



The Quality of life in patients with diabetic retinopathy – Madinah, 2019

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General Note



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ABSTRACT

Background: Diabetic Retinopathy (DR) is the most microvascular complication that affects the retina and cause disability among diabetic patients. **Aim and objectives:** The aim of the study was to determine the Quality of Life (QoL) among patients with DR and to investigate the association of participant's sociodemographic factors and diseased related factors with QoL. **Methods:** A cross-sectional study was carried out among diabetic patients using a (RetDQoL) questionnaire to assess QoL in patients with DR, all patients aged ≥ 18 years of both sex with either type 1 or type 2 DM with DR who were attended the ophthalmology outpatient clinic at Ohud hospital during May-August 2019 were included. **Result:** Majority of the patients were male 55.6%. The average ages

of the participants were 56.86 years old. P value showed significant relationships between QoL and gender, place of residence, education, smoking, employment, periodic eye examination, believing that DM can affect the eyes. *Conclusions:* In general, diabetic retinopathy is a major microvascular complication related to DM. Therefore, the high percentage of blindness due to DR can be prevented by early screening and proper treatment. Finally, the result of our study concluded that the quality of life among diabetic retinopathy patients in the accepted.

Keywords: Quality of Life; Diabetic Retinopathy; RetDQoL questionnaire.

1. INTRODUCTION

Diabetes Mellitus DM prevalence was growing in both developed and developing countries, it is considered as a major public health concern, the expected number of diabetic patients to be doubled by 2025 (Rathmann & Giani, 2004). Saudi Arabia had a high prevalence of diabetes it was estimated at 24%. In 2013, ranked seventh out of the top 10 countries for diabetes prevalence in people between age 20 -79 years (Guariguata et al., 2014).

Diabetic Retinopathy (DR) is a major microvascular complication related to DM that affects the retina and it is a serious cause of disability in patients with DM worldwide (Ahmadi et al., 2011; Albasheer et al. 2020). It is estimated that DR will develop up to 84.5% if the patients have had DM for more than 20 years (Rathmann & Giani, 2004). The study conducted by Ahmadi et al. (2011), found that after 20 years, 60% of patients with type 2 diabetes and 100 % of patients with type 1 diabetes developed retinopathy, including 3.6% of patients with type 1 diabetes and 1.6 % of patients with type 2 diabetes become blind. The prevalence of DR in Saudi Arabia was found to be 19.7% (Al-Rubeaan et al, 2015) while other study in Alhasa city reported a prevalence extending from 16.7% to 31% (Khan AR et al, 2010). However, studies supposed that the high percentage of blindness due to DR can be prevented by early screening and proper treatment (Peimani Maryam et al, 2008).

The natural history of DR typically follows a regular and predictable pattern; the long-term elevated blood glucose levels lead to vascular endothelial dysfunction and destruction of endothelial cells and pericytes. In general, it is divided into two stages: proliferative and non-proliferative diabetic retinopathy. The non-proliferative type is characterized by retinal vascular microaneurysms, spot hemorrhages, cotton-wool spots, and proliferative form when retinal new vascularization occurs in response to hypoxia causing vision loss in the vitreous or retinal detachment (Fauci et al, 2012). However, diabetic visual loss is caused by retinal ischemia, macular edema, macular ischemia, diabetic papillopathy, and non-arteritic anterior ischemic optic neuropathy (Parsa & Hoyt, 2015). Proliferative diabetic retinopathy is a significant reason of blindness in both developing and developed countries, it is characterized by the development of new blood vessels on the retina or into the vitreous cavity which is weak and may bleed, causing a sudden deterioration of vision, at any stage of this complication macular edema can occur. Macular edema is characterized by impaired central vision and thickening of the retina due to leaky blood vessels (Salehi et al, 2013; Kasiri et al. 2020). The key modalities of treatment are usually laser photocoagulation or vitrectomy plus the improvement of glycemic and blood pressure control those interventions decreased the rate of DR progression and may increase the possibility of a slight improvement in visual acuity (Fauci et al, 2012).

Overall, visual loss due to diabetic retinopathy and the cost associated with its care adversely affects the quality of life (QoL) of patients and imposes a significant financial burden on society (Salehi et al, 2013). For example, limitations and concerns from visual impairment arising from DR that can affect a patient's QoL lead to psychological, environmental, and social problems. However, patients who suffered from visual loss had low QoL, depression and the stress due to the inability to do their daily tasks will reduce their QoL more (Kamran & Nejad Leili, 2017).

However, proliferative retinopathy is most severe than the non-proliferative one that can affect the patient's vision and QoL more. A study in 2004 by Wood Cook et al. demonstrated that visual impairment due to DR had a significantly affected patient's QoL (Wood Cook et al, 2004)

A lot of research focused on awareness, prevalence, screening, and the impact of DR worldwide. As far as we know, limited quantitative data is focusing on QoL among DR patients, and no previous study in Madinah city. Since DM and it is retinopathy complications are continuously growing issues among the Saudi population that creating a socio-economic burden on health care. We should have more detailed information to investigate the QoL of the DM patients, their characteristics (age, gender, marital status, place of residence, education level, history of smoking), disease condition (duration, age at diagnosed as DM, type of medication use, periodic eye examination, etc), and social-environmental characteristics leading to a decrease QoL of patients. However, this study aimed to assess vision-related and health-related QoL in people with DR in Madinah, Saudi Arabia.

2. MATERIALS AND METHODS

A cross-sectional study was conducted at ophthalmology outpatient clinics (retinal clinics, laser clinics) in Ohud hospital Al- Madinah Al-Munawara, KSA from May to August 2019. by using a questionnaire to evaluate the quality of life in patients with diabetic retinopathy, the sample size of the study was 500 patients, aged >18 years either male or female diagnosed as Diabetes Type 1 or type 2, excluded those less than 18 years old, patients who had a history of central retinal vein occlusion, central retinal artery occlusion, any blood disorder, and mental illness.

The study tool consists of a two-part questionnaire among patients confirmed diagnosis as retinopathy by slit lamp and retinal examinations, it was completed by interviewed them face-to-face used participant's native language after translation to the Arabic language and back-translated to English by two expert translators.

the first part of the questionnaire includes the socio-demographic factors like (age, marital status, gender, place of residence, education level, history of smoking, employment status) and disease-related factors like (duration of diabetes, a medication used to control DM, history of chronic illness, periodic eye examination, etc). The second part belongs to the Retinopathy-Dependent Quality of Life Questionnaire (RetDQoL). The question items are based on the relevant research (Kamran & Nejad Leili, 2017) and the RetDQoL questionnaire. This part used 26 items covered in various aspects and areas of life to explore the impact of diabetic retinopathy on the various aspects and domains of quality of life. The domain-specific items each of them include one part to measure the impact of diabetic retinopathy in different domains.

RetDQoL questionnaire is accurate and reliable for people with diabetic retinopathy to measure QoL. Content validity index (CVI) and content validity ratio (CVR) for ensuring validity (Kamran & Nejad Leili, 2017). For CVI, all questions had scored more than 0.7 for simplicity relevance, and clarity. For CVI, all items scored more than 0.8. The reliability was confirmed by Cranach's alpha of 0.9 for all items related to the effect of a diabetic eye on various aspects of quality that indicating an acceptable reliability level. The data collector started with two overview questions. The first question asked the participants to complete the statement "In general, my present quality of life is:" using a 7-point scale from "excellent," scored as 3, "very good" scored as 2, "good" scored as 1, through "neither good nor bad," scored as 0 to "bad" scored -1, "very bad" scored -2 "extremely bad," scored as -3. The second "retinopathy-specific QoL" asked how QoL is affected by diabetic eye problems: "If I did not have diabetic eye problems, my quality of life would be:" and the options: "very much better" (scored -3), "much better" (-2), "better" (-1), "the same" (0), and "worse" (1) and the same scale was used in 24 different domains which not covered before. The RetDQoL questionnaire concluded by asking whether diabetic eye problems affect QoL in any way that was not previously asked by used the open-ended question. Generally, the importance of each phrase was asked and the final score was calculated. According to the used questionnaire and based on a final judgment only the final score of 9 means the desirable quality of life, in this study the final classification quality of life in patients with diabetic retinopathy including four categories as the following: very low quality of life (score > 0), low quality of life (Score = 0), acceptable quality of life (score between 0 and -9) and a desirable quality of life (score = -9) (Kamran & Nejad Leili, 2017).

The data analyzed by statistical analysis software (SPSS v.22) used the correct statistical methods for data entry and analysis to achieve the study's objectives. The following statistical methods were used: Frequencies & Percentages .Mean .Standard Deviation . Pearson Correlation Coefficient and T-test.

3. RESULTS

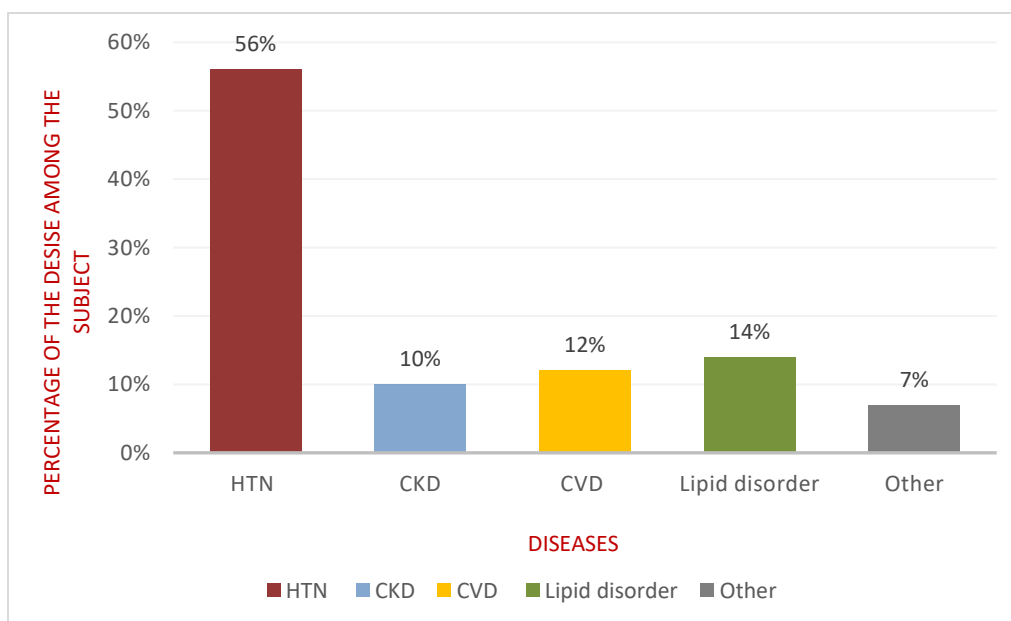
Table 1 showed the distribution of diabetic patients according to their socio-demographic factors; the results showed that the mean age was 56.86 years with a standard deviation of 14.26. Our study showed that 55.6% of the study samples were male. 77.4% were married, 8.8% single. 80.2% live in cities, while 19.8% live in villages.

Regard their education level, 28.6% illiterate, 22.2% elementary, 17% intermediate, 12.8% secondary, and 19.4% had a college degree and more.

The results showed the history of smoking in 16.2% while most of them 83.8% were non-smokers.75.6% were unemployed, while 24.4% were employees. The reported duration of diabetes was as 39.8% suffered from DM for 10-20 years, 26.2% suffered from DM for more than 20 years, 26% suffer from DM for 5-10 years. Moreover, the mean age of patients when they had diagnosed with diabetes was 41.37 years with a standard deviation of 15.67 and for medication used to treat diabetes, 29.4% used insulin, 27.4% used oral hypoglycemic, and 43.2% used both insulin and oral drug. About their periodic eye examinations, mostly 71.8% of patients check their eyes periodically, while 28.2% don't check it periodically. 85.6% believed the DM affect their eye while 14.4% do not believe it.

Table 1. Distribution of subjects in terms of socio demographic and disease related factors.

Socio demographic and disease related factors		Frequency	Percent
Age	Mean ± Std. Deviation	56.86 ± 14.259	
Gender	Male	278	55.6
	Female	222	44.4
Marital status	Single	44	8.8
	Married	387	77.4
	Other (divorced, widowed)	69	13.8
Place of residence	City	401	80.2
	Village	99	19.8
Education level	Illiterate	143	28.6
	Elementary	111	22.2
	Intermediate	85	17.0
	Secondary	64	12.8
	Collage and more	97	19.4
History of smoking	Yes	81	16.2
	No	419	83.8
Employment status	Employee	122	24.4
	Unemployed	378	75.6
Duration of diabetes (year)	Less than 5 years	40	8.0
	5-10 years	130	26.0
	10-20 years	199	39.8
	More than 20 years	131	26.2
How old are you when you were diagnosed with DM	Mean ± Std. Deviation	41.37 ± 15.667	
Which medication are you on	Insulin	147	29.4
	Oral hypoglycemic	137	27.4
	Both insulin and oral drug	216	43.2
Are you on periodic eye examination	Yes	359	71.8
	No	141	28.2
Do you think DM can affect your eyes	Yes	428	85.6
	No	72	14.4
Total		500	100.0

**Figure 1** Distribution of patients according to other diseases. More than half of patients suffer from (hypertension; HTN) (cardiovascular disease; CVD) (Chronic kidney disease; CKD).

The results of this study showed that among participants and its social factors used the t-test analysis, there was a significant relationship ($p < 0.05$) between the gender, residency, education, smoking, employment, periodic eye examination, believing that DM will affect the eyes and the quality of life questionnaire scores in diabetic retinopathy patients according to ANOVA test and t-test. Also, according to the analysis of Pearson's test found a statistically important association between age and quality of life ($r = -0.128$, $p < 0.004$), age when diagnosed with DM ($r = -0.100$, $p < 0.026$) (Table 2 & 3). Lastly, Table 4 showed the mean of the patient's QoL was in the accepted range (-4.19 ± 2.451), and in figure 2 also showed 98.8% of them were in the accepted range while 0.8% and 0.4% were in very low and low QoL respectively.

Table 2. Comparison between the mean score and standard deviation of quality of life according to socio demographic factors

Socio Demographic Factors		N	Mean \pm Std. D	P-value
Gender	Male	278	-4.40 \pm 2.40	.038*
	Female	222	-3.94 \pm 2.50	
Marital status	Single	44	-3.69 \pm 2.71	.126
	Married	387	-4.17 \pm 2.43	
	Other	69	-4.64 \pm 2.36	
Place of residence	City	401	-4.31 \pm 2.46	.035*
	Village	99	-3.73 \pm 2.37	
Education level	Illiterate	143	-4.41 \pm 2.28	.000*
	Elementary	111	-4.47 \pm 2.17	
	Intermediate	85	-4.72 \pm 2.34	
	Secondary	64	-3.11 \pm 2.53	
	Collage and more	97	-3.80 \pm 2.79	
History of smoking	yes	81	-3.23 \pm 2.32	.000*
	No	419	-4.38 \pm 2.44	
Employment status	Employee	122	-3.73 \pm 2.50	.015*
	Unemployed	378	-4.34 \pm 2.42	

Table 3. Comparison between the mean score and standard deviation of quality of life according to disease related factors

Disease related Factors		N	Mean \pm Std. D	P-value
Duration of diabetes (year)	less than 5 years	40	-4.20 \pm 2.57	.607
	from 5-10 years	130	-3.95 \pm 2.43	
	10-20 years	199	-4.30 \pm 2.52	
	more than 20 years	131	-4.28 \pm 2.34	
Which medication are you on	insulin	147	-3.94 \pm 2.58	.319
	oral hypoglycemic	137	-4.33 \pm 2.29	
	both insulin and oral drug	216	-4.28 \pm 2.46	
Are you on periodic eye examination	yes	359	-4.37 \pm 2.93	.012*
	No	141	-3.76 \pm 2.55	
Do you think DM can affect your eyes	yes	428	-4.40 \pm 2.35	.000*
	No	72	-2.99 \pm 2.72	
Age	Pearson Correlation		-.128	.004*
How old are you when you were diagnosed with DM	Pearson Correlation		-.100	.026*

Table 4. The quality of life in patients with diabetic retinopathy

Quality of life	Mean \pm Std. D	Level
	-4.19 \pm 2.451	acceptable quality of life

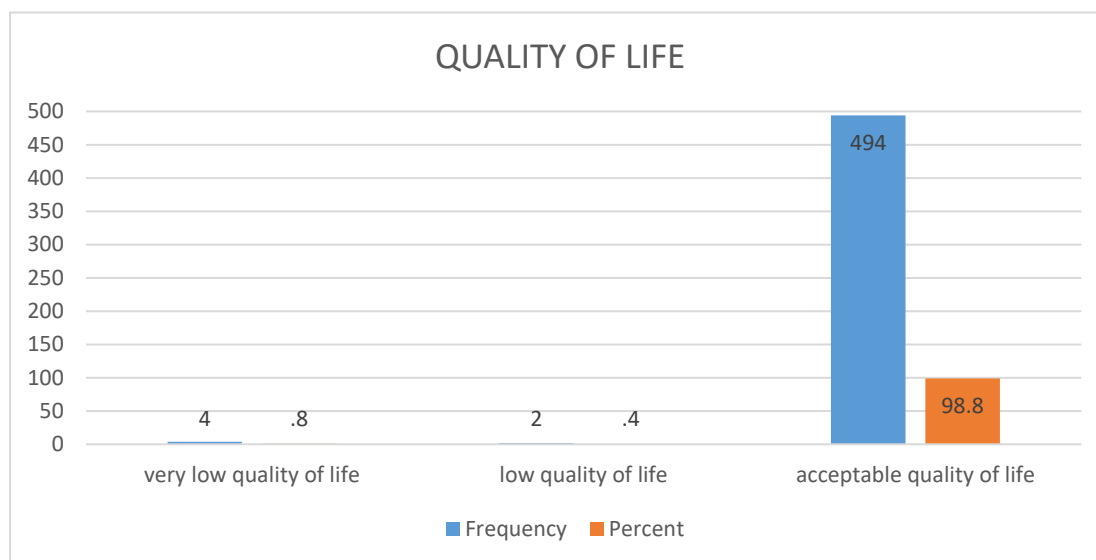


Figure 2: Distribution of the level quality of life in patients with diabetic retinopathy

4. DISCUSSION

In general, it's important to consider improving Quality of Life (QOL) In Diabetic Retinopathy (DR) patients; In this study, we found diabetic patients had generally an accepted range of QoL (-4.19 ± 2.451) that approximately 98.8% of patients have accepted QoL while 8% and 4% had very low and low QoL, respectively. The study did by Jannat et al., (2015) showed an acceptable level of QoL in diabetic patients with retinopathy. Moreover, this was also supported by the studies of Wood Cock which reported moderate QoL in most patients with DR. Other studies by (Gautam et al, 2009; Anumol et al, 2014), each concluded that in DR patient's diabetes harmed QoL. In contrast to (Haninen et al, 1998) the retinopathy was found to not affect QoL in diabetic patients. The different outcomes of previous studies may be attributed to cultural, lifestyle, and geographic variations affecting the QoL worldwide. Most of our sample were male 278 and this was close to the research findings of (Eljedi et al, 2006). The analysis of results showed that among participants, there was an important gender difference ($p=0.038$), mean QoL was higher for men than women (Kamran & NejadLeili, 2017). This study showed the mean age among DR patients was 56.86 ± 14.26 years and similar results showed in studies done by (Ali et al, 2013; King et al, 1998). The mean duration of DM was more than 10 years for our study participants and there was no statistically significant difference in the duration of DM and QoL scores, in contrast to the study did by Shirish (2011) the association of the duration of DM and QoL was shown independently and clearly suggested that the long history of DM impact on QOL (Asgari et al, 2018). According to employment status, the relationship between employees and unemployed was significant ($p=0.015$) which showed that QoL scores had better among unemployed patients.

In this study, there was a significant difference ($p=0.000$) between levels of education on QoL among diabetic patient we observed that the patients had intermediate level was higher QoL score than other which is inconsistent with the Set in et al study in Turkey (Setin et al, 2012). Our result found that QoL was better in patients who lived in cities than those in villages. However, the QoL score ($p=0.035$) was substantially reduced, presumably due to higher family and social support earned in cities, lack of specialized ophthalmology centers, and the lack of patient adherence to regular follow-up appointment and early examination in those lived away. In our study, QoL in non-smokers was better than smokers, and Philip et al. supported this by his study (Philip M et al, 2006). This may be due to the detrimental effects of smoking in worsening DM complications, its negative impact on the body, and the high cost of cigarette purchases (Kamran & Nejad Leili, 2017).

Also, the QoL scores do not indicate a statistically significant difference ($p= 0.319$) according to medications used among the study's participants, previous research independently investigating the relationship between medication and QoL found that the drug enhances QoL, as this gives better glycemic control (Prajapatil et al, 2017). According to a periodic eye examination, 71.8% of patients check their eyes periodically had better QoL ($p=0.012$) than 28.2% don't check their eyes periodically. It could be due to regular follow up that prevents progression of the disease. We found that hypertension 56 % was the most prevalent comorbidity followed by lipid disorder 12 %, the same result supported by Acharya et al. (2016) recorded hypertension in more than 50% of total diabetes patients. Jiménez-García et al. (2008) proved that comorbidities were an indicator of low QoL. In terms of the strengths of the study, the sample size was 500 patients of both genders recruited from an ophthalmology outpatient clinic who invited to

participate. Moreover, the tools used that measured QoL (RetDQoL) were valid and reliable and filled by interviewed each patient separately.

The limitations of our study are the absence of an electronic file system for keeping patient data missed some data regarding the stage of diabetic retinopathy with HbA1c level lead to difficulty to correlate each outcome with QoL items; we assessed QoL once regarding stages of DR while other researchers assessed QoL in each stage of DR.

In future studies, it is important to better understand RetDQoL scores in patients with DR to prospectively evaluate and collect data at multiple time points and to determine the effect of the various medicines and treatments used to monitor DR on the QOL.

5. CONCLUSION

In general, diabetic retinopathy is a major microvascular complication related to DM. Therefore, the high percentage of blindness due to DR can be prevented by early screening and proper treatment. Finally, the result of our study concluded that the quality of life among diabetic retinopathy patients in the accepted.

Abbreviation

(CKD): Chronic kidney disease, (CVD): Cardiovascular disease, (CVI): Content validity index, (CVR): Content validity ratio, (DM): Diabetes mellitus, (DR): Diabetic retinopathy, (HTN): Hypertension, (HbA1C): Hemoglobin A1c, (QOL): Quality of Life, (RetDQoL): Retinopathy-Dependent Quality of Life Questionnaire.

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Conflict of Interest

The authors declare that there are no conflicts of interests.

Informed consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

Ethical approval

The study was approved by the Medical Ethics Committee College of Medicine at Taibah University and the Ministry of Health (IRB00010413).

Data and materials availability

All data associated with this study are available upon request to the corresponding author.

Peer-review

External peer-review was done through double-blind method.

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