

“COGNITIVE FUNCTIONING AND QUALITY OF LIFE IN POOR CONTROLLED DIABETIC PATIENTS.”

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ABSTRACT: –Purpose: -To evaluate the association between cognitive dysfunction and poor diabetes control and contribution of diabetic complications on quality of life.**Objectives:** -To assess cognition level in poor controlled diabetic patients and assess quality of life of poor controlled diabetic patients.**Methodology:** - Cross Sectional Study design assigned by convenient sampling of 100 subjects.**Outcome Measures:** - MOCA scale, SF-36 Scale**Result:** - Out of 100 people, 32 had NC (MoCA score ≥ 26) and 68 had MCI (MoCA score < 26). **Correlation of HbA1C with FBS, PPBS and MoCA** was statistically significant, which was tested with spearman correlation test. The spearman r values were 0.2665, 0.3268 and 0.2427 respectively. P values of correlation with HbA1C were 0.0074 for FBS, 0.0009 for PPBS and 0.0150 for MoCA. **Role limitation due to Physical Health** in sf-36 had the lowest value, of which mean was 58.25 \pm 36.76 and **Social functioning** had the highest value, of which mean was 81 \pm 21.57.**Conclusion:** - There is significant correlation between HbA1C, FBS, PPBS, and MoCA. Due to Diabetes mellitus, patient’s quality of life gets affected. There is correlation between poor diabetic control and role limitation due to physical health. Thus it is concluded that “There is relationship between poor glycemic control and cognitive functioning and quality of life.”

Key words : cognition, diabetes, poor controlled diabetes, MoCA, quality of life

INTRODUCTION-Diabetes is a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces^[1-2]. Diabetes in older adults has become a major public health problem affecting an increasing number of individuals worldwide. Both older age and diabetics are independently associated with an increased risk of cognitive dysfunction;

the risk is even greater for older adults with diabetes. Neuropsychological tests have shown deficits in various aspects of cognitive function in both younger and older patients with diabetes^[3-8].

Deficits have been seen in areas of psychomotor efficiency, global cognition, episodic memory, and working memory^[9-10].

Abnormalities in cognitive functions mediated by frontal lobe, including several

complex behaviors such as problem solving, planning, organization, insight, reasoning, and attention are noted in patients with diabetes^[11-14].

Cognitive dysfunction with its wide range, from mild cognitive impairment (MCI) through dementia, is one of the chronic complications of diabetes mellitus^[15].

MATHADODOLOGY AND PROCEDURE

DATA ANALYSIS

Total 100 people with diabetes mellitus were taken and sample was convenient. Male: Female ratio was equally distributed, which was 1:1.

Table 1: - Baseline characteristics of patients with diabetes included in the study (n=100)

Variables	N=100
Age	58.63±8.42
HbA1C (%)	8.78± 1.75
FBS (mg/dL)	157.71±44.97
PPBS (mg/dL)	219.34±55.38
MoCA score	23.71±3.22

*Mean ± Standard deviation

Table 2:- Correlation between HbA1C; FBS,

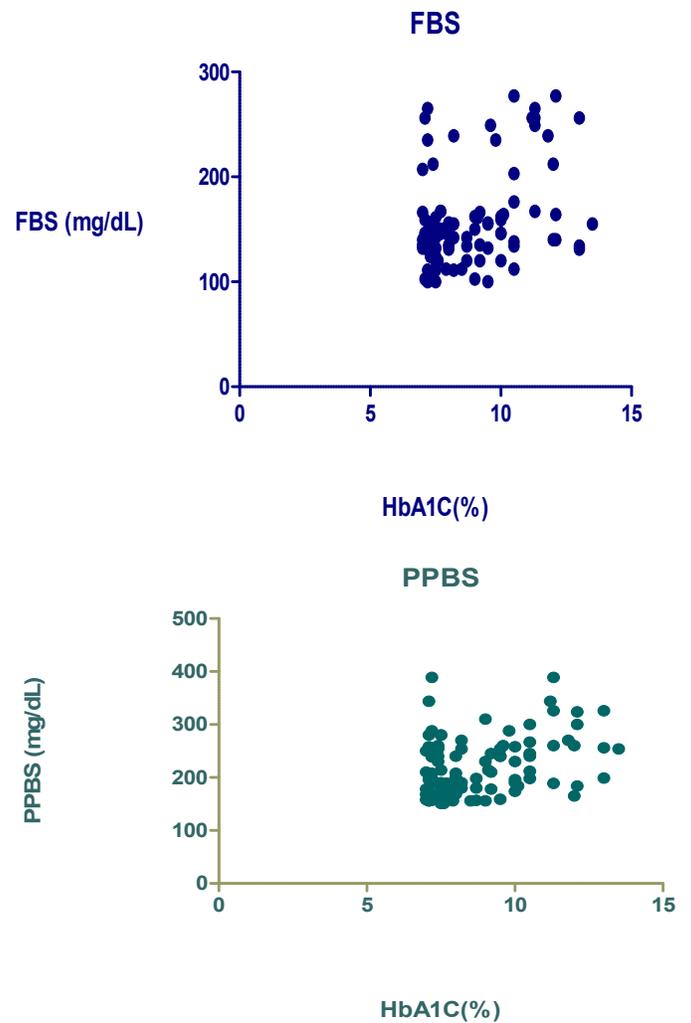
Variables	FBS	PPBS	MoCA
Number XY Pairs	100	100	100
Spearman r	0.2665	0.3268	0.2427
P value (two-tailed)	0.0074	0.0009	0.0150
Is the correlation significant? (alpha=0.05)	Yes	Yes	Yes

PPBS and MoCA scores

*Statistically significant

Correlation of HbA1C with FBS, PPBS and MoCA was statistically significant which was done by using SPEARMAN correlation method.

GRAPH 1: - CORRELATION BETWEEN HbA1C AND FBS , PPBS , MOCA



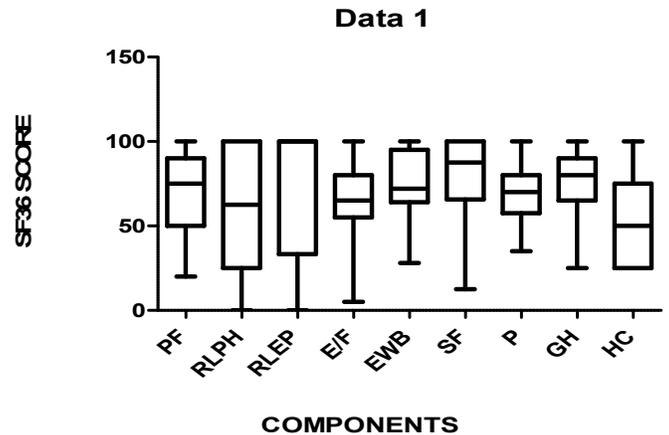
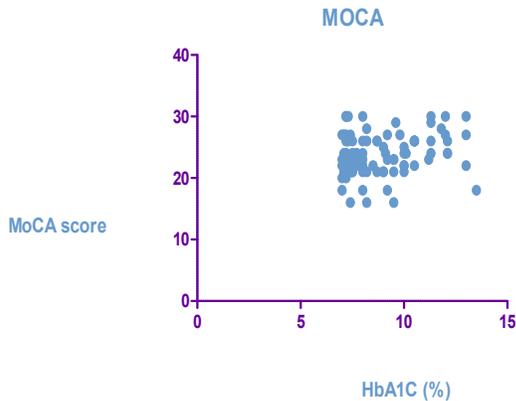


Table 3: - Baseline characteristics of SF-36 score (n=100)

Components	(N=100)
Physical functioning	70.9±20.77
Role limitation due to physical health	58.25±36.76
Role limitation due to emotional problems	70.33±36.97
Energy/Fatigue	66.45±22.66
Emotional well being	74.88±19.81
Social functioning	81±21.57
Pain	68.22±18.58
General health	75.4±19.38
Health change	48.25±22.82

*Mean± Standard deviation

Correlation between HbA1C and components of SF-36 was negative and “t” Test for male female of sf36 components was also negative.

GRAPH 4: - Mean observed in SF-36 components value

RESULT

Out of 100 people, **32 had NC (MoCA score >=26)** and **68 had MCI (MoCA score <26)**.

HbA1C, FBS and PPBS levels were significantly higher in patients with MCI.

Correlation of HbA1C with FBS, PPBS and MoCA was statistically significant, which was tested with spearman correlation test. The **spearman r values** were **0.2665, 0.3268 and 0.2427**, respectively. **P values** of correlation with HbA1C were **0.0074 for FBS, 0.0009 for PPBS and 0.0150 for MoCA**.

For quality of life of diabetic patients’ correlation between HbA1C and components of SF-36 was negative.

“t” Test for male female of sf36 components was also negative.

Role limitation due to Physical Health in SF-36 had the **lowest value**, of which mean was **58.25±36.76** and **Social functioning**

had the **highest value**, of which **mean** was **81±21.57**.

Mean health change was 48.25±22.82.

DISCUSSION: However, previous studies used MMSE, trail-making tests, modified MMSE, and other neuropsychological tests like digit span test, digit symbol substitution test, and others, which are less sensitive in detecting MCI and hence could have contributed to the difference. As MoCA is a more sensitive test, it might have helped detect MCI more accurately.

In our study, patients with cognitive impairment had significantly higher FBS, PPBS, and HbA1c, which were correlated with MOCA scores.

Hence, our results are consistent with existing literature that poor glycemic control in type 2 diabetes is associated with cognitive decline.

While there is vast epidemiologic data linking poor glycemia and cognitive impairment, it is not clear whether improving glucose control leads to improvement in cognition.

The MoCA is now accepted as an excellent tool for brief cognitive screening measure and is freely available with multiple editions in various languages.

It has previously been shown that the total score of the MoCA was a better

discriminator for aMCI and had a modest accuracy in differentiating No amnesic MCI (naMCI) patients from healthy controls that were better than the MMSE. [32]

We used the English version of MOCA as the local language version is not available. As some patient were unable to understand English, we translated the English version into Gujarati or Hindi for them.

In summary, our study shows a high prevalence of undetected MCI in type 2 diabetes mellitus patients attending an outpatient clinic setting.

A strong correlation was noticed between all parameters of glycemic control and MOCA scores representative of cognitive function.

These observations make a strong case for routine screening of type 2 diabetes mellitus patients to detect MCI with a sensitive tool such as MOCA.

Studies on the benefits of improved glycemic control on cognitive function would need to be performed in the future to help us understand the significance of our finding in the long-term management of these patients.

The lack of a direct relationship of depression to A1C was consistent with the findings in most other studies of patients with type 2 diabetes

Depression has an important impact on HRQoL in patients with DM2, and thus, strategies should be developed to prevent depression. It has been shown that exercise on a regular basis, of any type of intensity, prevents depression. [36-37] Because of this, some of the strategies should be to promote routine exercise for older adults.

CONCLUSION: There is significant correlation between HbA1C, FBS, PPBS, and MoCA. Due to Diabetes mellitus, patient's quality of life gets affected. There is correlation between poor diabetic control and role limitation due to physical health. Thus, it is concluded that "There is relationship between poor glycemic control and cognitive functioning and quality of life."

LIMITATION OF THE STUDY

- The size of the sample was relatively small. It was within sphere of one district. So, it does not represent the large population.

CLINICAL IMPLICATION

As per our study results, poor controlled diabetes affects cognitive function of the people. So cognitive function assessment should be added during Physiotherapy assessment of diabetic patients.

FUTURE RESEARCH

- The study should be in large population.
- Comparative study between 2 groups (Group 1: under control diabetic people and Group 2 : poor controlled diabetic patients) and their correlation with cognitive impairment and quality of life can be done.
- Experimental study between case group and control group can be done for improvement in glycemic control and improvement in cognition level.

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