Original Article

Comparative Study on Effect of Insulin and Oral Hypoglycemic Drugs on Quality of Life among Type 2 Diabetics Using Modified Diabetes Quality of Life Questionnaire (MDQOL-17)

Aparna Tare[1], Khyati Kothary[2]

[1]Intern, [2]Professor, K.J.Somaiya College of Physiotherapy, Mumbai

Abstract

Diabetes mellitus is defined as a group of metabolic diseases characterized by hyperglycemia, due to defective insulin secretion, action or both. Type 2 diabetics can be treated by using oral hypoglycemic drugs or insulin or both. Type 2 diabetics who do not respond to the treatment of oral hypoglycemic drugs or maybe insulin resistant over a period of time require supplemental insulin for adequate glycemic control. The reality is that diabetes influences patient's lives. The mere presence of diabetes deteriorates a person's quality of life. When diabetes co exists with other chronic illnesses, the effect is even worse. **Aim and Objective of the Study -** To compare quality of life in diabetics on insulin and oral hypoglycemic drugs. The objectives being assessing and comparing quality of life in Diabetics on insulin and oral hypoglycemic drugs using MDQol-17 on the components like Physical functioning, Role limitations due to physical health, Role limitations due to emotional health, Energy fatigue, Emotional well-being, Social functioning, and General health. **Study design and methodology -**Total of 124 subjects were included in the study. Of this, 62 were on insulin (Group A) and 62 were on oral hypoglycemic drugs (Group B).Outcome measure used was Modified Diabetes Quality of life questionnaire-17. **Results and analysis -** The data was collected and analyzed using statistical test – Unpaired t test for the comparison between two independent groups. The QOL score for insulin and OHD group was 60.96(±1.8) and 71.32(±1.5) respectively which was significant. With the p=<0.05. The difference in the domains of Role limitations due to physical health, role limitations due to emotional health, social functioning and general health was statistically significant on comparing between the two groups. **Conclusion -** There is significant difference in the Quality of life of Diabetic patients who are on insulin and those on oral hypoglycemic drugs.

Key words – *Diabetes mellitus, Modified Diabetes Quality of Life questionnaire.*

Introduction

Diabetes mellitus is defined as a group of metabolic diseases characterized by hyperglycemia, due to defective insulin secretion, action or both.

As per the etiological classification of Diabetes mellitus, it is divided into 2 types. 1.Type 1 diabetes (IDDM) Beta-cell destruction, usually leading to absolute insulin deficiency[1] 2.Type 2 diabetes (NIDDM) may range from predominantly insulin resistance with relative insulin deficiency to a predominantly secretory defect with insulin resistance[1]

Type 2 Diabetes is a growing challenge in India with estimated 8.7% diabetic population in the age group of 20 and 70 years. The rising prevalence of diabetes and other non-communicable diseases is driven by a combination of factors - rapid urbanization, sedentary lifestyles, unhealthy diets, tobacco use, and increasing life expectancy.[1]

Corresponding author:
Dr. Khyati Kothary (PT),
E-mail: khyati@somaiya.edu

Obesity and overweight are the most important risk factors responsible for diabetes. Much of the diabetes burden can be prevented or delayed by behavioral changes favoring a healthy diet and regular physical activity.

Type 2 diabetics can be treated by using oral hypoglycemic drugs or insulin or both.Type 2 diabetics who failed to be adequately controlled with diet and exercise need to be put on oral hypoglycemic agents for tight metabolic control.

The Oral Hypoglycemic agents which stimulate beta cells to secrete insulin are Sulphonylureas, the one which works by suppressing hepatic glucose production is Metformin, the ones which enhances insulin sensitivity in peripheral tissue are Thiazolidinediones and the drugs which interfere with absorption of glucose from gut are Alpha glucosidase inhibitors.

Type 2 diabetics who do not respond to the treatment of oral hypoglycemic drugs or maybe insulin resistant over a period of time require supplemental insulin for adequate glycemic control.

It is well established that the prevalence of diabetes has increased in the developed and developing countries during the last four decades. That is a result of abundance of food, the consequent change of our dietary habits and the lack of exercise. According to International diabetes Federation, now a days, one every 11 adults has diabetes (415 million worldwide). [7]

Progression of diabetes, and especially poor glycemic control, leads to numerous potentially life threatening complications. Almost half of the adults with chronic kidney disease are derived from diabetic population. Likewise, 9.8% of diabetics have experienced heart attack, 9.1% suffer from coronary artery disease (CAD), 7.9% have congestive heart failure, 6.6% have stroke while more than a quarter of them 27.8% have foot problems and last but not the least 18.9% have eye damage. All these complications along with the metabolic deterioration demand a large amount of patient's every day energy, planning and thought, which leads to a situation called "diabetes overwelmus" [7]

The reality is that diabetes influences patient's lives. The mere presence of diabetes deteriorates a person's quality of life. When diabetes co exists with other chronic illnesses, the effect is even worse.

The aim of this study is to compare quality of life in diabetics on insulin and oral hypoglycemic drugs.

The objectives being assessing and comparing quality of life in Diabetics on insulin and oral hypoglycemic drugs using MDQol-17 which includes the following components :

1) Physical functioning
2) Role limitations due to physical health
3) Role limitations due to emotional health
4) Energy fatigue
5) Emotional well being
6) Social functioning
7) General health

Null hypothesis of the study was that there would be no difference in quality of life in diabetics on insulin and diabetics on oral hypoglycemic drugs and the experimental being there would be a difference in quality of life in diabetics on insulin and diabetics on oral hypoglycemic drugs

Materials and Methodology

It was a cross sectional comparative study.The inclusion criteria were Type 2 Diabetics between the age group of 30 to 65 years on insulin and or hypoglycemic drugs. The exclusion criteria were all those with Type 1 Diabetics,Individuals with endocrine disorders (except Metabolic Syndrome) or cs with any serious illness or complications.Individuals with other severe musculoskeletal aches and pains or neurological conditions were also excluded from the study.

Total of 124 subjects were included in the study. Of this, 62 were on insulin (Group A) and 62 were on oral hypoglycemic drugs(Group B).

Outcome measure used was Modified Diabetes Quality of life questionnaire-17. It consists of 17 questions that comprise seven domains, which include

physical functioning, role limitation due to physical health problems, role limitations due to personal or emotional problems, emotional well being, social functioning, energy/fatigue and general health perceptions.

TABLE I - MDQoL-17 Domains and item numbers

Domains	Number of Items	Item Numbers
Physical functioning	3	4,5,6
Role limitations due to physical health	1	7
Role limitations due to emotional	2	11,12
Energy Fatigue	1	17
Emotional well being	3	8,9,10
Social functioning	4	13,14,15,16
General Health	3	1,2,3

TABLE 2 -Grading for questionnaire:

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Response category and scores of MDQoL-17

Item Number	Response category and Scores
1,2,7,13	1→100,2→75,3→50,4→25,5→0
3	1→0,2→25,3→50,4→75,5→100
4,5,6	1→0,2→50,3→100
8,9,10,11,12,14,15,16	1→0,2→20,3→40,4→60,5→80,6→100
17	1→100,2→80,3→60,4→40,5→20,6→0

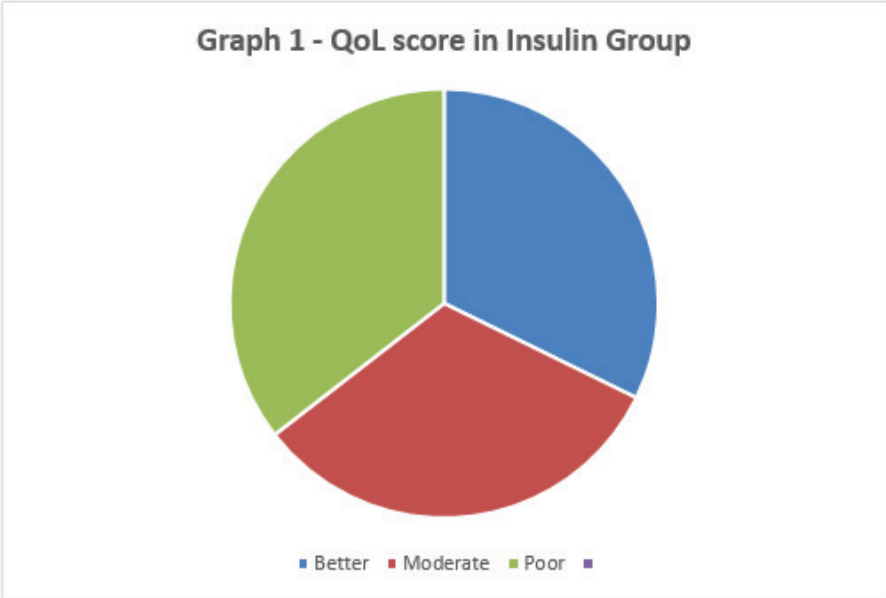
The subjects were interviewed for demographic data which included their name, gender, age, co morbidities, duration of diabetes, medications and insulin units consumed. The subjects were asked to fill the appropriate score for each question. All the contents were scored so that a high score depicts a more favorable health state. The possible scores were 0-100, 0 being the minimum and 100 being the maximum score. Scores represented the percentage of total possible scores achieved.

The Quality of Life (QoL) score of MDQol-17 was expressed as a percentage of total QoL score for ease of comparison and analysis. The patients with a QoL score

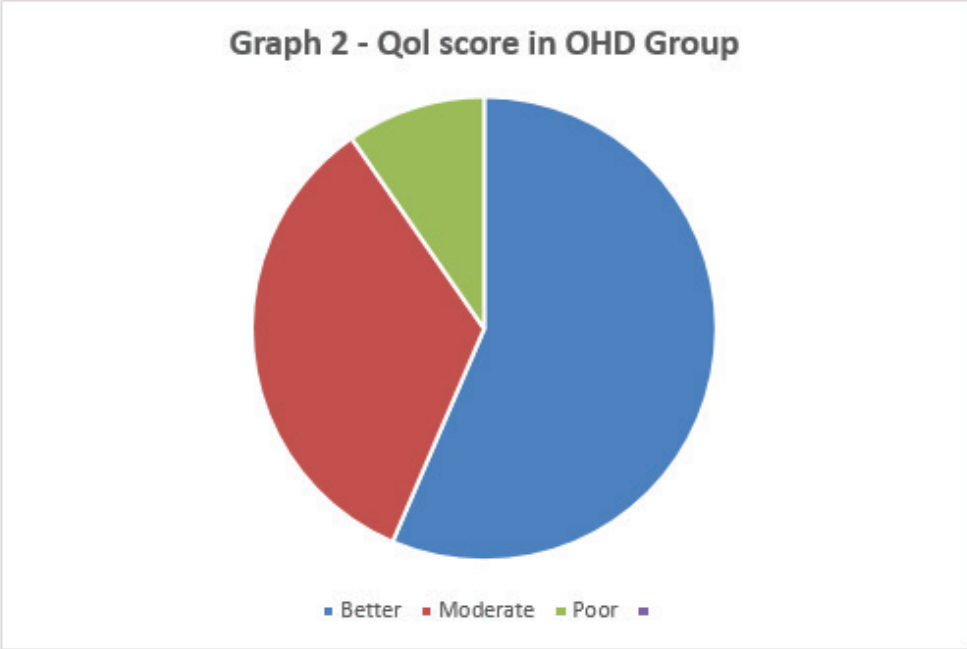
of more than 70 represented better QoL, those with a QoL score of 50-70 represented moderate QoL and those with less than 50 represented poor QoL.

Moreover, every component of the questionnaire was compared in the two groups.

STATISTICAL ANALYSIS AND RESULTS



The data was collected and analyzed using statistical test – Unpaired t test for the comparison between two independent groups.



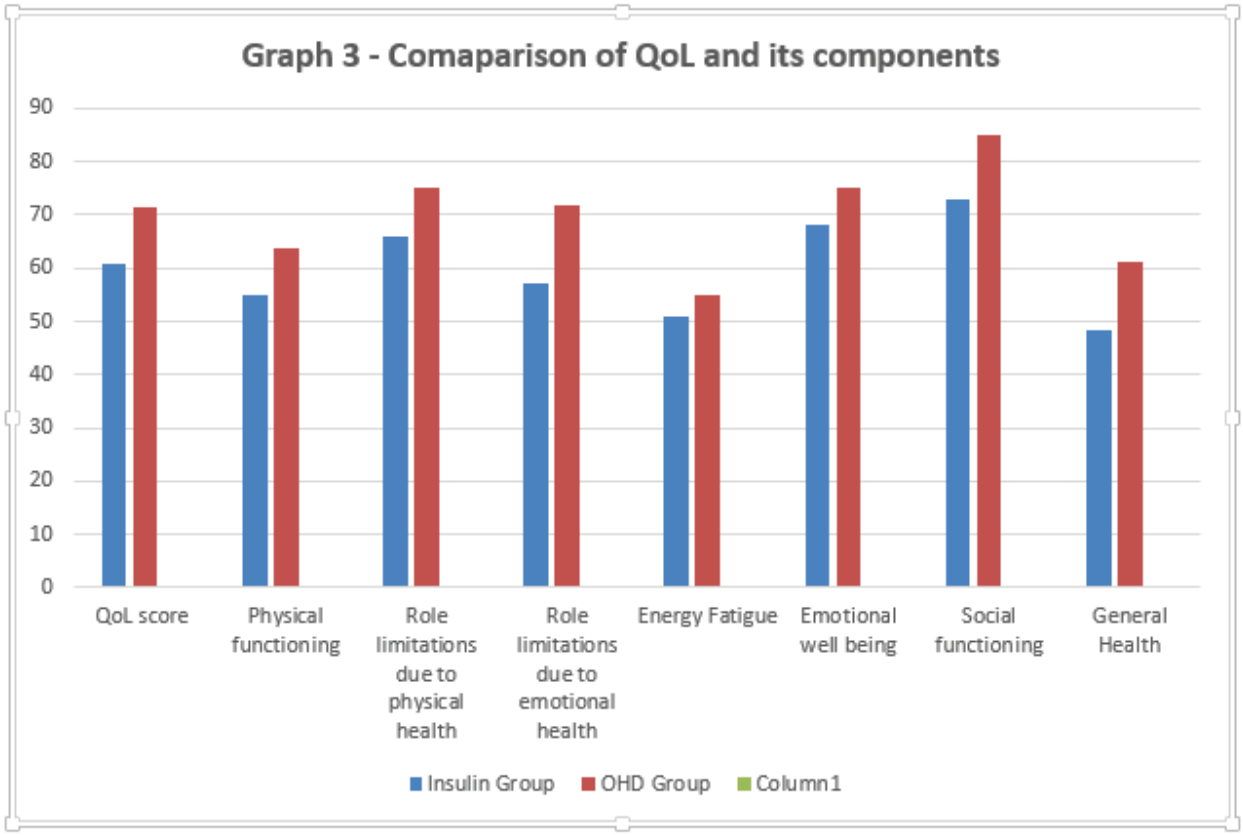


Table 3 - Comparison of QoL and individual components of QoL

	Insulin	OHD	P value	Interpretation
QOL score	60.96(±1.8)	71.32(±1.5)	0.00046	p<0.05, Significant
Physical functioning	55(±3.1)	63.71(±3.1)	0.069	Not significant
Role limited due to physical health	66(±3.2)	75(±2.1)	0.024	p<0.05, Significant
Role limited due to emotional health	57(±2.7)	72(±2.3)	0.00063	p<0.05, Significant
Energy fatigue	51(±2.4)	55(±2.3)	0.164	Not significant
Emotional well being	68(±2.6)	75.02(±2.1)	0.056	Not significant
Social functioning	73(±1.8)	85(±1.5)	0.000074	p<0.05, Significant
General health	48.3(±2.2)	61.12(±1.8)	0.001097	p<0.05, Significant

Discussion

In the present study, diabetic subjects on insulin (Group A) and diabetic subjects on oral hypoglycemic drugs (Group B) were included to observe the difference in Quality of life and its components using MDQoL-17. Age and gender were matched. Group A consisted of 62 patients, including 48% of women and 52% of men with the mean age 57.85 years (36-65 years) as seen from graph 1. Group B - n=62; 66% of women and 34% of men; with mean age 55.25 years (36-65 years)as sen in graph 2. There was no significant difference in mean age and gender between two groups.

As in graph 3, patients in group A had a longer disease duration time, 24% of respondents suffered from diabetes for 1 to 5 years, 34% between 5 to 10 years, and 42% for more than 10 years. In the group B, 58% of respondents were in the first five years of disease duration, 24% between 5 to 10 years; 18% for more than 10 years as shown in graph 4.

In Group A, 32% subjects had a better Quality of Life score i.e. more than 70%; 32% subjects had a moderate Quality of Life score i.e. between 50% to 70% and 35% subjects had a poor Quality of Life score i.e. less than 50%. In Group B, 56%, 34% and 10% of subjects had better, moderate and poor Quality of Life score respectively.

The overall Quality of Life of patients in Group A was less as compared to Group B because majority of patients on insulin had diabetes for a longer duration (graph 5 ,6). There is a strong association between Diabetes Mellitus and Cardiomyopathy that parallels with the duration and severity of hyperglycemia. Coexistence of Cardiovascular Diseases leads to significant increase in the clinical complications and thus to a substantial reduction in Quality of Life of patients.[9]

The difference in physical functioning component was not significant in two groups (p=0.069). But the role limitations due to physical functioning was significantly different, being more affected in Group A than Group B (p=0.024). this is because of the fact that the work life of Group A patients was adversely affected due to co morbidities as well as other factors like pain of insulin injections, urgency to take insulin injections in time, frequent change of sites as well as embarrassment of taking it in public. [2]

The role limitations due to emotional health were significantly more in Group A with p value being 0.000631. The diabetics on oral medications do not have an anxiety regarding self injections which are to be taken by the insulin patients so also the complicated regimens of insulin dosages and timing of injecting insulin adds on to the stress and hence emotional well being of the patients.[9]The fact that presence of more co morbidities as seen in insulin subjects as chronic diabetics use insulin makes them lose confidence in their abilities.

There was no significant difference in energy fatigue component between two groups (p= 0.167383) as well as emotional well being (p= 0.56022).

The social functioning was significantly reduced in Group A than Group B (p=0.000074) this is due to multiple factors like travelling being a hindrance for patients on insulin, insulin injectables which are more expensive than oral drugs hence adding onto an economic burden and reducing expenses on social functions.

General health of the patients in Group A was affected than those in Group B (0.001097) because of the presence of more co morbidities. Insulin leads to improvement in glycemic control and well being in patients receiving long term insulin therapy, but hypoglycemia related to the Type 2 Diabetes insulin treatment has a significant negative impact on health related Quality of Life and productivity of these patients. [9]

Thus, it can be concluded that presence of Diabetes Mellitus overall reduces the Quality of life of patients in all aspects like physical, emotional, social as well as general health; the affection being more in insulin group than in OHD group.

Limitations of the study was that the subjects were chosen from the hospital as well as from the community settings due to which Quality of life scores can differ. Also HbA1c could not be assessed for all the patients to know their latest glucose levels. Further it can be suggested that the Quality of Life can be compared separately for the patients with co morbidities and those without co morbidities.

The clinical implication of this study is that once we know how much physical functioning is affected at the same time what physical limitations the patient has due to Diabetes. This study will be helpful in the context of physiotherapy for designing exercise protocols for the affected domain, thus setting up individualized exercise protocols. Thus, finding a trend of which component is affected more in which group of diabetics and setting up exercise protocols for two separate groups is the significance for doing this study.

Conflict of Interest- There are no conflict of interests in the study.

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