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Quality of Life in Patients with Diabetic Retinopathy

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Abstract

Introduction: Diabetic retinopathy is a major cause of blindness and a fundamental cause of disability in diabetic patients in the world. Investigation about the quality of life in these patients can help plan for taking nursing measures to prevent or control the disease and improve patients' quality of life.

Objective: This study aimed to determine the quality of life in patients with diabetic retinopathy.

Materials and Methods: In this cross-sectional descriptive analytical study (2014), 316 patients with diabetic retinopathy who attended the laser unit in Amir-al-Momenin Medical Educational Hospital, Rasht, for treatment and had a follow-up record were selected by convenience sampling. The data were obtained by the Retinopathy-Dependent Quality of Life (RetDQoL) questionnaire, a socio demographic questionnaire and the Charlson Comorbidity Index (CCI). The final score for quality of life ranges-9 to 3. The closer to -9 is the final score; the better is the quality of life. Independent t-test, analysis of variance (ANOVA) and Pearson's correlation were used to analyze the data.

Results: The results showed that the mean score of quality of life in subjects was -1.73, indication glow quality of life. In addition, statistical tests indicated a significant relationship between quality of life in patients with diabetic retinopathy and income, employment and education ($p<0.0001$), marital status and smoking ($p<0.001$), place of residence and being a member of Diabetes Association ($p<0.044$), duration of diabetes ($p<0.015$), history of ocular surgery ($p<0.011$), type of retinopathy (unilateral and bilateral), neuropathy ($p<0.0001$), diabetic foot ulcers ($p<0.002$), history of other ocular diseases ($p<0.031$) and Charlson co-morbidity ($p<0.001$).

Conclusion: According to the findings, based on which patients had low quality of life, it is recommended that authorities adopt consulting, training and financial programs to control the predictors of quality of life and improve patients' quality of life.

***Keywords*: Quality of Life, Diabetic Retinopathy, Diabetes Mellitus**

Introduction

Diabetes is one of the common metabolic diseases with an increasing prevalence in the world [1]. Diabetes leads to complications such as ischemic heart disease, hypertension, retinopathy, neuropathy, cataract etc [2]. Diabetic retinopathy is considered a highly specific vascular complication for diabetes type 1 and 2 [3] and, according to the American Diabetes Association (ADA), it is the leading cause of blindness in working age (25 to 65 years old), which occurs in one-third of diabetic patients [1]. This complication occurs because of the destruction of small blood vessels feeding the retina and causes problems in receiving and sending images to the brain. The process is painless. The signs of diabetic retinopathy include micro aneurysms, bleeding and exudates [4]. The natural history of diabetic retinopathy usually follows a regular and predictable pattern and long-term high blood glucose levels cause vascular endothelial dysfunction leading to the destruction of endothelial cells and pericytes [5]. The prevalence of retinopathy in different parts of Iran varies from 33% to 51.5% [6]. A study in Rasht showed that 130 from 250 diabetic patients suffered a type of retinopathy [7]. Diabetic retinopathy is divided into two stages of proliferative diabetic retinopathy and non-proliferative diabetic retinopathy. Non-proliferative type is diagnosed by retinal vascular micro aneurysms, spot hemorrhages, cotton-wool spots, and proliferative type occurs with the appearance of retinal neo vascularization in response to hypoxia that cause vision loss by bleeding into the vitreous or detachment of the retina [5].

Proliferative diabetic retinopathy is the major cause of blindness in developed countries, and in many developing countries [8]. Research shows that 60% of patients with type 2 diabetes and 100% of patients with type 1 diabetes develop retinopathy after 20 years, among whom 3.6% of patients with type 1 diabetes and 1.6% of patients with type 2 diabetes become blind [2]. However, studies show that the largest percentage of blindness caused by diabetic retinopathy can be prevented through screening, timely treatment and proper training [9].

Visual impairment due to diabetic retinopathy and the costs associated with its treatment hugely impact patient's quality of life and impose a heavy financial burden on the society [10]. For example, visual impairment, concerns and limitations arising from it can affect different aspects of patients' quality of life and cause psychological and environmental-social problems [11].

In patients with low vision, reduced vision decreases efficiency and quality of life, which together with depression caused by reduced vision and the stress caused by decreased ability to perform everyday tasks reduce their quality of life even more [10].

In recent years, researchers in health sciences have noted the important role of quality of life in the treatment and care of patients with diabetes. Different studies from around the world reveal conflicting results on the quality of life in these patients. Haninen et al. [12] showed that retinopathy has no effect on quality of life. Lioyd et al [13]. Also showed that retinopathy has no significant effect on different aspects of patients' quality of life. However, Wood Cook et al. [14] concluded that visual impairment due to diabetic retinopathy had a significant effect on patients' quality of life. Therefore, the culture of each community impacts improved quality of life and effective care in these patients [9]. As a result, we should have more information about the quality of life in these patients, their characteristics, disease condition and the effect of acute and chronic complications of diabetes, health care system and social environmental characteristics leading to reduced quality of life in these patients.

Many diabetic patients live in Iran, especially in Guilan Province, but few studies have addressed the quality of life in them. Furthermore, the quality of life in patients with retinopathy is different in different societies. Considering all these, it is necessary to determine the quality of life in these patients.

The results of this study could help identify factors associated with quality of life in these patients, control the predictors of patients' quality of life, and improve their quality of life in this province.

Materials and Methods

This descriptive analytical cross-sectional study recruited patients with diabetic retinopathy attending the laser unit in a teaching hospital in Rasht (2014). From a total of 330 patients attending the laser unit for treatment, 316 were selected by convenience sampling. The sample size was calculated 316 patients based on the results of Peimani et al's study [9] with a report of the relatively favorable level of 54.8% in social functioning, employment and quality of life, at a confidence interval of 95% and considering the relative estimation errorless than 10% for quality of life.

Inclusion criteria included patients with diabetes type 1 and 2 whose proliferative and non-proliferative diabetic retinopathy was confirmed by a retina subspecialist.

A three-part questionnaire was used for data collection. The first part comprised two parts of socio demographic factors and disease-related factors. The second part pertained to quality of life in patients with diabetic retinopathy (RetDQoL) [15]. The tool had two parts related to the effects of diabetic eye problems on various aspects of quality of life and items related to the importance of various aspects of quality of life. Given that the tool did not have a Persian version, it was translated and back-translated by two people fluent in English, and given to ten faculty members. After suggestions were collected and revisions were performed, the final tool was modified and finalized. Content validity index (CVI) and content validity ratio (CVR) were used to ensure the validity. For CVI, all questions obtained scores of more than 0.7 for simplicity, clarity and relevance, and for CVR, all items scored higher than 0.8. The reliability was confirmed through Cranach's alpha of 0.9 for internal consistency of items related to the effect of diabetic eye on various aspects of quality of life and 0.7 for items related to the importance of various aspects of quality of life, indicating an acceptable reliability for internal consistency of items. Test-retest was used to determine the reliability of the tool. Hence, 15 subjects completed the questionnaire twice with a week interval (after a phone call for re-attendance) and correlation coefficient index was used between the two stages for the reliability of test-retest ($r = 0.9$).

The tool was composed of two 26- item parts. The first part contained items about the effect of diabetic eye problems on quality of life whose scores were in the range of -3 to 1 and the second part contained items related to the importance of each of these phrases on quality of life whose scores were in the range of 0 to 3. To determine the quality of life, first, for the importance of each phrase, the target item was raised and the score was given and if the item was important for the patient, the item about the effects of diabetic retinopathy on that item was asked and then it was scored. Then the scores of significance and effect of each item were multiplied, and the final score was varied between -9 to 3.The closer to -9 is the final score, the better is the subject's quality of life. In addition, based on this tool only the score of 9 means desirable quality of life and based on a final judgment, the quality of life in patients with diabetic retinopathy in this study was classified into four categories including very low quality of life (score > 0), low quality of life (Score = 0), acceptable quality of life (score

between 0 and -9) and desirable quality of life (score = -9).

The third part of the questionnaire was the Charlson comorbidity Index which was used to determine the effect of comorbidities on quality of life. The index was used to measure the confounding variable of chronic diseases whose score was calculated based on medical diagnoses.

The total score of the tool was derived from the sum of scores related to each disease ranging from 0 to 37in the case of age incompatibility and from 0 to 42 in the case of age compatibility. After data were processed with excel, finally the scores were ranked as follows: without disease (0), mild disease (1-2), moderate disease (3-4) and severe disease (≥5) (16). Higher scores indicate greater effect of comorbidities.

First, the researcher obtained authorization from the Research Council of the University where the data were collected and the Ethics Committee (code #93060405) to conduct the present study, the subjects (n=316) were selected by convenience sampling and reviewing their medical records. The number of patients who attended the center was varied in different days. After the patients with retinopathy were selected in the laser unit, the research purpose, how to response to the questionnaire and confidentiality of information were explained to them and written consent was obtained from those who were content to participate in the study.

It should be noted that before sampling, diabetic retinopathy and its type was diagnosed by a retina specialist and was recorded in an eye examination form which was attached to outpatients' medical records. The researcher reviewed the medical records of outpatients with diabetic retinopathy who attended the laser unit and recorded the type of diabetic retinopathy (proliferative or non-proliferative) and the eye with retinopathy, which was previously mentioned by the relevant physician. Other variables were recorded in the questionnaire by asking patients and their entourages. It is noteworthy that the type of diabetes was diagnosed by asking patients' medications. Patients' height was measured by Secastadio meter with an accuracy of 0.5 cm without shoes and their weight was measured by Seca scales with a minimum cover with an accuracy of 100 gr. Cumulative intensity of smoking was obtained by calculating the number of cigarettes smoked per day.

The researcher attended the laser unit every day from Saturday to Thursday in the morning and afternoon shifts for nearly a month and a half (from August 26 to October 12, 2014) to access samples and obtain sampling, during which from a total of 330 patients who attended the laser unit for treatment 14 patients were excluded from the study as they did not wish to sign the written consent form and thus 316 patients were entered into the study.

Then the data were analyzed by SPSS-20 using descriptive statistics (mean, frequency, standard deviation) and inferential statistics (t-test, one-way ANOVA, Pearson correlation coefficient).

Results

Demographic characteristics of the study population are shown in Table 1. According to the objectives of this study, the results showed that the score of quality of life was -1.73±0.92, and given the score ranging from -9 to 3 the tool shows that the subjects are in an acceptable range. But, the closer to -9 is the final score, the better is the quality of life, and according to the results, the subjects had low quality of life.

Table 1. Distribution of subjects in terms of socio demographic factors

Socio demographic characteristics		Number (%)
Gender	Female	188 (59.3)
	Male	128 (40.7)
BMI	Less than 18.5 (slim)	3 (0.9)
	18.5-24.9 (normal)	69 (21.8)
	25-29.9 (overweight)	201 (63.4)
	30-34.9(obesity grade 1)	33 (10.4)
	35-39.9 (obesity grade 2)	18 (2.5)
	Greater than 40 (extreme obesity)	3 (0.9)
Duration of diabetes (year)	Mean and standard deviation (1-50)	19.1±8.5
History of drug use	Yes	(18) 56
	No	(82) 260
History of smoking	Yes	(26.2) 83
	No	(73.8) 233
Cumulative intensity of smoking	1 to 3	(30.1)25
	4 to 10	(26.5) 22
	11 to 20	(19.3) 16
	More than 20	(22.9) 19
	I don't know	(1.2) 1
Marital status	Single	(4.4) 14
	Married	(73.8) 234
	Other (divorced, widowed)	(22.3) 68
Education	Illiterate	(30.4) 95
	Able to read and write	(31) 97
	Under high school diploma	(19.5) 61
	High school diploma	(15) 47
	Higher education	(4.2) 13
Employment status	Employee	(8.3) 26
	Self-employed	(5.4) 17
	Worker	(7.9) 25
	Farmer	(7.9) 25
	Unemployed	(2.5) 8
	Housewife	(45.1) 142
	Retired	(22.9) 72
Family income ($)	Mean and standard deviation range (571-8000$)	7825949±4100882
Place of residence	City	(75.7) 237
	Village	(24.3) 76
Social support	Supplementary insurance: Yes	(56.8) 175
	Supplementary insurance: No	(43.2) 133
	Member of Diabetes Association	(92.1) 128
	Other supportive associations	(7.9) 11
Head of the family	Yes	(56.3) 178
	No	(43.7) 138
Age	Mean and standard deviation (25-82)	59.65±10.89

The results showed that among subjects' individual and social factors, and according to the analysis of variance test and t-test, there was a significant relationship between income (p=0.0001), place of residence (p=0.044), employment (p=0.0001), education (p=0.0001), marital status (p=0.001), smoking (p=0.001), member of the Diabetes Association (p=0.044) and the scores of quality of life questionnaire of patients with diabetic retinopathy and among factors related to the disease according to ANOVA test and t-test there was a significant relationship between duration of diabetes (p=0.015), history of ocular surgery (p=0.011), type of retinopathy (p=0.0001), monocular and binocular proliferative retinopathy (p=0.0001), monocular and binocular non-prolife rativeretinopathy (p=0.0001), neuropathy (p=0.0001), diabetic foot ulcers (p=0.002), the history of other diseases of the eye (p=0.031) (Table 2). In addition, the results of Pearson's test showed that there was a statistically significant relationship between quality of life score and family income (r=0.2, p<0.0001). The results also showed that among the diseases studied in Charleson Index, according to ANOVA test and independent t-test, 256 patients (81.5%) had diabetes with organ involvement, and none of the subjects developed lymphoma, leukemia, immune deficiency syndrome and metastatic solid tumors and there was a significant relationship between Charleson comorbidities (p=0.001) and the scores of quality of life in patients with diabetic retinopathy.

Discussion

Our findings suggest that the quality of life in patients with diabetic retinopathy was low, Wood Cock reported moderate quality of life in the majority of patients with diabetic retinopathy [14], and Leonyin Germany reported well to moderate quality of life [15]. In contrast, Haninen et al. in Russia showed that retinopathy had no effect on the quality of life in these patients [12].The different results in these studies may be due to geographic, climatic, lifestyle and cultural differences that affect individual's perception of quality of life. Different classifications of quality of life in the present study using different tools can be another reason for our different results.

The results showed that quality of life scores reduced as the income increased, which is not consistent with the results of some studies [17-19], the difference could be due to differences in the economic status in different countries. In the present study, the mean quality of life was higher in women than in men, which is similar to the study of Monjamed et al. in Tehran [20] and is inconsistent with the results of some studies [21, 22]. The effects of diabetic retinopathy complications on the performance of men and their jobs, the social and marital relations and the type of support received from the community and close people and the intensity of diabetic retinopathy can be other reasons for these differences.

Furthermore, non-smokers had better quality of life than smokers, which is similar to the study results of Philip et al. in England [23] and is inconsistent with the findings of Flavio et al. [24]. The quality of life in smokers reduced probably due to the effects of smoking on exacerbating diabetes complications such as retinopathy and the high costs of buying cigarettes. According to the results, illiterate people's quality of life score in our subjects was higher than others, which is not consistent with the study of Set in et al. in Turkey [25].

Table 2. Comparison between the mean score and standard deviation of quality of life in terms of qualitative variables (socio demographic factors)

Socio Demographic Factors		Moderate Quality of Life		Sig.
		Number	Mean and	
Gender	Female	188	-1.82±0.90	*0.046
	Male	129	-1.61±0.95	
BMI	<18.5	3	-1.67±1.31	**0.597
	18.5-24.9	69	-1.80±1.07	
	25-29.9	201	-1.67±0.84	
	30-34.9	33	-1.96±1	
	35-39.9	8	-1.77±1.24	
	>40	3	-2.04±0.45	
	Total	316	-1.73±0.92	
The History of Drug use	Yes	57	-1.53±0.70	*0.068
	No	260	-1.78±0.96	
The history of smoking	Yes	83	-1.44±0.74	*0.001
	No	234	-1.84±0.96	
Cumulative Iintensity of Smoking	1 to 3	25	-1.49±0.91	**0.286
	4 to 10	22	-1.45±0.61	
	11 to 20	16	-.1.57±0.77	
	More than 20	19	-1.19±0.55	
	I don't know	1	-2.54±0	
Marital Status	Single	136	-1.42±0.68	**0.0001
	Married	105	-2.07±1.13	
	Others	69	-1.89±0.78	
Education	Illiterate	95	-2±0.75	**0.0001
	Able to read and write	97	-1.84±0.93	
	Under high school diploma	61	-1.50±0.94	
	High school diploma	47	-1.50±1.04	
	Higher education	13	-1.18±0.93	
Employment Status	Employee	26	-0.95±0.55	**0.0001
	Self-employed	17	-2.10±1.22	
	Worker	25	-1.42±0.80	
	Farmer	25	-1.78±0.87	
	Unemployed	8	-1.82±1.18	
	Housewife	142	-1.93±0.91	
	Retired	72	-1.61±0.83	
Place of Residence	City	237	-1.68±0.94	*0.044
	Village	76	-1.93±0.85	
Supplementary Insurance	Yes	176	-1.66±0.97	*0.330
	No	133	-1.76±0.81	
Social Support	Member of Diabetes Association	128	-1.73±0.94	*0.025
	Others	11	-2.41±1.16	
Head of the Family	Yes	178	-1.27±0.91	*0.704
	No	138	-1.76±0.95	

*** Independent t-test ** One-way analysis of variance**

According to the researcher, differences in cultural structure, different people's attitudes to and understanding of the problems and diseases and differences in socioeconomic conditions of each society can justify the differences in the findings. In this study, the quality of life in patients with retinopathy in rural areas was better than those in cities probably due to higher familial and social support rural people receive. The study results of The et al. in England showed the opposite result [26]. These differences may also be influenced by the type of tools used, as well as different cultural and social structure.

According to the results, the quality of life in patients with non-proliferative retinopathy was better than patients with proliferative retinopathy; the study results of Alcubierre et al. in Germany showed that the severity and degree of retinopathy have a negative effect on patients' quality of life [27]. Accordingly, as proliferative retinopathy has more severe symptoms, it can affect individuals' abilities and quality of life more than the no proliferative type.

According to the results, people with the history of eye surgeries had a better quality of life compared to those without, which can result from better performance of eye after surgeries such as cataract or glaucoma, which is consistent with the results of Jannuzzi et al. in Brazil [28].

The results of this study indicate that the subjects' quality of life was low and as diabetes complications such as retinopathy are preventable and treatable, proper training and improving knowledge about the disease and its complications as well as necessary care and screening with greater accuracy and early detection of diabetes are recommended. Furthermore, as we used a standard questionnaire, the results can be compared with other studies to find out differences between Iranian patients and patients from other countries and plan to resolve these differences by identifying the causes. Given that quality of life deteriorated with increasing income in our sample and that it is inconsistent with the findings of other studies, it is suggested that the role of economic status on quality of life be studied with more accurate tools.

A limitation of this study was patients' psychological conditions while answering the questions that might affect the accuracy of answers, but the researcher could not control it.

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