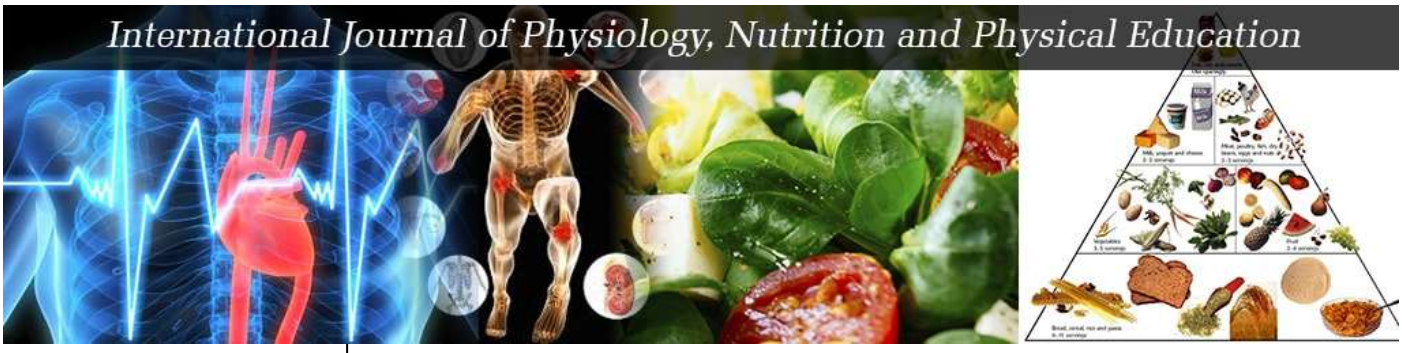

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Effect of duration of diabetes type 2 on cognition in middle aged Indian population: A correlational study

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Abstract
Aim: The aim of this study is to find the co-relation between cognition and duration of 10 years of type II diabetes in middle aged subjects of 45-59 years.
Method: A group consisting of 30 diabetic (type II, 0-10 years) participants was taken using random sampling. The sample included both the genders of 45-59 years of age group with normal BMI (18.50-24.99 kg/m2).PGI memory scale was administered to assess memory and various cognitive parameters.
Result: The mean and S.D value of age was 52.56 ± 5.309 years. PGI memory scale was administered and obtained scores were correlated withduration of diabetes and cognitive decline (highest possible score being 115).Pearson correlation coefficient (r)for PGIMS and duration of diabetes was found to be r= -0.37) at a statistically high level of significance (p_< 0.03) ascerting cognitive decline with increased duration of diabetes type II.
Conclusion: The negative correlation obtained between the duration of diabetes type II and PGIMS scores in the study/project are indicative of marked decline in cognitive functioning with increased duration of diabetes type II.

Keywords: Diabetes, type ii, cognition, memory, middle aged adults

1. Introduction

Diabetes, a disease of poor lifestyle claimed the lives of about 65+ million diabetic patients aged 20–79 years in 2013 in India, and substantial further increases anticipated. The elevated susceptibility to diabetes in India is alarming and unfortunately has made the nation the "diabetic capital of the world [1]." WHO estimated 80% of diabetic population deaths in low and middle income countries and projected two folds rise in the same in the year 2016 [2].

Diabetes is a complex, chronic illness which requires continuous medical care with various risk-reduction strategies beyond glycemic control [3]. Out of diabetes type 1 and 2, diabetes type 2 accounts for 90-95% of adult diabetes cases globally [4].

Its complication include cardiovascular diseases, hypertension, dyslipidemia, and various neuropathies. Renal function and wound healing has also found to be impaired in the diseased [5].

Diabetes affects the brain where the most common diabetic brain complications include cognitive decline and depression. An overall 50–100% increase in the incidence of dementia in people with diabetes has been reported in a systematic review of longitudinal studies [6].

Such disease associated complication like dementia has been the major cause of disability among older adults suffering from diabetes type 2 and among the same, those with longer duration of diabetes, poorer glycemic control, and more vascular complications are at the highest risk of developing dementia [7].

Recent evidence from several epidemiological studies suggests that it is also a risk factor for cognitive dysfunction which is a serious problem and is rising in prevalence worldwide, especially among the elderly [8-12]. Learning and memory dysfunction is widely believed to be a consequence diabetes type 2, particularly in adults > 65 years of age [13].

Therefore whether the detrimental effects of diabetes type 2 on memory and cognition are related to the duration of disease is the main focus of this study.

2. Materials and Methods

2.1 Subjects

A total of 30 subjects suffering from diabetes type 2 as diagnosed by the physician through laboratory investigation, were included in the study.

Random sampling was used to include 15 males and 15 females of age group 45-59 years. Duration of the disease taken into consideration was 0-10 years.

The sample population was literate with BMI ranging from 18.50-24.99 kg/m2.

A short, simple, objective, valid test for cognition and memory named PGI memory scale (PGIMS), has been used in the study to find a correlation between duration of diabetes type 2 and cognitive function in the selected sample group. It was constructed and standardized in 1977 and contains 10 sub tests namely, remote and recent memory, mental balance, attention concentration, delayed recall, immediate recall, retention for similar and dissimilar pair, visual retention and recognition. Each sub test has different scoring method. Total maximum possible score for the full test is 115.

Table A.1: Descriptive information of subject's age

Age	N	Mean± Standard Deviation(S.D)
45-59 years	30	52.56+5.309

2.2 Data Analysis

The data was managed on excel spread sheet and was analyzed using SPSS (statistical package for the social sciences) software, version 21. For all statistical tests, the level of significance was set at p value ≤ 0.05. All values were expressed as mean and standard deviation.

Pearson Co relation was used to determine relationship between cognitive functioning and duration of diabetes type 2.

3. Results

The mean and S.D. value of age was 52.56+5.309 years as per the table A.1

PGI memory scale scores and duration of diabetes type II were used to assess the participants where total maximum possible score being 115 for PGIMS. Pearson correlation coefficient (r) calculated for PGIMS and duration of diabetes was r= (-0.37) at level of significance (p≤0.03) which was statistically highly significant. This explains that cognitive functioning and duration of diabetes are inversely proportional to each other asserting that the increase in duration of diabetes leads to impaired cognitive functioning.

Table A.2: Co- relation between duration of diabetes and PGIMS scores

N	Variable		Co-relation Value
30	Duration of Diabetes	PGIMS	-0.37*
	PGIMS	Duration of Diabetes	

4. Discussion

The incidence and prevalence of diabetes type 2 have increased in recent years, with a decreasing age of onset, and it is likely that diabetes mellitus is becoming an important cause of cognitive deficits among older people [14]. The aim and results of this study have also justified the same.

According to a study, the associated cognitive deficit with diabetes have been traditionally assumed to be due to atherosclerosis [15]. Proposed mechanisms of pathogenesis of cognitive dysfunction in diabetes include chronic hypoglycemia, vascular disease, cumulative effect of hypoglycemic events and possible direct effects of insulin on the brain [16]. In addition, there is some evidence to suggest that impaired glucose tolerance, a precursor to diabetes type 2, may also be associated with cognitive deficits [17]. It is now recognized that insulin is very active in the central nervous system. It plays an important role in memory and affects several processes relevant to synaptic plasticity and neurogenesis. Moreover, insulin also seems to assist in the clearance of beta-amyloid, a suspected key player in Alzheimer‘s disease.

Although psychological distress may seem to be a natural and inevitable response in such circumstances, the clinical implications of a depressive co-morbidity in either major or minor forms can be of serious consequence. In addition to its implications for physical, mental and social well-being, depression contributes to poor self-care and adherence to medical treatment, diminished quality of life and higher rates of medical morbidity and mortality, as well as increased health-care costs which has resulted in a global health issue [18-24]

Therefore an early detection of high-risk groups is necessary in order to reduce the burden associated with diabetes-related neurocognitive disorders and for efficient rehabilitation.

5. Conclusion

PGIMS was administered on the sample population for measuring cognitive functioning and duration of diabetes type 2 was taken into record.

Negative co relation was found between the duration of diabetes type 2 and PGIMS scores which indicated a declining cognitive power or functioning with increase in duration of diabetes. We found a significant decrease in PGIMS scores with increase in duration of diabetes.

Table A.3: Master Chart

Age	BMI	Duration Of Diabetes	PGIMS Scores
45	24.39	6	94
47	24.48	8	67
52	24.4	7	62
50	24.5	9	76
47	22.2	5	68
47	24.88	5	70
50	22.65	8	68
54	24	7	75
59	24.7	8	81
59	24	8	74
56	23.9	5	93
58	22	10	72
45	23.87	6	95
52	22.1	5	67
60	21.6	7	64
54	25	5	70
57	20.3	5	77
45	20.8	10	66
59	23.6	10	62
59	23.6	8	79
46	22.1	5	81
58	18.16	6	96
52	25.2	7	66
48	24.97	7	90
50	24.76	8	64
50	24.23	8	55
45	23.53	5	73
59	24.74	9	69
55	24.45	8	50
59	24.5	8	61

6. Acknowledgement
Appendices

7. References

1. International Diabetes Federation. International Diabetes Federation Atlas, 6th ed. Brussels: International diabetes Federation, 2013.
2. India is the diabetes capital of the world, The Times Of India, January 28, 2016.
3. Diabetes Care 2015: Volume 38, Supplement 1, January 2015, ADA
4. Wood AG, Chen J, Moran C, Phan T, Beare R, Cooper K *et al.*, Brain activation during memory encoding in Type 2 Diabetes mellitus: a discordant twin pair study. J Diab. Res. 2016.
5. Standards of Medical care in Diabetes Abridged for primary care providers, American Diabetes Association, Spring, 2015, 33(2).
6. Biessels GJ, Koffeman A, Scheltens P. Diabetes and cognitive impairment, Clinical diagnosis and brain imaging in patients attending a memory clinic. J neurol, 253, 477-482.
7. Diabetes and cognition, Elizabeth Rose Mayeda *et al*, Clin Geriatr Med. 2015; 31:101-115.
8. Thomas VS, Darvesh S, Mac Knight C, Rockwood K. Estimating the prevalence of dementia in elderly people: a comparison of the Canadian Study of Health and Aging and National Population Health Survey approaches. Int Psychogeriatr. 2001; 13(1):169-175
9. Allen KV, Frier BM, Strachan MW. The relationship between type 2 diabetes and cognitive dysfunction: longitudinal studies and their methodological limitations. Eur J Pharmacol. 2004; 490:169-175
10. Areosa Sastre A, Grimley Evans J. Effect of the treatment of Type II diabetes mellitus on the development of cognitive impairment and dementia. The Cochrane Library. 2005, 2. http:// www.cochrane.org/cochrane/revabstr/AB003804.html
11. Lobo A, Launer LJ, Fratiglioni L. Prevalence of dementia and major subtypes in Europe: A collaborative study of population-based cohorts. Neurologic diseases in the elderly research group. Neurology. 2000; 54(5):S4-S9
12. Stewart R, Liolitsa D. Type 2 diabetes mellitus, cognitive impairment and dementia. Diabet Med, 1999, 16:93-112.
13. Strachan MWJ, Deary IJ, Ewing FME, Frier BM. Is type 2 (non-insulin dependent) diabetes mellitus associated with an increased risk of cognitive dysfunction? Diabetes Care. 1997; 20:438-445.
14. (Pre) diabetes, brain aging, and cognition, Jarbas S.
15. Reaven GM, Thompson LW, Nahum D, Haskins E. Relationship between hyperglycemia and cognitive function in older NIDDM patients. Diab Care. 1990; 13(1):16-21
16. Indian Journal Psychiatry. 2009; 51(1):S35–S38.
17. Elias MF, Elias PK, Sullivan LM, Wolf PA, D'Agostino RB. Obesity, diabetes and cognitive deficit: the Framingham Heart Study. Neurobiol Aging. 2005; 26S:S11-6.
18. Reagan LP. Neuronal insulin signal transduction mechanisms in diabetes phenotypes. Neurobiol Aging. 2005; 26S:S56-9.
19. Ciechanowski PS, Katon WJ, Russo JE. Depression and diabetes: impact of depressive symptoms on adherence, function, and costs. Arch Intern Med. 2000; 160:3278-3285.
20. Ciechanowski PS, Katon WJ, Russo JE, Hirsch IB. The relationship of depressive symptoms to symptom reporting, self-care and glucose control in diabetes. Gen Hosp Psychiatry 2003; 25: 246-252.5 Katon W, Sullivan MD. Depression and chronic medical illness. J Clin Psychiatry. 1990; 51:12-14.
21. Katon WJ. Clinical and health services relationships between major depression, depressive symptoms, and general medical illness. Biol Psychiatry. 2003; 54:216-226
22. Scheen AJ. Central nervous system: a conductor orchestrating metabolic regulations harmed by both hyperglycemia and hypoglycemia. Diabetes Metab. 2010; 36(3):S31-8.
23. Reutens AT. Epidemiology of diabetic kidney disease. Med Clin North Am. 2013;97(1):1-18
24. Prachi Tiwari, Nusrat Hamdani. Sensory–motor and psychosocial factors correlates of adaptive locomotor performance in diabetes patients. International journal of scientific research. 2015, 4(4).