Impact of microvascular complications on quality of life in diabetic patients

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ABSTRACT

Diabetes is a serious health concern all over the world. Among people with diabetes, a key factor influencing quality of life (QOL) is degree and nature of diabetes related complications experienced by the patients over a lifetime. QOL is important health related factor and one of the most widely used measure to self-assess the effect of the management of chronic disease on health and monitors the physical, psychological, and social aspects of personal health. This study is a prospective questionnaire based observational study which was conducted in a tertiary care hospital among diabetic patients using WHOQOL-BREF questionnaire and relevant information was collected. The domain wise scores are calculated. A total of 140 diabetic patients were included in the study of which 100 were with complications and 40 were without complications. The inference obtained this study was that nephropathy is the most common microvascular complication and affects the psychological and environmental status of subjects. We conclude that taking proper diabetic diet and self-care can prevent the worsening of QOL in patients with microvascular complications.

Keywords: Diabetes mellitus; Quality of life (QOL); WHO-BREF questionnaire; microvascular complications; Nephropathy; Retinopathy; Neuropathy.

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INTRODUCTION

The WHO defined "Diabetes mellitus as a group of metabolic disorders characterized by hyperglycemia, is associated with abnormalities in carbohydrate, fat and protein metabolism and results in chronic complications including microvascular and macrovascular complications".

Diabetes mellitus is classified into two types. They are type 1 (insulin dependent) and type 2 (combination of insulin resistance and reduced insulin secretion).

Type 1 is an autoimmune disease characterized by pancreatic beta cell destruction and an absolute deficiency of insulin. It accounts for approximately 5 to

10% of all cases, most commonly diagnosed in patients younger than 20 years of age.

Type 2 is caused by a combination of peripheral resistance to insulin action and a reduced secretory response by the beta cells of pancreas. It accounts for approximately 90 to 95% of diabetic patients and a vast majority of such patients are overweight. The prevalence of type 2 diabetes in children and adolescents is increasing at an alarming pace.^[1]

Diabetes is the main cause for serious complications like cardiovascular diseases, cerebrovascular diseases, renal disorders inflammation and immunity, and obesity.^[2] Factors which affect diabetes complications are gender, age, and ethnic background. Defects in insulin metabolism and dysfunction in carbohydrate, lipid and protein metabolism leads to high levels of blood glucose which result in long term complications.^[3] These complications affect small blood vessels that typically includes retinopathy, neuropathy, nephropathy.

Diabetic Retinopathy is progressive chronic disease that results from vascular injury due to hypoglycemia, which is the leading cause of blindness in working age adults.^[4]

Diabetic nephropathy is a progressive rise in urine albumin excretion, coupled with increasing blood pressure, leading to declining glomerular filtration and eventually results in end stage renal failure.^[5]

Diabetic Neuropathy is a heterogeneous condition related to nerve pathology, the condition is classified

according to the nerves affected and include focal, diffuse, sensory, and autonomic.^[4]

Quality of life (QOL) is defined as “individual perception of their position in life, in relation to their goals, expectation, standards and concerns”. QOL incorporates patient’s perspective of his/her physical/mental/social wellbeing. QOL is a powerful tool to predict an individual’s capacity to manage the disease and maintain long term health and well-being.^[6]

QOL assessment is considered as important measure of outcome in chronic disease management. It also represents the ultimate goal of all health interventions.^[7] Routine assessment of QOL as a part of clinical practice has the potential to improve communication between patient and the health care provider, identify frequently overlooked problems and assess them.^[8] The framework of QOL is based on understanding of an individual’s well-being. QOL is measured in terms of objective and subjective indicators: objective QOL includes finance, employment, education and social or physical environment; subjective QOL includes personal opinion, emotional and physical well-being.^[9]

WHOQOL-BREF SCALE

The WHOQOL-BREF is a 26-item instrument consisting of four domains: physical health (7 items), psychological health (6 items), social relationships (3 items), and environmental health (8 items); it also contains QOL and general health items. Each individual item of the WHOQOL-BREF is scored from 1 to 5 on a response scale, which is stipulated as a five point ordinal scale. The scores are then transformed linearly to a 0–100 scale, where 100 is the highest QOL and 0 is the lowest QOL. The mean score of each domain and the total score were calculated.^[10]

The physical health domain includes items on mobility, daily activities, functional capacity, energy, pain, and sleep. The psychological domain measures include self-image, negative thoughts, positive attitudes, self-esteem, mentality, learning ability, memory concentration, religion, and mental status.

The social relationships domain contains questions on personal relationships, social support, and sex life. The environmental health domain covers issues related to financial resources, safety, health and social services, living physical environment, opportunities to acquire new skills and knowledge, recreation, general environment.^[11]

MATERIALS & METHODOLOGY

Objectives: The main objective of the study is to measure the impact of microvascular complications and to assess the effect of patient counselling in improving their quality of life in diabetic patients.

Study site: The present study was conducted in tertiary care hospital, Chalmeda Ananda Rao institute of medical science, Karimnagar, Telangana.

Study period: 6 months

Study criteria: All patients who have diagnosed with diabetes mellitus

Inclusion criteria: All patients with diabetes irrespective of gender

Exclusion criteria: Critically ill patients who are not in a position to be interviewed, pregnant women cancer patients, psychiatric patients were excluded from the study.

Study procedure: The study was conducted in multiple departments of Chalmeda Ananda Rao institute of medical science. The data like demographic details, comorbidities, past medication history and medical history were obtained by direct patient interview, review of patient medical records and documented in the data collection forms designed for study. The QOL of each patient was assessed by using WHO-BREF questionnaire. It consists of 26 questions and 4 domains as discussed above. Each individual item of WHO-BREF is scored from 1 to 5 on a response scale. The row scores for the domains were calculated by adding values of single items and were transformed on the scale ranging from 0 to 100, where 100 is the highest and 0 is the lowest QOL.

Statistical analysis: Data analysis was carried out using Microsoft excel 2001 version. Statistics was applied using graph pad prism 8 and the correlation between the complications and quality of life was analysed by using Pearson’s correlation co-efficient.

RESULTS & DISCUSSION

Data was collected from a total of 140 diabetic patients of the age distribution 10 to 88 years with a mean age of 55.56 years (Mean age $\pm$ SD 55.56 $\pm$ 18.38). 97 (69.28%) were male with mean age of 55.52 $\pm$ 9.89yr and 43 (30.71%) were female with mean age of 55.65 $\pm$ 3.53years.

Figure 1: Age distribution of diabetic patients by gender

Table 1: Age distribution of diabetic patients by gender

Age group (years)	No. of patients (%)	Male (%)	Female (%)
10-19	5 (3.57%)	3 (3.09%)	2 (4.65%)
20-29	4 (2.85%)	2 (2.06%)	2 (4.65%)

30-39	9 (6.42%)	8 (8.24%)	1(2.32%)
40-49	22 (15.71%)	16 (16.49%)	6 (13.95%)
50-59	31 (22.14%)	21 (21.64%)	10 (23.25%)
60-69	47 (33.57%)	33 (34.02%)	14 (32.55%)
70-79	16 (11.42%)	9 (9.27%)	7 (16.27%)
80-89	6 (4.28%)	5 (5.15%)	1 (2.32%)
Total	140	97	43

Education distribution: Among the study participants majority of them are illiterate (53%), and literate (24%), the rest of them completed at least their primary and secondary (4%) education.

Table 2: Education distribution by number of patients

Education	No. of patients	Percentage (%)
Illiterate	83	59%
Literate	33	24%
Primary	18	13%
Secondary	6	4%

Figure 2: Education distribution by number of patients

Among 140 patients, 100 were diagnosed with different complications and 40 without complications.

Figure 3: Complications Chart

Among 100 patients 67 (67%) were diagnosed with nephropathy, of which 50(74.62%) were males, 17 (25.37%) were females. 5(5%) patients were diagnosed with retinopathy, of which 4 (80%) were males, 1(20%) were females. 18(18%) patients were diagnosed with foot ulcers, of which 12 (66.66%) were males, 6(33.33%) were females. 7(7%) patients were diagnosed with DKA, of which 3(42.85%) were males, 4 (57.14%) were females. 3(3%) patients were diagnosed with neuropathy, of which 3 (100%) were males.

Figure 4: Distribution of patients by type of complications

Table 3: Distribution of patients by type of complications

Complications	Male	Females
Nephropathy	50	17
Retinopathy	4	1
DKA	3	4
Neuropathy	3	0
Foot ulcers	12	6

In this study among 140 patients, 64 (45.7%) patients were satisfied, of which males were 41(64.06%) and females were 23(35.93%). and 76(54.2%) patients were dissatisfied, of which males were 56(73.68%) and females were 20(26.31%).

Table 4: No of patients satisfied and dissatisfied based on WHOQOL-BREF Score

	Satisfied	Dissatisfied
Complications	46	54
Without complications	23	17

Figure 5: No of patients satisfied and dissatisfied based on WHOQOL-BREF Score

In total, 140 participants were interviewed with WHOQOL-BREF questionnaire. Of this male were 97(69.2%) with a mean age of 55.52±9.8994. and females were 43(30.71%) with a mean age of 55.65±3.5355. The mean of different domains was found to be DOM1- 52.671±26.87, DOM2- 49.70±4.242, DOM3- 52.31±26.16, DOM4- 49.76±4.94. The highest mean score was found for DOM1 Physical health (52.67), implying good activities of daily living, less dependence on medicinal substances and medical aids, enough energy and mobility, less pain and discomfort, sufficient sleep, rest and good work capacity. And lowest mean score for DOM2 Psychological health (49.70), indicating not

very much bodily appearance, negative feelings, personal beliefs, thinking, learning, memory and concentration.

The mean scores were slightly lower for all the domains in diabetic patients with complications compared with the controls without complications. The Pearson's correlation co-efficient was used to determine the level of agreement between diabetes with complications and without complications ($r = -0.1168$). We used single t-test for comparison of mean scores values for the domains of the WHOQOL-BREF and the significant difference between four domains is found to be $p < 0.001$.

Table 5: Domain wise mean in different complications

Complications	Do-main 1	Do-main 2	Do-main 3	Do-main 4
Nephropathy	51.59	50	53.84	49.66
Neuropathy	52.52	54.19	56.68	48.83
Foot ulcers	51.38	53.16	55.5	47.61
DKA	56.42	55.42	58	54.42
Retinopathy	37.6	48.6	58.8	46.4
Without complications	55	48.62	52.05	54.5

Figure 6: Domain wise mean in different complications

CONCLUSION

This study has shown that diabetic complications particularly nephropathy, have a profound impact on the quality of life of patients with type 2 diabetes mellitus. Even the presence of mild diabetic complications has a significant impact on the QOL. In this study WHOQOL- BREF questionnaire is used to know the impact of microvascular complications on quality of life in diabetic patients.

Participants with older age, male gender of diabetes Mellitus worse their quality of life. Diabetic patients with complications are not satisfied with their QOL compared with diabetic patients without complications. To improve QOL in patients with type 2 diabetes, early diagnosis of the disease and aggressive management of risk factors, counselling and education regarding the disease are necessary to prevent the development of diabetic complications and ensuring improvement of QOL.

With the emergence of non-communicable diseases in developing countries, health care professionals should make use of opportunities in educating people with diabetes mellitus to promote a good quality of life.

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