

EFFECT OF TYPE 2 DIABETES ON INTELLIGENCE OF TEACHERS: A STUDY

ASST. PROF. VRUSHALI MATTALWAR

Zulekha College of Education, Nagpur MS

Research Scholar, P. G. Department of Education, RTM Nagpur University, Nagpur MS.

ABSTRACT

The purpose of this study was to investigate the impact of type 2 diabetes on the cognitive abilities of teachers. The research aimed to assess how diabetes affects the cognitive behavior, specifically intelligence, of teachers. To achieve this objective, an intelligence test by Jalota S. was administered to a sample of 400 teachers, consisting of 200 diabetic and 200 non-diabetic teachers. The selection of participants was random and drawn from various educational institutions in Nagpur city, Maharashtra state. Descriptive statistics were utilized for data analysis. The study examined the influence of diabetes on intelligence by comparing the test scores of diabetic and non-diabetic teachers. The results indicated a significant difference in intelligence between the two groups, with non-diabetic teachers exhibiting higher mean intelligence scores compared to diabetic teachers.

Key words: Type 2 diabetes, intelligence, cognitive performance, and teachers.

INTRODUCTION:

Education is the process through which individuals acquire a range of habits, knowledge, attitudes, and experiences essential for coping with the challenges of life. In essence, education serves as a fundamental tool for learning. Various factors, including social, economic, and personal aspects, are intertwined with the educational process. One of the critical factors influencing education is health, and health and education are intrinsically linked. Without adequate physical and mental health, the educational process remains incomplete. The well-being of both students and teachers plays a pivotal role in the education system. Today, numerous health-related issues impact the health of teachers, with various diseases disrupting their cognitive and physical capabilities. These chronic illnesses often result in social, economic, personal, and mental disadvantages.

Among the many chronic diseases affecting educators, the prevalence of diabetes is rising rapidly. Diabetes mellitus is a significant healthcare challenge that impairs an individual's normal functioning. In India, diabetes has emerged as a major healthcare concern. According to the Diabetes Atlas, there were 40 million people with

diabetes in 2007, and this number is projected to increase to approximately 70 million by 2025. The onset of diabetes can have detrimental effects on intelligence, leading to a decline in IQ due to impaired mental processes. It also raises the risk of specific illnesses, such as neurological morbidities. Long-term poor metabolic control has been associated with cognitive decline, typically observed after the age of 24. Neurological morbidities associated with diabetes, such as Alzheimer's disease and generalized brain atrophy, have gained attention recently. Metabolic disturbances caused by diabetes can disrupt brain development. Brief or mild hypoglycemia has no lasting effects on the brain, although it can temporarily alter the brain's responses to subsequent hypoglycemia. Prolonged and severe hypoglycemia can result in lasting damage, affecting cognitive function and motor control. One study even found that chronic hyperglycemia predicted a significant decline in performance IQ and verbal IQ (Schoenle et al., 2002).

Type 2 Diabetes, also known as Non-Insulin Dependent Diabetes Mellitus (NIDDM) or adult-onset diabetes, accounts for approximately 90% to 95% of all diagnosed cases of diabetes. It is much more common and occurs when the body produces insufficient insulin for normal function or when the body becomes resistant to insulin, rendering it ineffective. Type 2 diabetes is frequently associated with being overweight.

SIGNIFICANCE OF THE STUDY:

The effectiveness of education relies heavily on the educational qualifications and professional competencies of teachers, as well as their overall health. The performance of teachers in their teaching roles is significantly influenced by their mental, psychological, and physical well-being. Numerous research studies have consistently shown that when a teacher's mental (cognitive) and physical health is compromised, their performance tends to decline. Certain diseases, such as diabetes, can have a detrimental impact on a teacher's performance and their overall physical and emotional health. Diabetes is known to be associated with cognitive decline, dementia, and Alzheimer's disease. Research conducted by Annick Fontbonne et al. (2001) and Marlise E.A. van Eersel et al. (2013) specifically explored the cognitive performance of individuals with diabetes. These studies involved comparisons between diabetic patients and non-diabetic groups to assess the relationship between cognition and diabetes. The findings of these investigations consistently demonstrated that diabetes is linked to cognitive dysfunction. Moreover, research conducted by Augustina M.A. Brands, Geert Jan Biessels et al. (2005) and Justine M. Nagui et al. (2009) highlighted cognitive impairment not only in older patients but also in young adults with type II diabetes. These studies collectively revealed that individuals with type II diabetes exhibit cognitive impairments and a subtle reduction in overall intellectual functioning. Type II diabetes is associated with an increased risk of cognitive dysfunction, underscoring the importance of considering the health of teachers in the educational context.

OBJECTIVE OF THE STUDY:

To study the effect of type 2 diabetes on intelligence of teachers.

HYPOTHESIS OF THE STUDY:

There will be significant effect of type 2 Diabetes on intelligence of teachers.

SCOPE AND DE-LIMITATION OF THE STUDY:

This study is limited to Nagpur city in the state of Maharashtra only. These studies evaluate the effect of Diabetes mellitus only on teacher's intelligence only.

RESEARCH METHODOLOGY:

The present study is in the area of interdisciplinary research based on survey method. The purposive sampling technique, a type of non probability sample was used. In present research study two groups of teachers is taken i.e. teachers suffering from diabetes and normal groups (non diabetic teachers) and compared on basis of cognitive performance in terms of intelligence.. Intelligence Test by Jalota S was applied to compare the intelligence of both the groups. The Intelligence Scores achieved by the teachers on Standardized Intelligence Tests are considered. Mean and SD were calculated for both the groups and t-test was applied to test the hypothesis.

DATA ANALYSIS AND INTERPRETATION:

In this study analysis of data was done by using various statistical technique i.e. Frequency Distribution, Percentage, Mean, SD., SE.dm., 't' test and graphical presentation etc.

Table no. 1.1

Mean difference between the cognitive performance of diabetic and non-diabetic teachers in terms of Intelligence

Teachers	N	M	SD	Df	SE.d m	't' Value
Diabetic Teachers	200	54.795	14.410	398	1.409	2.749*
Non-Diabetic Teacher	200	58.670	13.776			
Diabetic Male Teachers	116	54.362	14.146	214	1.858	1.763
Non-Diabetic Male Teacher	100	57.640	13.152			
Diabetic Female Teachers	84	55.392	14.831	182	2.163	1.991*
Non-Diabetic Female Teacher	100	59.700	14.364			

* 0.01 Level of Significance ** 0.05 Level of Significance

From the above table shown that, the significant mean difference of between the Intelligence for the Diabetic and Non-Diabetic male and female Teachers. The Diabetic and non-diabetic Teachers mean score of Intelligence is 54.795, 58.670 & SD is 14.410, 13.776 respectively. The Diabetic and non-diabetic Male Teachers mean score of Intelligence is 54.362, 57.640 & SD is 14.146, 13.152 respectively. The Diabetic and non-diabetic Female Teachers mean score of Intelligence is 55.392, 59.700 & SD is 14.831, 14.364 respectively. Compare the mean score of intelligence for all Diabetic and Non-Diabetic Teacher, Male and Female Diabetic and non-diabetic teachers and calculated the SE.dm is 1.409, 1.858, 2.163 and calculated 't' value is 2.749, 1.763, 1.991 On 398, 214, 182 df table value is 1.96 on 0.05 level of significant and 2.58 for 0.01 level of significant. Hence the calculated 't' value of all diabetic and non-diabetic teachers and Female diabetic and non-diabetic teachers is

greater than the table value on 0.05 level of significant, and the ‘t’ value of Male diabetic and non-diabetic teachers is less than 0.05 level of significant. It is concluded that Diabetes has significant effect on the intelligence of all Diabetic Teachers, and female diabetic teachers compared to all non-Diabetic Teachers and female non-diabetic teachers. It’s means that, Non-Diabetic Teacher Intelligence is better as compared to Diabetic Teacher Intelligence.

Table no. 1.2
Level of Frequency distribution of Intelligence of Diabetic and Non-diabetic teachers

Level	N & %	Diabetic Teachers			Non-Diabetic Teachers		
		Male	Female	Total	Male	Female	Total
High	N	21	16	37	16	23	39
	%	18.103%	19.048%	18.50%	16.00%	23.00%	19.50%
Moderate	N	67	45	112	72	59	131
	%	57.758%	53.571%	56.00%	72.00%	59.00%	65.50%
Low	N	28	23	51	12	18	30
	%	24.137%	27.381%	25.50%	12.00%	18.00%	15.00%
Total	N	116	84	200	100	100	200
	%	100%	100%	100%	100%	100%	100%

From the Above table shown that, level of frequency distribution of Intelligence for Diabetic and non-Diabetic teacher, 18.103% Diabetic male Teachers, 19.048% Diabetic Female teachers & 18.50% total Diabetic teachers belongs to high level of Intelligence. On the other hand 16.00% Non-Diabetic male teachers, 23.00% non-Diabetic female teachers and 19.50% total non-Diabetic teachers belongs to high level of intelligence.

The moderate level of intelligence of Diabetic teachers indicated that, the 57.758% male Diabetic teachers, 53.571% female Diabetic teachers and 56.00% all Diabetic teachers belongs to moderate level of intelligence. On the other hand 72.00% non-Diabetic male teachers, 59.00 % non-Diabetic female teachers and 65.50% non-Diabetic all teachers belongs to moderate level of intelligence.

The low level of intelligence of Diabetic teachers indicated that, the 24.137% male Diabetic teachers, 27.381% female Diabetic teachers and 25.50% all Diabetic teachers is belongs to moderate level of intelligence. On the other hand 12.00% non-Diabetic male teachers, 18.00% non-Diabetic female teachers and 15.00% non-Diabetic all teachers having to low level of intelligence.

CONCLUSION:

The majority of Diabetic teachers (81.50%) having Moderate and Low level of intelligence where as Non-Diabetic teachers (85.00%) having High and Moderate level of Intelligence.

FINDINGS:

It is found that there is significant difference between the mean intelligence score of Diabetic and Non-Diabetic teachers. The intelligence of Non-Diabetic teachers is better than Diabetic teachers.

DISCUSSION:

The primary aim of this study was to investigate the impact of type 2 diabetes on the intelligence of teachers. The findings of the study clearly demonstrate a significant influence of diabetes on the cognitive abilities of teachers, particularly in terms of intelligence. Specifically, non-diabetic teachers exhibited superior cognitive performance compared to their diabetic counterparts. Several plausible explanations exist for this observed effect. The brain serves as the central organ responsible for the cognitive behavior of individuals. Normal brain function relies on a steady supply of energy derived from the sugar present in the bloodstream. Given that blood sugar levels fluctuate considerably in individuals with diabetes, it is reasonable to expect that these fluctuations can disrupt the brain's normal functioning by altering the amount of sugar it receives.

BIBLIOGRAPHY:

1. Ann E. Gold, Ian J. D, Kenneth M. MacLeod, Brian M. Frier, **“The effect of IQ level on the degree of cognitive deterioration experienced during acute hypoglycemia in normal humans”**, Original Research article, Intelligence, Vol. 20 Issue 3, May-June 1995, pp 267-290.
2. Augustina M. A. Brands, Geen Jan B, Edward H.F. de Haan, L. Jaap K, and Roy P.C. Kessels, **“The effects of Type I Diabetes on Cognitive Performance, meta-analysis”**, American Diabetes Association, Inc., 2005.
3. Alan M. J, M.D., Gail M, Christopher M. Ryan, Nancy Silvers, Pittsburgh; Patricia Cleary, Barbara Waberski, Rockville, Amanda Burwood, B.S., Katie Weinger, Meg Bayless, William Dahms, **“Long-term effect of Diabetes and its treatment on cognitive function”**, (2009), The New England Journal of Medicine. www.nejm.org
4. Ausubel, D.P. **“Educational Psychology; A cognitive view”**, (1968), New York : Hol, Reinhart and Winston inc.
5. Awad N, Gagnon M, Messier C. **“The relationship between impaired glucose tolerance, type II diabetes, and cognitive function”**, J Clin Exp Neuropsychol 2004; 26:1044–1080
6. Abirami M. J, Raj Kala A. **“Health Implications of School Teachers - A Review”**, International Journal of Health Sciences and Research Vol 8 Issue 5 May 2018
7. Bradbury A. J., Smith C. S., **“An assessment of diabetic knowledge of school teachers”**, Department of Child Health, Alder Hey children’s Hospital, Liverpool, 1983.
8. Christopher T. Kodi, Elizabeth R. Seaquist **“Cognitive Dysfunction and Diabetes Mellitus”**, (2008), Endoer Reve., J. 29(4): 494 – 511.
9. Daniel J. Cox, Boris P. Kovatchev, Linda A. Gonder F, Kent H. Summers, Anthony McCall, Kevin J. Grimm, William L. Clarke.. **“Relationships between Hyperglycemia and cognitive performance among adults with type I and type II diabetes”**, (2005), diabetes cae vol. 28.

10. Elias M.F., Elias P.K, Sullivan L.M, PA Wolf and RB D. Agostino, **“Lower cognitive function in the presence of obesity and hypertension: the Framingham heart study”**, International journal of Obesity 260-268. (2003).
11. Edward W. Gregg, K Yaffe, Jane A. Cauley et. al **“Is diabetes associated with cognitive impairment and cognitive decline among older women? Study of Osteoporotic Fractures Research Group”**, Archives of Internal Medicine 160b(2):174-80,(2000).
12. Garrett, Henry E., (2005), **“Statistic in Psychology and Education”**, Mumbai : Kalyani Publication house.
13. Maria Paile-Hyvärinen **“Depression and cognition in Type 2 Diabetes”**, (2011), Research 52 National Institute for Health and Welfare.
14. Mangal S.K. **“Advanced Educational Psychology”**, (2005), New Delhi : Prentice – Hall of India Pvt. Ltd.
15. Michael L. Alosco, Mary Beth Spitznagel, Manfred van Dulmen, Naftali R, Ronald C, Lawrence H., Lisa H. Colbert, Richard J, Joel H, Jim Rosneck, and John G **“The Additive effects of Type-2 Diabetes on cognitive function in older adults with Heart failure”**, (2011), cardiology research and practice vol. 2012, 1155.
16. Moheet, S Mangia, and E. R. Seaquist **“Impact of diabetes on cognitive function and brain structure”**, (2015), HHS Public Access Peer reviewed Issue 60 No. 71
17. Stewart R, Liolitsa D. **“Type II diabetes mellitus, cognitive impairment and dementia.”**, Diabet Med 1999;16:93–112
18. Takahiko K Toshitaka U, Nigishi H. **“Cognitive impairment in diabetic patients: can diabetic control prevent cognitive decline?”**, Journal of Diabetes Investigation Vol. 3, issue 5. (2012).
19. Vaishnav R S, Srivastava A, **“Effect Of Juvenile Diabetes And Intelligence Of Adolescents”**, Voice Of Research Volume I Issue 3 Dec. (2012).
20. Van den Berg E, Dekker J, Nijpels G, Kessels RPC, Kappelle LJ, de Haan EHF, Heine RJ, Stehouwer CDA, Biessels GJ. **“Cognitive functioning in elderly persons with type 2 diabetes and metabolic syndrome: the Hoorn study”**, Dement Geriatr Cogn Disord 2008;26:261–269.