A comparison of blood factors, cognitive status, moods and mental health status, in diabetic patients type 2 with control group

Presenter

Ali Akbar Malekirad

Type 2 diabetes is the most common type of diabetes, accounting for around 90% of all diabetes cases. It is generally characterized by insulin resistance, where the body does not fully respond to insulin. Because insulin cannot work properly, blood glucose levels keep rising, releasing more insulin.

According to the World Health Organization, it is estimated that 422 million people had diabetes in 2014, representing 8.5% of adults worldwide. The prevalence of diabetes has been increasing consistently for three decades and is projected to continue rising. Diabetes is associated with several complications including loss of vision, kidney failure, cardiovascular disease, and lower limb amputation and recent evidence indicates that it may lead to increased cognitive decline.

Moreover depression is a common mental illness, with an estimated 350 million people affected around the world, that is similarly associated with cognitive decline as measured by neuropsychological assessments and rates of dementia. On the other hand, there were associations between depression and subsequent dementia and Alzheimer's Disease. Evidence indicates that diabetes and its complications are strongly associated with psychological and psychiatric problems.

These include depression, poor-eating habits,and fear of hypoglycemia.Moreover, patients with type 2 diabetes mellitus (T2DM) also have a two-fold greater risk for comorbid depression compared to healthy controls, hampering the QoL of patientsResearch also indicates that patients with diabetes suffer from high levels of diabetes-specific emotional stress. Depression and diabetes are independent risk factors for one another, and both are associated with increased risk of cognitive decline. Diabetes patients with lower cognitive function are more likely to suffer poorer health outcomes. Epidemiological and mechanistic studies support the association between Diabetes Mellitus and mood disorders, such as Major Depressive Disorder and Bipolar Disorder. This association is especially relevant in specific domains of depressive psychopathology, such as disturbances in reward systems and cognitive functions. Acute hypoglycemia in humans impairs cognitive functions and alters mood states. In addition to being risk factors for cognitive decline, studies show that diabetes and depression are independent risk factors for each other. In addition, an estimated 47.5 million people have dementia around the world, with the number expected to almost triple by 2050.

Risk factors

 several risk factors have been associated with type 2 diabetes and include:
- Family history of diabetes
- Overweight
- Unhealthy diet
- Physical inactivity
- Increasing age
- High blood pressure
- Ethnicity
- Impaired glucose tolerance (IGT)*
- History of gestational diabetes
- Poor nutrition during pregnancy
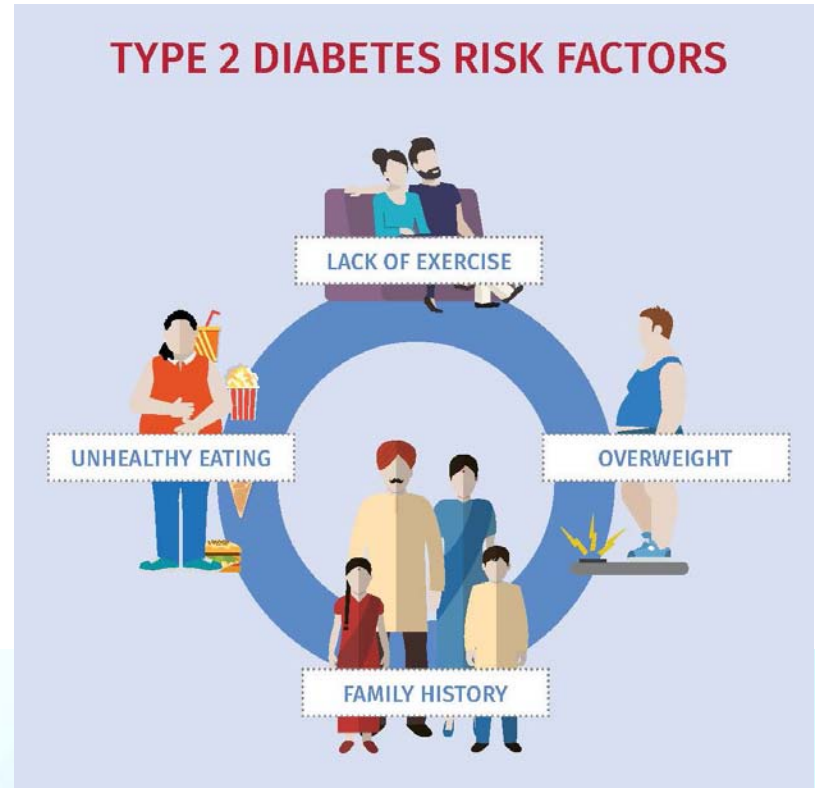
AIM

This study was examined blood factors, cognitive status, moods and mental health in patients with type II diabetes in Diabetes Center of Shahid Mohammad Montazeri Hospital in Najafabad and compared them with a control group.

Methods

In this cross-sectional study, 49 patients with type II diabetes referring to Diabetes Center with average age of 51 years were compared with the control group with the average age of 50. Both groups were homogenized in gender and education. Biochemical parameters of blood, Hemoglobin A1C (HbA1c), Subjective Neurocognitive Inventory (SNI), Profile of Mood States (POMS), General Health Questionnaire (GHQ) in two groups were examined. For data analysis, Multivariate Statistical Analysis and Mann-Whitney Test have been done by software SPSS.

Demoghraphic Data in Study Groups

		Mean	SD
Age	Control	50.52	±10.116
	Diabetes	51.43	±10.386

Sex	Control	Diabetes
Man	4	4
Woman	46	45

Comparison General Health in study groups

Groups	Number		Somatic symptoms	Anxiety and insomnia	Social dysfunction	Severe depression
Control	50	**Quartile 1**	3.00	3.00	5.75	0.75
		Median	5.00	5.00	7.00	2.00
		Quartile 3	7.00	7.00	7.00	4.25
Diabetes	49	**Quartile 1**	5.00	4.50	6.00	1.00
		Median	6.00	6.00	7.00	2.00
		Quartile 3	10.00	9.00	8.00	5.00

Groups	Somatic symptoms	Anxiety and insomnia	Social dysfunction	Severe depression
Sig	0.002	0.03	0.02	**0.56**

This results showed a significant increase in anxiety and physical illness and a significant decrease in Scale manure-friendly and Energy in diabetic group.

Comparison of Cognitive State in Study Groups

Groups	Number		psychomotor speed PS	selective attention(SA)	divided attention(DA)	verbal memory VM	nonverbal memory NVM	prospective memory PM	spatial functioning SF	initiative/energy I/E	مشترك
Control	50	mean	30.50	36.20	15.66	26.38	15.98	27.40	20.44	37.46	74.60
		SD	±5.65	7.69±	±3.52	±5.82	±2.49	±4.86	±3.93	±7.12	±14.3
Diabetes	49	mean	27.94	36.06	15.41	24.57	14.49	25.45	20.06	33.24	70.45
		SD	±6.55	9.88	±3.42	±6.59	±3.09	±6.80	±4.37	±9.02	14.96

group	psychomotor speed PS	selective attention SA	divided attention DA	verbal memory VM	nonverbal memory NVM	prospective memory PM	spatial functioning SF	initiative/energy I/E	Common
F	4.34	0.006	0.13	2.09	9.96	2.70	0.20	6.66	1..98
df	1	1	1	1	1	1	1	1	1
Sig	0.04	0.93	0.71	0.15	0.01	0.10	0.65	0.01	0.16

lambda coefficient =0.001

Table showed that diabetes group indicated lower psychomotor speed, Non-verbal memory and initiated energy than the control group

Comparison of Mood State in Study

Groups	Number		Anger	Depression	Fatigue	Hostility	Confusion	Tension	Vigour
Control	50	Mean	7.30	12.60	5.54	15.16	7.94	10.36	16.68
		SD	±7.16	±9.27	±4.31	3.47±	±3.66	±3.75	±4.83
Diabetes	49	Mean	9.00	15.27	6.90	12.78	8.54	10.92	14.00
		SD	±6.42	±8.31	±3.74	3.88±	±3.55	±4.09	±4.27

Groups	Anger	Depression	Fatigue	Hostility	Confusion	Tension	Vigour
F	1.54	2.26	2.79	10.36	0.80	0.50	8.51
Df	1	1	1	1	1	1	1
Sig	0.21	0.13	0.09	0.002	0.37	0.48	0.004

The table showed a decrease in Scale manure-friendly and Energy in diabetic group.

Comparison Blood Factor in Study Group

		Control	Diabetes	df	F	Sig
Cholesterol	mean	196.68	183.70	85	0.13	**0.15**
	SD	±38.94	±44.57			
Triglycerides	mean	146.35	167.70	85	0.90	**0.28**
	SD	±73.56	±105.00			
High-density lipoprotein	mean	48.46	45.96	85	0.01	**0.21**
	SD	±9.01	±9.53			
Low density lipoprotein	mean	115.73	33.69	85	0.32	**0.27**
	SD	±106.94	±39.68			

		Control	Diabetes	Sig
Fasting Blood Sugar	**Quartile 1**	89.00	124.00	**0.000**
	Median	96.50	158.00	
	Quartile 3	102.00	206.00	
HbA1c	**Quartile 1**	4.50	5.80	**0.000**
	Median	4.75	7.20	
	Quartile 3	5.20	8.40	

The diabetics group showed higher Fasting Blood Sugar (FBS), HbA1c than the control one (p<0.05). There were no significant differences between the two groups in other biochemical parameters

Conclusion

The findings showed not only levels of blood glucose and HbA1c in diabetic patients are very high, but also their mental health and mood status are lower than healthy group.

Psychosocial stress, HPA axis dysregulation and elevated levels of glucocorticoids might also be part of the mechanism that leads from diabetes and depression to cognitive decline. Depression is a stress-related disorder and diabetes is strongly associated with psychosocial stress, while stress modulates brain function and alters brain structure and likely is associated with cognitive deficits.

At the individual level, healthcare professionals must be aware that in addition to well-established complications of diabetes, persons with diabetes are at high risk of depression, and that people with comorbid depression and diabetes are more likely to suffer from lower cognitive functioning than their peers.

Thanks for your pay attention