

The Impact of Visual Impairment on the Quality of Life of Diabetic Patients Attending the University Hospital of the West Indies

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ABSTRACT

Objective: To assess the impact of visual impairment on the quality of life (QOL) of patients with diabetic retinopathy attending the Retina Eye Clinic at the University Hospital of the West Indies (UHWI).

Method: A questionnaire modelled from the National Eye Institute Visual Function Questionnaire (NEIVFQ-25) was administered to 150 patients with diabetic retinopathy. The questions ranged from concern with their vision, health and social problems to functional ability. The associations between an overall QOL score and level of visual impairment among other variables were assessed using chi-square test and the *t* test in the SPSS software.

Results: The mean age was 56 ± 10 years. Sixty-six percent were females. Type 2 diabetes was more common in 63% and 79% of the females and males, respectively. There were significant negative associations between QOL and increased duration of diabetes mellitus (DM) ($p = 0.016$), reduced vision (left eye; $p < 0.049$), reduced monthly income ($p = 0.008$), lack of compliance with exercise ($p = 0.021$), and a special diet ($p = 0.01$). There were no significant relationships between QOL and age ($p = 0.495$), marital status ($p = 0.318$) and DM type ($p = 0.651$).

Conclusion: Poorer QOL was associated with decreased left eye visual acuity, lower income and lack of compliance with exercise and special diet among patients with diabetic retinopathy at UHWI.

Keywords: Diabetic retinopathy, Jamaica, quality of life, visual impairment.

INTRODUCTION

Quality of life (QOL) is defined by the World Health Organization (WHO) as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns (1). A visually impaired person can be defined as a person who is blind or has impairment of visual function which cannot be improved by the use of corrective lenses (2). Of the 415 million diabetics worldwide, 50%–85% will have diabetic retinopathy (DR), these numbers are expected to increase unless new health strategies are implemented (3–6). Decreased vision negatively impacts the QOL

in patients with type 2 diabetes (3, 4, 7–10). However, there are currently no studies specific to vision related QOL in patients with DR in the Caribbean.

Diabetic patients considered loss of vision as the worst complication of diabetes mellitus (DM), with mild to moderate visual impairment negatively impacting on perceived QOL and psychosocial functioning (4). This study assessed the impact of visual impairment on the QOL of diabetic patients attending the retina eye clinic at University Hospital of the West Indies (UHWI), Jamaica. The associations between QOL and socio-economic factors, DM duration and compliance with exercise, diet and medication were also examined.

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SUBJECTS AND METHODS

This was a prospective cross-sectional study of 150 patients recruited over a 6-month period. The inclusion criteria were adult patients with DR who attended the retina clinic at UHWI. Patients with other sight threatening ocular comorbidities such as glaucoma were excluded.

Approval was obtained from the Faculty of Medical Sciences UHWI Ethics Committee. All patients gave informed voluntary consent, while anonymity and confidentiality were maintained. Demographic, socio-economic and QOL data were collected. A questionnaire modelled from the NEIVFQ-25 QOL but modified for the Jamaican population was used to collect the QOL

data. The study investigated emotional distress caused by visual impairment, family and spousal relationships, restricted social activities and functional abilities (eg, navigation, reading and cooking) as shown in the 29-item questionnaire (Table 1A and 1B). Their responses were based on frequency during the past month and scored as follows: 'not at all' = 1, 'a little' = 2; 'sometimes' = 3, 'most times' = 4 and 'always' = 5. If the participant felt that the question did not apply to them 'not applicable' was documented and a score of 0 assigned for that specific question.

Results from the questionnaire were converted to scores and QOL grades, ranging from poor to excellent. Chi-square tests were used for categorical variables and

PART 1: Effect of visual impairment on quality of life

(Questions 1–14) (Please indicate with a tick [✓] your correct answer)

How much time during the past month...

Table 1A: Questionnaire on quality of life

	Not at all	A little	Some of the time	Most of the time	Always
	1	2	3	4	5
1. Have you been unhappy with your general health problems?					
2. Have you been unhappy with your vision?					
3. Have you needed a lot of help from others because of your eyesight?					
4. Do you worry about your vision?					
5. Do you feel burdened by your health problems?					
6. Do you worry about embarrassing yourself because of poor vision?					
7. Do you stay home most of the time because of your vision?					
8. Does your vision prevent you from working?					
9. Do you think your vision affects your social life?					
10. Do you think your vision affects your close personal relationships OR having close personal relationships? (spouse/partner)					
11. Do you think your vision affects your relationships with your children? (Indicate if no children)					
12. Does your vision affect your enjoyment of eating food?					
13. Are you concerned about your hairstyle/how you dress?					
14. Do you being trapped in a fire?					

Difficulty level in doing tasks

(Questions 15–29) (Please indicate with a tick [✓] your correct answer)

Table 1B: Questionnaire on quality of life

	None	Little difficulty	Some difficulty	Very difficulty	Can't do at all
	1	2	3	4	5
15. Seeing the details of a person's face					
16. Reading the Newspaper					
17. Filling our forms					
18. Watching TV or a movie					
19. Seeing to eat food					
20. Seeing bus numbers					
21. Seeing to cook					
22. Sewing					
23. Picking out and matching clothing					
24. Navigation (Moving around)					
25. Going down stairs in dim light					
26. Driving during the day					
27. Driving during the night					
28. Reading street or shop signs					
29. To choose your street clothes					

the *t* test for continuous variables. A probability level of $p < 0.05$ was used to establish statistical significance. All statistical analyses were performed using SPSS software version 19 (IBM Corp, Armonk, NY, USA).

Weight, height, body mass index (BMI) and blood pressure were measured using a balanced beam scale in kg (± 0.1 kg), stadiometer in metres (± 0.1 m) and sphygmomanometer (± 1 mmHg) respectively. Snellen visual acuity (VA) was assessed and converted to Log Mar units.

RESULTS

There were 150 patients in the study; 34% were males and 66% females (Table 2). The age of the males ranged from 47 to 66 years (mean 56.7 ± 9.4). The age of the females ranged from 45 to 69 years (mean 57 ± 11.7). A total of 66% of patients had a BMI > 25 kg/m²; 20% were obese and 46% were overweight. A normal BMI was seen in 31% and 8% were underweight. There were no significant gender differences in blood pressure ($p = 0.122$).

Visual acuity

Visual acuity was grouped into normal VA (logMAR 0), mild visual impairment (logMAR 0.1–0.6), moderate visual impairment (logMAR 0.7–1.0) and severe visual impairment (\geq logMAR 1.0). The mean logMAR VA was 0.9 and 0.67 for the right and left eyes, respectively ($p = 0.03$). Females had higher percentages of normal vision and mild visual impairment than males (Fig. 1). Males had higher percentages of moderate and severe visual impairment than females. A total of 36.5% of males versus 24.7% of females had severe visual impairment in the left eye (Fig. 1).

Table 2: Distribution of patients per socio-demographic characteristics

Categories	Number	(%)
Age (year)		
20 to < 40	8	5.3
40 to < 60	78	52
> 60	64	42.7
Gender		
Male	51	34
Female	99	66
Marital status		
Single	40	60
Married	44	66
Divorced	6	9
Widowed	8	12
Other	2	3
Education		
Primary	66	44.3
Secondary	55	36.2
Tertiary	29	18.9
Monthly Income		
Unemployed	111	74
< J\$10 000	11	7
J\$10 000–50 000	20	13
J\$51 000–100 000	4	3
> 100 000	4	3

There was no significant sex difference for the VA in the right eye ($p = 0.47$). The level of visual impairment for the left eye was worse in males compared to females ($p = 0.049$). The older population were more likely to have normal vision. The 20 to < 40-year-old age group was more likely to have moderate and severe visual impairment than the other age groups (Fig. 2).

Among persons with type 1 DM, the mean logMAR VA was 0.89 and 0.94 for the right and left eyes,

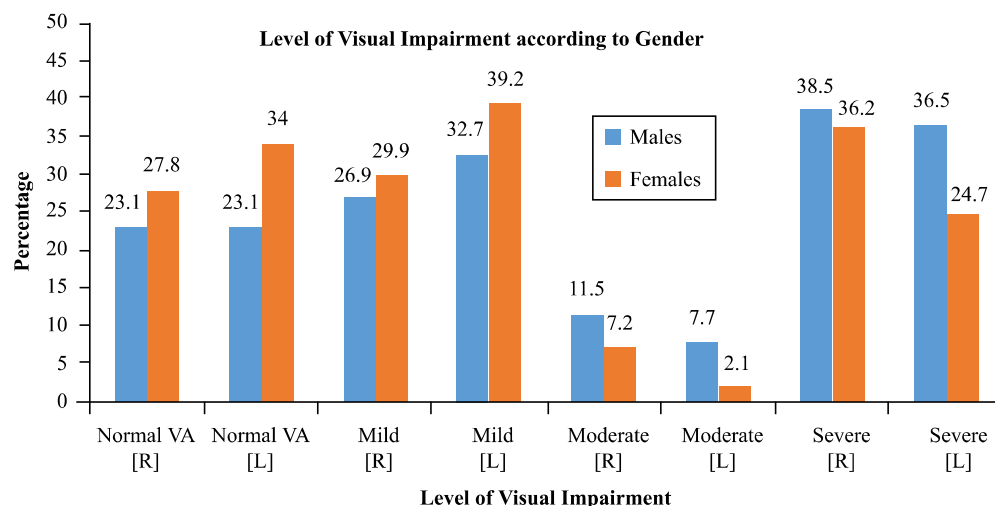


Fig. 1: A comparison of level of visual impairment for right [R] and left [L] eyes according to gender.

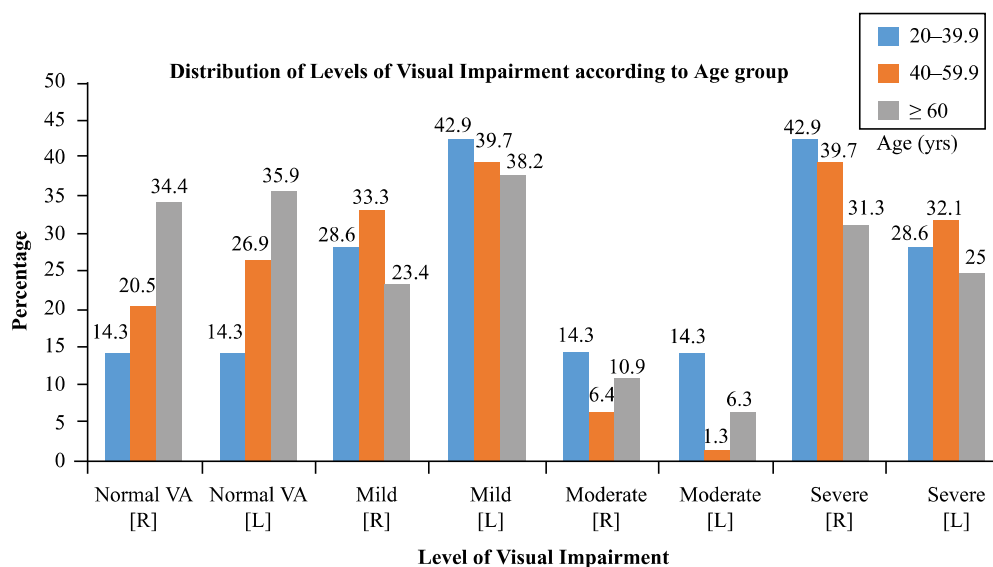


Fig. 2: Distribution of levels of visual impairment according to age group.

respectively. For persons with type 2 DM, the mean logMAR VA was 0.53 and 0.76 for the right and left eyes, respectively. There was no significant difference in VA for DM type ($p = 0.651$). Visual impairment was associated with male gender ($p = 0.049$), longer duration of DM ($p = 0.018$) and poor compliance with a special diet ($p = 0.003$).

Quality of life scores

Based on the scoring of the questionnaire, the QOL score was inversely proportional to actual QOL, *eg*, when 'not applicable' responses were considered, a lowest possible QOL score of 22 would represent the highest possible level of QOL and the highest possible QOL score, 145, would correspond to the lowest level of QOL (Table 1). For this study, the grading of QOL was as follows: excellent QOL 22–25 (100%), good QOL 26–55 (70–99%), fair to average QOL 56–87; (50%–69%), poor QOL 88–145 (< 50%). The range of QOL score was 26–122, mean 57 ± 26 and a median of 49 (Table 3). Significant associations were found between QOL and monthly income ($p = 0.008$), DM duration ($p = 0.016$), compliance with exercise ($p = 0.021$) and compliance with a special diet ($p = 0.01$) (Table 3).

Quality of life and monthly income

The lowest QOL grading of poor which corresponded to the highest QOL scores was seen in the unemployed group as well as those with a monthly income of J\$101 000 to J\$150 000 (Table 3).

Quality of life and DM duration

Patients in the first year of diagnosis of DM had the highest QOL. The poorest QOL grading was noted in the patients who have had diabetes for > 20 years, followed by the 1- to 5-year DM duration groups ($p = 0.016$) (Table 3).

Quality of life and compliance with exercise and diet

Persons who claimed compliance with a regular exercise regime (at least 30 minutes, 3 times/week) had a better QOL than those who did not with mean QOL scores of 51.8 and 61, respectively (Table 3). Persons who had a balanced special diet had significantly better QOL than those who did not. The mean QOL scores for these groups were 52.5 and 62.1, respectively (Table 3).

There were no significant relationships between QOL and age ($p = 0.495$), marital status ($p = 0.318$), DM type ($p = 0.651$), education (0.495), and compliance with diabetic or hypertensive medications ($p = 0.592$ and 0.056, respectively) (Table 3).

DISCUSSION

Quality of life was reduced in patients with severe visual impairment (particularly with reduced vision in the left eye) and was adversely affected by low income, poor compliance with exercise, a special diet, longer duration of DM and male gender. This may be due to the challenges of affording good health care, medicines and healthy lifestyle. Patients should be counselled about inexpensive lifestyle changes which include regular exercise and healthy diet.

Table 3: A comparison of mean QOL scores and *p* values according to levels of visual impairment, age, gender, marital status, DM type, DM duration, monthly income, education, compliance with DM and HTN meds

Variables	Categories	Range of QOL score	Mean QOL score	<i>p</i> value
Visual impairment	None	28–86	56.5 ± 26.8	0.470 (right eye)
	Mild	28–62	45 ± 16.8	0.049 (left eye)
	Moderate	26–88	56.3 ± 24.8	
	Severe	44–98	71.1 ± 26.7	
Age	20 to < 40	36–80	59.1 ± 19.1	0.495
	40 to < 60	26–121	58.7 ± 26.2	
	≥ 60	27–122	55.4 ± 26.2	
Gender	Male	28–122	67 ± 25.7	< 0.001
	Female	26–121	52.1 ± 24.5	
Marital status	Single	26–118	56.6 ± 26.6	0.318
	Married	27–122	58.7 ± 26.7	
	Divorced	31–96	65 ± 21.9	
	Widowed	27–91	48.5 ± 21.8	
	Other	62–66	64 ± 2.8	
DM type	Type 1	26–118	59.7 ± 25.5	0.651
	Type 2	28–122	56.1 ± 26.0	
DM duration (years)	< 1	28	28	0.016
	1–5	28–107	69 ± 34.4	
	5–10	28–87	45.2 ± 18.5	
	10–15	26–112	53.5 ± 24.8	
	15–20	27–117	54.2 ± 21.4	
	> 20	27–122	69.1 ± 29.3	
Monthly income	Unemployed	27–122	61 ± 27.0	0.008
	<J\$10 000	28–83	45.1 ± 21.0	
	J\$10 000–50 000	26–91	46.0 ± 16.5	
	J\$51 000–100 000	29–48	35.2 ± 8.0	
	J\$101 000–150 000	36–88	63.7 ± 26.2	
	J\$151 000–200 000	85		
Education	Primary	26–122	56.5 ± 26.7	0.495
	Secondary	28–118	58.4 ± 26.1	
	Tertiary	28–104	57.9 ± 24.0	
Compliance with DM meds	No			
		28–114	59.6 ± 27.1	0.592
	Yes	26–122	56.9 ± 25.5	
Compliance with HTN meds	No	28–116	62.9 ± 29.3	0.056
	Yes	27–122	57.6 ± 24.0	
Compliance with exercise	No	27–122	61 ± 26.9	0.021
	Yes	26–107	51.8 ± 23.3	
Compliance with special diet	No	28–122	62.1 ± 26.5	0.010
	Yes	26–117	52.5 ± 24.4	

DM = diabetes mellitus; QOL = quality of life.

Poor compliance with a special diet and exercise have been reported to be associated with poorer QOL (11). Patients with DM who lack a sense of empowerment have poorer glycaemic control than those who feel empowered (12, 13). Support groups that engage the visually impaired in sporting activities through adaptive

sports, recreation and social activities have been established in some countries (14). Introducing this in Jamaica may improve the QOL, self-esteem and glycaemic control of patients with DR.

Dieticians, healthcare workers, private sector organizations, working with policy makers and government can

improve healthy lifestyles by the development of community vegetable gardens and free parks. Government and medical agencies should develop preventative programmes to encourage healthy lifestyles. Diabetic retinopathy is an expensive burden, with significant direct annual medical costs and absenteeism amongst workers (15).

In our study, 70% were unemployed and had insufficient income to properly manage their diabetes and DR. With low income, poorer QOL could result from emotional stress, functional and social limitations due to progressive visual impairment. Educating patients about the future QOL implications could improve lifestyle changes of modifiable risk factors. However, diabetes-specific emotional distress is related to glycaemic control ($p = 0.007$), so we must consider the patient's emotional status when discussing their diabetes control (16). In diabetic patients, depressive symptoms are significantly associated with poor physical activity ($p = 0.001$) (17).

Males had a significantly poorer VA, which may be due to late presentation because of poor health seeking behavior. Improved QOL for vision-related activities and psychosocial aspects after acquiring low vision aids (eg, magnifiers) have been proven and should be considered in patients with visual impairment (18, 19).

The longer the duration of DM, the higher the risk of DR especially if the diabetes onset is between 31 and 45 years of age (20). This was reflected in our study; poorer QOL and visual impairment were associated with longer duration of DM. Therefore, modifiable risk factors such as compliance with diet, exercise and medication are important. There was an inverse relationship between DM duration and QOL, except for patients in the 1- to 5-year DM duration category that had poor QOL. The visual impairment in this group of patients was mild to moderate; however, it may be due to difficulty accepting the new diagnosis of DR and learning to cope with the new lifestyle changes.

In an Iranian study, the disutility of visual impairment from diabetic eye disease was highest in the early stages and reduced with advancing disease (21). The former was in keeping with our patients who had a worse QOL in the first 5 years, which may be associated with adapting to the lifestyle changes and in addition to visual impairment. This reduced after 5 years from diagnosis of diabetes; however, the QOL of life reduced again after 20 years from diagnosis. This may be related to multiple causes, besides for visual impairment, such as lack of family support or finances in their older age.

Neither QOL nor visual impairment was associated with age, marital status and education. A Caribbean study had shown that anxiety and worry had the highest impact on QOL in the young patients with diabetes (22). Other factors causing poor QOL were being unable to drive and read the newspaper (22). Persons were least concerned about their ability to see food, being trapped in a fire, having close personal relationships and choosing clothing (22). Anxiety and worry increased as a patient became older (22), which could explain the reduced QOL in the older population.

This study was the first to use a questionnaire modelled from the NEIVFQ, a valid and reliable questionnaire for eye conditions, in Jamaica to evaluate the impact of visual impairment on the QOL of patients with DR (23).

Bias may have occurred as the very poorly controlled patients with DR were lost to immediate referral to the Accident and Emergency (A&E) from the Eye Clinic due to life-threatening elevated blood glucose levels and/or blood pressure readings. Some patients who were feeling unwell or were not in a receptive mood to be interviewed declined the invitation to participate in the study. The relationship between patient factors and QOL may have been strengthened by the inclusion of these groups of patients.

This study did not compare QOL in age and gender-matched controls in the non-diabetic population. Other aspects of vision such as colour vision, contrast sensitivity and visual field could have been measured since these also impact vision-related QOL (24).

These data could be used to create a greater awareness of the QOL experienced by patients with DR. Understanding the impact of visual impairment on QOL can allow the development of appropriate visual rehabilitation programmes, self-education, social programmes and support groups to improve QOL in the diabetic patient (25). Social activities and increased physical activity (exercise) can assist the patients to get better control on their diabetes, self-esteem and QOL.

CONCLUSION

Future research to study the impact of interventions such as low vision aids, occupational therapy in conjunction with appropriate employment programmes, sporting activities, counselling, and support groups on QOL and glycaemic control could be done. There is much work that needs to be done to educate and assist this country's diabetes care. The implementation of these interventions would serve to benefit patients and improve their QOL.

AUTHORS' NOTE

LM conceived paper, planned study design, oversaw data collection and contributed to interpretation of the data and critical revision of the manuscript. TF planned study design, data collection and wrote the manuscript draft. JM involved in data analysis and interpretation, and critically revised manuscript. The authors declare that they have no conflicts of interest.

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