Vision Related Quality of Life in Patients with Diabetic Retinopathy

Diyabetik Retinopatili Hastalarda Görmeye Dayalı Yaşam Kalitesi*

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ABSTRACT

Purpose: To assess vision related quality of life (VRQoL) in patients with diabetic retinopathy (DR).

Materials and Methods: Ninety-three patients with DR were included in the study. Turkish version of VFQ (Visual function questionnaire) -25 was used for measuring VRQoL. The effects of age, gender, education, duration of diabetes mellitus (DM), macular edema (ME), HbA1c, comorbidity, medication, visual acuity (VA) and severity of DR on VRQoL were searched.

Results: Composite VFQ-25 score was significantly higher in patients who had better education, had a shorter duration of DM and had better VA. Gender, education and comorbidities were significantly associated with some of the subscales. After adjusted for the effect of age, gender, education, severity of DM, comorbidities, VA, HbA1c, laser photocoagulation, ME and medications; VA and HbA1c were significantly associated with composite score.

Conclusions: High HbA1c and poor VA is significantly associated with poor VRQoL. From the patients' perspective, DR also has an effect on general health, mental health and role difficulties.

Key Words: Diabetes mellitus, diabetic retinopathy, quality of life, VFQ-25, visual acuity.

ÖZ

Amaç: Diyabetik retinopatili hastalarda görmeye dayalı yaşam kalitesinin değerlendirilmesi.

Gereç ve Yöntem: Çalışmaya diyabetik retinopati saptanan 93 hasta dahil edildi. Görmeye dayalı yaşam kalitesinin ölçümünde VFQ-25 (Visual function questionnaire) ölçeğinin Türkçe versiyonu kullanıldı. Yaş, cinsiyet, eğitim, diyabetes mellitus süresi, makula ödemi, HbA1c, eşlik eden hastalık, ilaç kullanımı, görme keskinliği ve diyabetik retinopati şiddetinin görmeye dayalı yaşam kalitesi üzerine etkisi araştırıldı.

Bulgular: Eğitim düzeyi ve görme keskinliği yüksek, diyabet süresi kısa olan kişilerde kompozit VFQ-25 skorunun anlamlı şekilde yüksek olduğu saptandı. Cinsiyet, eğitim ve eşlik eden hastalıkların bazı subgruplarla anlamlı şekilde ilişkili olduğu izlendi. Yaş, cinsiyet, eğitim, diyabetik retinopatinin şiddeti, eşlik eden hastalıklar, görme keskinliği, HbA1c, lazer fotokoagulasyon, makula ödemi ve ilaç kullanımı etkisi düzeltildikten sonra, görme keskinliği ve HbA1c ile kompozit skor arasında anlamlı bir ilişki saptandı.

Sonuç: Yüksek HbA1c ve düşük görme keskinliği, görmeye dayalı yaşam kalitesinde azalma ile ilişkili bulundu. Hastaların perspektifinden bakıldığında, diyabetik retinopatinin genel sağlık, mental sağlık ve rol zorlukları üzerine de etkileri olduğu izlendi.

Anahtar Kelimeler: Diyabetes mellitus, diyabetik retinopati, görme keskinliği, yaşam kalitesi, VFQ-25.

**** Bu çalışma TOD 44. Ulusal Oftalmoloji Kongresi'nde sunulmuştur.***

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Geliş Tarihi - Received: 04.04.2012
Kabul Tarihi - Accepted: 27.07.2012
Ret-Vit 2012;20:213-217

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INTRODUCTION

Diabetic retinopathy (DR) is a leading cause of blindness and visual loss among adults younger than 60 years of age.[1] It brings some limitations which are visual impairment and functional loss individually and economic loss due to treatment costs and reduced work productivity socially.[1]

The number of diabetic people is increasing and it has been predicted that the total number of people around the world with diabetes mellitus (DM) will be 366 million by the year 2030.[2]

In ophthalmology, traditional clinical parameters used to diagnose and follow-up the patients with DR include visual acuity (VA), fluorescein angiography and optical coherence tomography findings. However, these objective tests do not cover every aspect of visual function so there is a dramatic increase in use of health related quality of life (QoL) measures, which reflects an emerging shift in health care towards valuing the patients' perspective.[1,3,4]

Disparity for estimates of QoL between patients and physicians has been reported previously and it was thought to be related to poor physician-patient communication.[5]

Clinicians often focus on loss of VA and underestimate the psychologic, emotive changes and difficulties in undertaking vision-specific daily activities that can occur with even mild visual disturbances.[1]

The QoL studies not only contribute to understanding the patients' perspective of the disease but also may play a potential role in the decision to offer treatment in the future by targeting the most affected function.[1]

National Eye Institute-Visual Function Questionnaire (NEI-VFQ)-25 is an instrument that is designed to measure vision-dependent function and the QoL impact of different ocular conditions.[6] It was previously tested for reliability and validity in participants with many ocular diseases including DR.[6]

The purpose of this study was to assess the vision related QoL and associated factors in a Turkish DR population.

MATERIAL AND METHODS

Study Population: The study enrolled 93 consecutive patients with DR who were evaluated at the Department of Ophthalmology, University of Pamukkale between January-September 2010.

Patients with ocular pathologies other than DR that might cause visual impairment (such as age-related macular degeneration, 3+cataract[7]) were excluded from the study.

Sociodemographic data including age, gender and educational status and of each patient were recorded before the ophthalmologic evaluation including measurement of best corrected VA, intraocular pressure, slit-lamp biomicroscopy and fundus examination.

The stage of DR was recorded as background, nonproliferative (NPDR) and proliferative diabetic retinopathy (PDR). Glycosylated hemoglobin (HbA1c) values available in the medical files were also recorded. All of the patients were examined by the same physician.

National Eye Institute Visual Function Questionnaire (NEI VFQ-25): The Turkish version of the National Eye Institute Visual Function Questionnaire-25 (NEI VFQ-25) was used to measure vision related QoL.[3] The 25-item version of the NEI VFQ is a short form of a 51-item survey designed to assess the influence of visual impairment on health-related QoL. The VFQ-25 is composed of 25 vision targeted questions under 11 vision-related subscales, plus an additional single-item general health question.

The VFQ-25 also includes an appendix of additional items from the 51-item version to expand the scales up to 39 total items. The vision-specific subscales are as follows: 1) general vision, 2) near vision, 3) distance vision, 4) ocular pain, 5) social functioning, 6) mental health, 7) role difficulties, 8) dependency, 9) driving, 10) color vision, and 11) peripheral vision. All items are scored from 0 to 100, where a high score represents better functioning.

Each item is then converted to a 0 to 100 scale so that the lowest and highest possible scores are set at 0 and 100 points, respectively. The scores of items within each sub-scale are averaged together to create the 12 sub-scale scores. The composite score is calculated by averaging the vision-targeted subscale scores, excluding the general health rating question.

The scoring algorithm can be obtained from the RAND Health Web site (http://www.rand.org/content/dam/rand/www/external/health/surveys_tools/vfq/vfq25_manual.pdf). In the study, 39 items were asked to the patients and the questionnaire was read to the patients by an investigator masked to the results of ophthalmic examinations.

Oral consent was obtained from each participant before administrating the questionnaire. The study was carried out with the approval of the ethics committee of Pamukkale University.

Statistics: Data were analysed in SPSS 11.0 (SPSS Inc, Chicago, IL,USA). T test, the Spearman correlation and multiple linear regression analyses were used for statistical analysis. A significance level of 0.05 was used throughout all statistical analyses.

Table 1: *The sociodemographic data regarding age, gender and education.*

Age (years), mean(SD)	57.9±0.3
Gender, n(%)	
Female	47 (50.5)
Male	46 (49.5)
Education, n(%)	
Not-literate	8 (8.6)
Literate	7 (7.5)
Elementary	43 (46.2)
Secondary School	25 (26.9)
High School	10 (10.8)
University	0

RESULTS

Ninety-three patients with a mean age of 57.9±10.3 (29 to76) were enrolled in the study. 50.5% were female and 49.5% were male. Eighty-nine percent had less than a high school education. Table 1 summarizes the sociodemographic data consisting age, gender and education.

The mean duration of DM was 13.3±4.9 years. Data on HbA1c levels at the time of NEI-VFQ-25 were available for 37 of 93 subjects. The mean HbA1c was 8.1±2 (range 5.4 to 14.4). Of 93 patients, 64.5% had comorbidities including hypertension, coronary artery disease, chronic renal failure cerebrovascular disease, 68.8% used insulin and 75.3% had PDR. Forty-three percent (40) of the patients had diabetic macular edema (DME), 22.6% (21) previously had focal laser photocoagulation for DME and 30.1% (28) had a previous cataract extraction.

The mean VA was 0.2 in the better eye and 0.4 in the worse eye (Log MAR) (Table 2). The mean composite score of the patients was 65.9±20.1. The highest score was in the color vision subscale (79.9±25) and the lowest scores were in the general health (49.7±14) and general vision (51.5±15) subscales.

In patients with better VA, VFQ-25 scores were significantly higher ($p<0.01$). In patients with better VA, composite VFQ-25 scores were significantly higher ($p<0.001$, $r=-595$ for worst eye, $p<0.001$, $r=-609$ for better eye, VA in Log Mar, Pearson's correlation). Males had significantly higher scores in general health and dependency subscales than females. Education was significantly associated with the following subscales: General health, general vision, social functioning, mental health, role difficulties, near and distance activities ($p<0.05$).

Table 2: *Data regarding visual acuity in the better eye, worse eye, medications, comorbidities and severity of diabetic retinopathy.*

Visual Acuity (log MAR), mean (SD)	
Better eye	0.2
Worse eye	0.4
Medications, n(%)	
Oral antidiabetics	29 (31.2)
Insulin	64 (68.8)
Stage of DR*, %(n)	
Background	8 (8.6)
Non-proliferative	15 (16.1)
Proliferative	70 (75.3)
Comorbidities, %(n)	
Hypertension	49 (52.6)
Coronary artery disease	23 (24.7)
Chronic renal failure	21 (22.5)
Cerebrovascular disease	5 (5.3)

**Diabetic retinopathy*

The duration of DM was significantly associated with composite score ($p=0.10$, $r=-265$), general vision, mental health, role difficulties, dependency, color vision, near and distance activities. Comorbidities had significant associations with all subscales except ocular pain and driving. The composite scores were 68.8±17.6 and 64.9±20.9 in non-PDR and PDR groups respectively. The difference in VFQ scores between PDR and non-PDR groups was insignificant ($p=0.42$). HbA1c levels, prior focal laser photocoagulation, medication type (insulin vs. oral antidiabetic), existence of DME and severity of DR were not significantly associated with any of the subscales. Age was significantly associated with only ocular pain subscale.

After adjusted for the effect of age, gender, education, severity of DM, comorbidities, VA in the better and worse eye, HbA1c, focal laser photocoagulation, DME and medications, VA in the better eye, worse eye and HbA1c were strongly associated with composite score.

DISCUSSION

There are many different tools that can be used to measure health-related QoL in patients with DR.[1,4] VFQ-25 is previously reported to be a good measure of vision-related QoL for patients with DR as it captures mental and emotional aspects of the disease as well as visual function.[8,9]

Table 2: *NEI-VFQ-25 scores in different diabetic retinopathy populations.*

NEI-VFQ25 subscales	Current study n=93	Mangione et al. n=123	Klein et al. n=602	Matza et al. n=671	Cusick et al. n=170	Warrian et al. n=91	Hariprasad et al. n=33	Okamoto et al. n=99
General health	49.7±14	46±25	60.5±23.8		50±2.0		42±4.4	39.1±19.6
General vision	51.5±15	62±21	79.7±16.1	69.5±17.4	72±1.3	61.7±18.77	64±2.8	44.2±21.2
Ocular pain	72.3±19	88±17	92.6±13.0	89.1±15.2	93±1.1	78.3±20.82	74±4.2	75.1±22.3
Near activities	60.6±24	63±30	87.6±17.3	75.8±21.7	78±1.9	61.5±23.23	60±4.0	44.2±22.6
Distance activities	65.7±23	66±30	86.6±17.7	82.9±17.9	77±1.9	67.5±22.8	67±4.9	48.1±22.8
Vision specific								
Social functioning	76.8±23	81±26	94.7±12.4	93.9±12.9	93±1.3	81.2±22.3	74±4.9	59.5±24.2
Mental Health	56.9±25	66±29	84.6±18.2	77.2±21.3	77±1.9	64.1±27.0	56±4.4	43.6±23.8
Role difficulties	57.7±25	69±31	91.8±18.1	81.4±3.1	81±1.9	59.2±32.0	61±4.4	52.9±26.0
Dependency	67.5±27	77±30	93.3±16.5	91.3±17.4	87±1.8	78.0±27.1	67±5.9	53.3±29.7
Driving	62.2±26	55±40	85.1±22.9	81.1±20.7	79±2.0	68.9±27.1	39±6.6	41.7±34.2
Color vision	79.9±25	90±22	94.8±14.9	94.6±14.7	90±1.6	82.7±22.6	77±4.5	69.5±25.2
Peripheral vision	70.1±24	78±29	89.3±20.9	88.4±19.4	82±2.0	69.2±26.9	76±4.5	46.6±23.3
Composite score	65.9±20.1		88.9±13.7	84.1±13.5	82±1.3	70.0±18.78		52.8±19.0

Therefore, we preferred VFQ-25 for assessing the vision-related QoL in patients with DR. VFQ-25 has been used in many different populations to measure the QoL in patients with different diseases. [10-12] The scores showed differences according to the disease as well as the sociodemographic features of the study sample.[6,13]

Globe et al.,[13] reported significantly different results in different ethnic groups in the same population. Therefore it is important to assess the impact of a certain disease on the patients' QoL in different cultures.[14] We evaluated vision-related QoL in a Turkish diabetic population by using the Turkish version of VFQ-25 which was previously reported to be valid and reliable.[3] Our study provides information about the effect of age, gender, education, visual acuity and the severity of DR on vision-related QoL in diabetic patients. In our study, general health and general vision were affected the most and color vision was affected the least. Composite VFQ-25 score was significantly higher in patients who had better education, had a shorter duration of DM and had better VA. Gender, education and comorbidities were significantly associated with some of the subscales. HbA1c levels, prior focal laser photocoagulation, medication type (insulin vs. oral antidiabetic), DME and severity of DR were not significantly associated with any of the subscales. After adjusted for the effect of age, gender, education, severity of DM, comorbidities, VA in the better and worse eye, HbA1c, focal laser photocoagulation, DME and medications, VA in the better eye, worse eye and HbA1c were independently associated with composite score. In our study, males had significantly higher scores in general health and dependency subscales than females, age was significantly associated with only ocular pain subscale and comorbidities had significant associations with all subscales except ocular pain and driving.

Previously, it was reported that age and gender were not significantly associated with the VFQ-25 scales and having co-morbidities was inversely associated with the VA and the health related QoL.[15,16] We showed that VA and VFQ scores were significantly associated in DR patients. As VA increased, VFQ scores also increased. The effect of DR on vision-related QoL was previously investigated (Table 3).

VFQ-25 has been administered to 602 patients with DR in the Wisconsin Epidemiologic Study of DR and strong associations were reported between VA and VFQ scores associated with central vision.[9] However, VA alone does not reflect the extent to which vision-related function is impaired due to DR.[21] It is reported that VFQ-25 was a superior measure of vision-related QoL than VA in patients with DR.[8] This is mainly because the patients with DR may suffer from a wide range of conditions other than VA changes including decreased contrast sensitivity, loss of central or peripheral vision.

It has been documented that low scores on the NEI VFQ-25 may reflect poor central visual fields and contrast sensitivity in addition to poor visual acuity.[17] In our study, 43% of the patients had DME and their scores were not significantly different from DR patients. Additionally, prior laser photocoagulation for DME did not have a significant effect on vision-related QoL. Okamoto et al. also reported similar composite VFQ scores in DME and DR patients.[20] However, in another study, the authors showed worse VFQ scores in DME patients compared to DR patients. [19] Tranos et al. reported beneficial effect of laser photocoagulation on vision-related QoL in patients with DME.[22] In our study, the time between the laser treatment and the questionnaire administration differed from patient to patient so it is hard to assess the effect of laser treatment on vision-related QoL. Despite the differences among studies in the measures and instruments used to assess QoL in diabetic patients, there is a consensus on that the patients with poor VA have worse vision-related QoL.[4,15,23,24] Gabrielian et al.,[8] reported that as retinopathy progresses from NPDR to PDR, the biggest decrease was in mental health subscale which captures the worry, frustration, lack of control over activities, and the fear of potential embarrassment associated with vision. In another study, the patients with relatively mild vision loss had lower scores than the patients with poorer VA and this was explained by the loss of independence by the decrease in vision.[25] Matza et al., showed that a loss of at least 10 letters was associated with substantial declines in driving, dependency, role limitations, and mental health.[15] Although strongly associated with VA, VFQ seems superior to VA in its assessment of the degree of anxiety, fear, and dependency associated with DR. Additionally, it is showed that health related QoL can be affected even before vision is affected due to anxiety about the future and emotional reaction to diagnosis and treatment.[1] In our study, although the scores were lower in NPDR than PDR group, the difference was not significant. The scores in mental health and role difficulties subscales were lower than the composite scores. Dependency score was lower in PDR than NPDR but the difference was not significant. We thought that this might be due to the large number of PDR patients (75.3%) in our sample, so the comparison between the groups might not entirely reflect the effect of severity of DR on vision-related QoL. Briefly, this study provides information about the vision-related QoL in a Turkish diabetic population. Poor VA is significantly associated with poor vision-related QoL and the scores of general health, general vision, mental health and role difficulties subscales are low in general. Remembering the impact of DR on emotional well-being and the importance of preserving VA for better vision-related QoL seems crucial for diabetic patient care.

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