain, general health, social functioning and mental health domain scores were significantly lower in the patient group than in the control group. SF-36 physical functioning, role-physical and limitation due to emotional health (role-emotional), social functioning domain scores were positively correlated with right and left eye visual acuity while bodily pain was correlated with left eye visual acuity and vitality and general health perception domain scores with right eye visual acuity ($p<0.05$). A statistically significant difference between the left eye perimetric stage and SF-6 and SF-7 was found when the patients' left perimetric stage and SF-36 sub-scales were compared ($p<0.05$). **Conclusion:** Our study shows that QoL should also be taken into consideration in patients with glaucoma.

Key Words: Glaucoma; quality of life; vision

ÖZET Amaç: Glokom tanısı ile izlenen hastaların görme fonksiyonlarını ve yaşam kalitesini (QoL) değerlendirmek. **Gereç ve Yöntemler:** Çalışmaya göz polikliniğinde primer açık açılı glokom tanısı ile izlenen 103 hasta ve kontrol grubu olarak da sadece gözlük muayenesi için gelen sağlıklı 50 kişi katıldı. Hasta ve kontrol grupları, göz muayenesinden sonra psikiyatri kliniğine gönderildi. Burada psikiyatri uzmanı tarafından değerlendirilen hastalara sosyodemografik veri formu ve kısa form 36 (SF-36) anketi uygulandı. **Bulgular:** SF-36 alt ölçekleri fiziksel fonksiyon, fiziksel rol güçlüğü, bedensel ağrı, sosyal fonksiyon, mental sağlık açısından glokom grubunun puan ortalamaları kontrol grubuna oranla istatistiksel açıdan daha düşük bulundu ($p<0.05$). Hastaların görme keskinlikleri ile SF-36 alt ölçekleri arasındaki ilişkiye baktığımızda fiziksel fonksiyon, fiziksel rol güçlüğü, sosyal fonksiyon, emosyonel rol güçlüğü ile sağ ve sol göz görme keskinlikleri arasında; bedensel ağrı ile sol göz görme keskinliği arasında; genel sağlık, enerji ile sağ göz görme keskinliği arasında pozitif yönde zayıf ama önemli ilişki saptandı ($p<0.05$). Hastaların sol göz perimetrik evreleri ile SF-36 alt ölçekleri karşılaştırıldığında, sol göz perimetrik evre ile SF-6 ve SF-7 arasında istatistiksel açıdan önemli bir farklılık saptandı ($p<0.05$). **Sonuç:** Glokomlu hasta grubunda yaşam kalitesinde düşme olabileceği ve tedavi planlanırken bu konunun da dikkate alınması gerektiği vurgulanmaktadır.

Anahtar Kelimeler: Glokom; yaşam kalitesi; görme

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Glaucoma is a chronic, progressive disorder of the eye that can damage the optic nerve and result in visual loss in many patients despite treatment.[1,2] Glaucoma is reported to affect many patients negatively in terms of quality-of-life (QoL)[3] leading to psychological and emotional problems in addition to visual loss and blindness.[2,4,5]

Studies show that glaucoma takes the second place among the causes of blindness in the USA and that there are 2.47 million patients with this disorder in the year 2000.[6,7]

Studies carried out in countries such as Sweden, England, Norway, Japan, Italy and Brazil have indicated that QoL is reduced more in patients with glaucoma than in those who do not have the disorder.[5,8-13] In the recent years, although QoL studies have evaluated chronic and ocular diseases in our country, there is no study concerning QoL in glaucoma patients.[14-17]

Glaucoma is a major public health problem and our study aimed to evaluate the QoL in glaucoma patients in our country.

MATERIAL AND METHODS

SAMPLING

The study group comprised of 103 patients followed-up for glaucoma in the Eye Outpatient Clinic of Gaziosmanpasa University Faculty of Medicine, Research and Practice Hospital, who accepted participation in the study and 50 control subjects visiting the hospital for refractive error only and suitable for the study in terms of age, sex, education, marital status and socio-economic conditions. All patients and control group subjects accepted to participate in the study and gave written informed consents after they were informed about the aim and details of the cross-sectional study and the questionnaire. The study conformed to the principles of Declaration of Helsinki.

Exclusion criteria were physical disorders that might affect the psychiatric assessment, cognitive impairment, patients being treated for a psychiatric disorder, glaucoma type other than primary open angle glaucoma (secondary, angle-closure, normotensive) and other eye disorders (advanced cataract, retinal detachment, age related macula degeneration, corneal problems. etc.). Other exclusion criteria were hypertension, diabetes mellitus, asthma and common chronic disorders like rheumatoid and renal disorders. Before the study, the patients and control group subjects were checked fully by the ophthalmologist [visual acuity with the Snellen Chart, refraction, biomicroscopic examination, gonioscopy, measurement of the intra-ocular pressure (IOP) by Goldman applanation tonometry, fundoscopy, and visual field testing with full-threshold or Swedish Interactive Threshold Algorithm (SITA) strategy, program 24-2, on the Humphrey Field Analyzer]. Perimetric field findings were evaluated using the "Hodapp- Parrish-Anderson Criteria".[18] The perimetric findings were classified as stage 1 for early, stage 2 for moderate and stage 3 for advanced perimetric field damage. The diagnosis of primary open angle glaucoma was made when there was an increase in glaucomatous cup/disc ratio at least in one eye together with visual field loss and intraocular pressure over 22 mmHg in the same eye. None of the eyes had a narrow angle on goniosocopy.

Following the ophthalmologist's examination, all cases were evaluated by a psychiatrist and the measurement tests below were administered.

SOCIO-DEMOGRAPHIC DATA FORM

The investigators used this form to collect socio-demographic data within the framework of the study.

SF-36

This was developed and presented to use by Rand Corporation in order to evaluate QoL.[19] The SF-36 categorizes QoL in eight domains:

1. Physical functioning,
2. Social functioning,
3. Role limitation due to physical health (role-physical),
4. Role limitation due to emotional health (role-emotional),
5. Mental health,
6. Energy/vitality,
7. General perception of pain (bodily pain) and
8. General perception of health (general health).

The evaluation is generally Likert type except for a few items and the last four weeks are taken into consideration. For every given state, the related item points are coded according to the answers. For each domain, a score is given according to the patient response and QoL is measured in a scale ranging from 0 to 100 with the highest level

being representative of the most favorable functioning and well-being with no subjective impairment.

STATISTICAL ANALYSES

The "t-test for independent samples" was applied for continuous data when the results were normally distributed and the "Mann Whitney U test" was used otherwise. The chi-square test was used for the discontinuous data. When the number of categories was three or more "one way analysis of variance" was applied. The "Pearson's correlation coefficient" was used for all continuous variables to find the relation between the continuous variables (all variables showed linear association).

RESULTS

There was no significant difference between the groups in terms of age, sex, marital status, socioeconomic or educational levels ($p > 0.05$). The sociodemographic and ophthalmologic data of the groups were listed in Table 1, 2.

TABLE 1: Sociodemographic data.

	Patients with glaucoma (n=103)	Control (n= 50)	t	χ^2	p
Mean age (years) ± SD	52.17 ± 10.55	52.90 ± 7.93	0.430		0.668
Sex, n (%)					
Female	68 (66%)	33 (66%)		0.0001	0.998
Male	35 (34%)	17 (34%)			
Marital status, n (%)					
Married	86 (83.5%)	44 (88%)		0.541	0.763
Single	6 (5.8%)	2 (4%)			
Divorced	11 (10.7%)	4 (8%)			
Socioeconomic level, n (%)					
Low	24 (23.3%)	11 (22%)		0.285	0.867
Moderate	62 (60.2%)	29 (58%)			
High	17 (16.5%)	10 (20%)			
Education, n (%)					
Primary school	70 (%68%)	35 (70%)		0.065	0.968
High school	22 (21.4%)	10 (20%)			
University	11 (10.7%)	5 (10%)			

TABLE 2: Opthalmologic data.

	Glaucoma (n= 103), Median , IQR	Control (n= 50), Median , IQR	z	p
Right eye visual acuity	0.90 [0.50]	1.00 [0.10]	-4.292	0.0001
Left eye visual acuity	0.80 [0.50]	1.00 [0.10]	-4.195	0.0001
Right eye intraocular pressure	16.00 [4.0]	14 [3.0]	-5.656	0.0001
Left eye intraocular pressure	16.00 [2.0]	14 [2.0]	-5.728	0.0001
Right eye cup/disc ratio	0.4 [0.20]	0.30 [0.0]	-6.320	0.0001
Left eye cup/disc ratio	0.4 [0.20]	0.30 [0.125]	-6.174	0.0001
Right eye perimetric stage, n (%) (n=87)		-		
Stage 1	40 (45.9%)			
Stage 2	27 (31.0%)			
Stage 3	20 (23%)			
Left eye perimetric stage, n (%) (n=93)		-		
Stage 1	45 (48.4%)			
Stage 2	29 (31.2%)			
Stage 3	19 (20.4%)			

Table 3 presents QoL domain scores of the groups. Although the average scores of the glaucoma group for physical functioning, role-physical, bodily pain, general health, social functioning, and mental health were statistically lower than that of the control group, there was no significant difference in terms of energy and role-emotional between the groups.

The mean duration of glaucoma was 3.35±0.20 years. Although a significant negative correlation was found between duration of glaucoma and SF-4 (r=-0.232, p=0.019), there was no significant correlation between the duration of glaucoma and the other sub-scales of the SF-36.

Of the glaucoma patients, 16 (15.53%) had undergone an ophthalmic operation previously while 87 (84.46 %) had not. When those with and without a history of surgery were compared, no significant difference was found with regard to SF-36 subscales (p>0.05).

The analyses for a correlation between the visual acuity of the patients and SF-36 sub-scales revealed a significant positive correlation between SF-1, SF-2, SF-6, SF-7 and the visual acuity of the left and right eye; SF-3 and the visual acuity of the left eye; and SF-4, SF-5 and the visual acuity of the right eye (Table 4). There was no significant correlation between the SF-36 sub-scales, the IOP values of the eyes and cup/disc ratios (p>0.05). There was no significant correlation between the ophthalmologic examination findings of the control group (visual acuity and IOP of the right and left eye, cup/disc ratios) and SF-36 sub-scale parameters.

The comparison of the perimetric stage of the right eye with the SF-36 sub-scales revealed no significant correlation (p>0.05). A significant difference between the left eye perimetric stage and SF-6 and SF-7 was found (F=3.862 p=0.025, F=5.947 p=0.004, respectively). The difference stemmed from the fact that the average SF-6 and SF-7 scores in stage 3 were lower. When the groups were compared two by two using the Tukey HSD test for SF-6, the values found were as follows: p=0.870 for stage 1-2, p= 0.048 for stage 1-3 , p= 0.027 for stage 2-3. When the groups were compared two by two using the Tukey HSD test for SF-7, the values found were as follows: p=0.114 for stage 1-2, p= 0.133 for stage 1-3 , p= 0.003 for the 2-3 .

DISCUSSION

Our study is important, as it is the first in our country that examines the QoL in glaucoma patients. Studies on the QoL in glaucoma patients are available in many industrial countries and in developing countries.[5,20-22] In our study, we examined the quality of life in patients using the SF-36 and found that the values of physical functioning, role-physical, bodily pain, general health, social functioning, mental health scores were significantly lower than those of the control group. There was no significant difference between the two groups in terms of energy and role-emotional. Our comparison of the glaucomatous patients and healthy control group subjects in terms of the QoL was presented in Table 3, and the results of other studies[5,8,20-22] in Table 5. Our study showed that glaucoma patients had a different QoL percep-

TABLE 3: F-36 scores for glaucoma patients and controls.

SF-36	Glaucoma (n= 103), mean ± SD	Control (n= 50) mean ± SD	t	z	p
Physical functioning	54.0 ± 22.29	72.8 ± 23.10	4.853		**0.0001**
Role-physical	25.0 [75.0]*	75.0 [50.0]*		-4.541	**0.0001**
Bodily pain	41.0 [28.0]*	74.0 [32.25]*		-6.014	**0.0001**
General health	51.5 ± 19.7	62.7 ± 18.1	3.378		**0.0010**
Vitality	65.0 [35.0]*	75.0 [31.25]*		-0.789	0.430
Social functioning	59.3 ± 24.4	75.2 ± 22.3	3.873		**0.0001**
Role-emotional	63.9 ± 33.8	72.6 ± 30.6	1.539		0.126
Mental health	75.0 [32.0]*	76.0 [20.0]*		-2.676	**0.0070**

*Median, IQR.

TABLE 4: The relation between subscale values of SF-36 and visual acuity.

SF-36	r	p
SF-1 and right eye visual acuity	0.321	**0.0010**
SF-1 and left eye visual acuity	0.391	**0.0001**
SF-2 and right eye visual acuity	0.196	**0.0470**
SF-2 and left eye visual acuity	0.229	**0.0200**
SF-3 and right eye visual acuity	0.179	0.0700
SF-3 and left eye visual acuity	0.221	**0.0250**
SF-4 and right eye visual acuity	0.268	**0.0060**
SF-4 and left eye visual acuity	0.169	0.0870
SF-5 and right eye visual acuity	0.206	**0.0370**
SF-5 and left eye visual acuity	0.109	0.2730
SF-6 and right eye visual acuity	0.402	**0.0001**
SF-6 and left eye visual acuity	0.354	**0.0001**
SF-7 and right eye visual acuity	0.364	**0.0001**
SF-7 and left eye visual acuity	0.439	**0.0001**
SF-8 and right eye visual acuity	-0.82	0.4130
SF-8 and left eye visual acuity	-0.102	0.3040

tion than a normal non-glaucomatous population and this concurs with the results reported in the literature.[5,8,20-22]

The analysis for a correlation between the ophthalmologic examination findings (visual acuity, IOP, cup/disc ratio, perimetric stage) and QoL revealed no significant correlation between the IOP, cup/disc ratios and SF-36 sub-scales. However, a significantly positive correlation, except for the domains of mental health, was found between visual acuity and SF-36 sub-scales (a significantly positive correlation between SF-1, SF-2, SF-6, SF-7 and the visual acuity of the left and right eye; between SF-3 and the visual acuity of the left eye; SF-4, SF-5 and the visual acuity of the right eye). As obvious, as the visual acuity decreased, the average scores related to the quality of life (SF-1, SF-2, SF-3, SF-4, SF-6, SF-7) were also decreased. Similar to our study, studies carried out by Wändel et al. in which the Swedish Health Related Quality of Life Survey (SWED-QUAL) was used in glaucomatous patients and by Bechetoille et al. in which the glaucoma-specific health-related quality of life (The Glau-QoL©) was measured, have shown that the scores related to the quality of life decrease in correlation with visual acuity.[8,23]

The comparison of the left eye perimetric stage with SF-36 sub-scales revealed a significant correlation between the left eye perimetric stage and SF-6 and SF-7. This difference stems from the fact that the average SF-6 and SF-7 scores are lower in stage 3. Some studies evaluating the relation between perimetric stage and QoL in glaucomatous patients have found no correlation.[20,21] Similar to our study, a study by Mills et al.[24] using the visual activities questionnaire (VAQ) showed a significant correlation between VAQ scores and perimetric stage while Gutierres et al.[25] showed that VF-14 scores reduced as the perimetric stage increased.

The remarkable finding in the present study that the sub-scale scores of the quality of life decreased as visual acuity decreased and perimetric

TABLE 5: Comparison of quality of life measures listed by author.

	Cypel et al (2004) (SF-36) mean ± SD	Wilson et al (1998) (SF-36) mean ± SE	Parrish II et al (1997) (SF-36) mean ± SD	Sherwood et al (1998) (MOS-20)	Wändel et al (1997) (Swed-Qual)
Physical functioning	50.8 ± 22.8	68.1 ± 9.2	70.6 ± 28.6	64.6	75
Role-physical	45.8 ± 43.2	63.1 ± 10.5	66.4 ± 40.3	41.1	49.5
Bodily pain	7.0 ± 2.8	66.9 ± 4.3	72.7 ± 25.4	48.2	71.2
General health	63.0 ± 20.1	*	69.7 ± 21.4	43.8	72.8
Vitality	70.5 ± 24.2	*	57.8 ± 18.4	[a]	[a]
Social functioning	54.0 ± 34.5	79.3 ± 3.0	80.9 ± 23.4	81.1	75.7[b]
Role-emotional	77.4 ± 41.2	76.5 ± 3.8	69.8 ± 39.9	a	57.3
Mental health	63.4 ± 22.5	75.6 ± 1.4	72.9 ± 19.7	72.9	63.6

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*Data not presented in the original article (in this study SD and SE have not been reported),

[a]Item not used in the survey,

[b]Mean of satisfaction with family (86.8), marital functioning (79.7) and sexual functioning (60.8).

stage increased (together with an increase in eye damage), indicates that the QoL decreases as visual loss increases. The quality of life is negatively affected by glaucoma, in addition to other psychological and emotional problems.[5,23,24,26]

The study by Cypel et al. in Brazil using SF-36 showed that the average scores of five items out of eight (physical functioning, role-physical, bodily pain, social functioning and mental health) were significantly lower in the glaucoma group than in the non-glaucomatous control group.[5] In our study, the average scores of physical functioning, role-physical, bodily pain and social functioning were lower than the control group. In contrast to the study of Cypel et al., the scores of general health were significantly lower than the control group. We found no significant difference between the two groups in terms of average scores of difficulty in role-emotional and vitality, and this result was similar to that of Cypel and his colleagues.

Cypel et al. commented that the lack of a difference between the two groups in terms of difficulty in role-emotional was surprising as they predicted that the affected vision in the patient group could influence their emotional life.[5] However, they did not analyze the relation between the visual functions of the patient and their QoL while making this prediction. In our study, as in the study of Cypel et al, the mean score for difficulty in role-emotional was lower than in the control group but this difference was not significant.[5] In contrast to the same study, we found a significant positive correlation between SF-7 (difficulty in role-emotional) and visual acuity. Though there was no significant difference between the two groups in terms of the difficulty in role-emotional, the average score became lower as the visual functions decreased, indicating that patients with visual loss have difficulty in role-emotional.

Althouh several studies reported a negative correlation between the QoL and duration of glaucoma, others found that quality of life showed little change in early glaucomatous patients where the duration of disease was less than six years and when the disorder was only at its early stage.[27,28] In our study, existed a negative correlation between SF-4 (general health) and average glaucoma duration, despite the duration was lower than six years. The difference was only apparent in SF-4 and it was not present in other parameters of the QoL. This is in contrast to the results of previous studies and indicates that QoL may be affected in glaucoma patients even if the duration is less than six years.

In our study, the average scores of glaucomatous patients for bodily pain were significantly lower than in the control group (the mean bodily pain score of the glaucomatous patients was 45.4). In studies evaluating QoL using SF-36, Cypel et al. found a bodily pain value of 7.0 while it was 66.9 in the study by Wilson et al.[5,20] Comparison with the control group showed the first set of values to be significantly lower. In the study where Parrish et al. assessed the relation between visual functions and the QoL using SF-36, they found a bodily pain value of 72.7.[21] There was no comparison in the study of Parrish et al. as there was no control group.[21] Glaucoma patients suffer no pain except in acute angle closure, neovascular glaucoma, a secondary glaucoma like uveitis or high pressure glaucomatous situations. However, the average score of bodily pain is low in some studies including ours.[5,20,22] This indicates that social values and cultural differences determine how much people complain of pain. It may be imagined that the patients complain of pain more or state more pain because pain is accepted socially and makes the individual free of some responsibilities or because the patients want to increase the doctors' sympathy.[5] Besides, it must be kept in mind that some eye drops used to treat glaucoma can cause pain.[5]

CONCLUSION

Consequently, our study is important as it shows that the quality of life in glaucomatous patients is significantly lower than in the control group. It must be kept in mind that the QoL will decrease in parallel to the progression of the disorder during the follow-up and treatment periods.

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