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Cognitive assessment in a sample of Egyptian patients with Generalized Anxiety Disorder

M.H.El sheikh, E.M.Fahmy, V.S.Mikhael, H.M.El Sayed and M.M.Eldeeb
Psychiatry, Dept., Faculty of Medicine, Benha Univ., Benha, Egypt
E-mail: mohammed.o1852@gmail.com

Abstract

Generalized anxiety disorder (GAD) is a mental illness marked by excessive, uncontrolled concern, as well as cognitive and emotional impairments, such as a tendency to overinterpret potential danger (IB). The purpose of this project is to: Adults with generalised anxiety disorder (GAD) were recruited for this research, which evaluated cognitive impairments, serum cortisol levels, and serum BDNF levels. Methods and subjects: 80 patients from the outpatient clinic of the psychiatric department at BENHA university hospital were selected for this cross-sectional research, and 80 healthy people with similar age, gender, and educational level were compared to the patient group. BDNF was shown to have a substantial association with illness duration and the Hamilton Anxiety Rating Scale (HARS). Stroop test and cortisol levels showed a substantial positive connection. This study implies that top-down control mechanisms favour anxiety reduction above task performance, as GAD patients have difficulty disengaging from danger while still participating in complex WM activities. Brain-derived neurotrophic factor (BDNF), task performance, and cortisol are all terms associated with GAD.

Key words:

1. Introduction

There is a common thread among people with anxiety disorders: they worry about the future. Autonomic and somatic problems are also prevalent, as are anxiety, avoidance, and worry.

According to the DSM-5, generalised anxiety disorder is characterised by psychiatric symptoms such as excessive anxiety, uncontrollable concern, restlessness, impatience, and impaired social or occupational functioning. In addition, there are bodily signs such as exhaustion, tense muscles, and insomnia [1].

Cognitive function refers to the higher mental processes, including memory, attention, perception, problem solving and mental imagery. For now, the word "neurocognitive" refers to the abilities of the brain's neural pathways and cortical networks that are intimately related to one another [2].

Subjects with generalised anxiety disorder have cognitive abnormalities, although the nature of these deficits is still poorly understood (GAD). An executive function test and a nonverbal memory task performed worse in young GAD participants than controls in a recent research [3]. Associative cognitive deficits in working memory have been seen in older patients with GAD [4].

The memory processing in anxiety and depression in humans has been linked to brain derived neurotrophic factor (BDNF). As part of the synaptic plasticity that occurs during learning and memory, BDNF plays an important role (5). BDNF deficiency has been linked to anxiety disorders and depression [6].

2. Methods and PATIENTS

The research was done at the BENHA university hospital's outpatient mental clinic. The Benha University Hospital's Outpatient Psychiatric Clinics recruited 160 patients to participate in this cross-sectional research. There were 80 patients selected from Benha University Hospital's Outpatient Psychiatric Clinics who met the diagnostic criteria for generalised anxiety disorder according to DSM 5, and they had to meet the following inclusion and exclusion criteria:

Adherence and agreement to participate are required for all patients who have been diagnosed with generalised anxiety disorder in accordance with the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5).

Current substance abuse or comorbid psychiatric disorders; sensory impairment that may interfere with cognitive testing; and recent administration of Electro-Convulsive therapy in the last six months are all exclusion criteria.

Patients were compared to a control group of 80 healthy individuals who met the following inclusion and exclusion criteria, including age, gender, and educational level.

Inclusion criteria for the control group include the absence of a DSM-5-based structural clinical interview-based diagnosis of generalised anxiety disorder or another mental health disease, as well as written informed permission from the person to participate in the research.

Participants in the control group were subject to the same exclusion criteria as those in the sick group.

80 instances of generalised anxiety disorder with particular inclusion and exclusion criteria are chosen for random sampling.

Patients were subjected to the following:

The "Research Ethics Committee of the BENHA Faculty of Medicine" will review and approve all procedures. In order to participate, all participants were required to sign an informed consent form. This contains information about the study's objectives, methodology, location, duration, participants, tools, and confidentiality. Participants were informed that they were free to exit the research at any time.

The directors of the hospitals gave their formal approval for the research to proceed.

Both groups will use the following data gathering and analysis tools:

The DSM-5 clinical evaluation of GAD: In order to determine whether a patient has GAD, doctors look for the following symptoms: Excessive fretting and worrying over a wide range of subjects, events, or activities. An excessive amount of worry has been occurring for at least six months. Worry is seen as a major obstacle to overcoming. Adults and children alike may worry about a variety of things at once. For a diagnosis of generalised anxiety disorder (GAD), three somatic or cognitive symptoms must be present in addition to the anxiety and worry: Insomnia or difficulty sleeping as a result of jitteriness or restlessness, weariness more readily than normal, lack of concentration or the sensation that the mind goes blank, irritation (which may or may not be noticed by others) (due to trouble falling asleep or staying asleep, restlessness at night, or unsatisfying sleep)

For evaluating a person's capacity for inhibiting cognitive interference, the Stroop Color and Word Test (SCWT) utilises the Stroop Effect, a phenomenon in which the processing of one sensory characteristic interferes with the simultaneous processing of another. One of the WCST's indicators of executive functioning is the capacity to construct abstract thoughts (abstract thinking) and shift between groups of cards. The Wisconsin Card Sorting Test (mental or cognitive flexibility and problem solving). Cognitive mechanism with limited capacity that allows for the temporary storage and processing of information in working memory (WM). The phonological loop, the visuospatial sketch pad, and the central executive system make up WM, which is important for complex activities including understanding, learning, and reasoning. HAM-A: The Hamilton Anxiety Scale (HAM-A) is a commonly used scale for assessing the intensity of anxiety symptoms in clinical and scientific contexts. Psychoanalytical and somatic anxiety are both measured by the scale's 14 items, each of which is described by a set of symptoms (physical complaints related to anxiety).

Venous blood was drawn between 8.30 and 11 a.m. before breakfast to measure levels of cortisol and BDNF in the blood at baseline and during the next 12 weeks. Within 30 minutes, the sample had clotted and the serum had separated. Coded serum samples were kept at -18 C in the freezer.

Analysis of obtained data will be done using a statistical tool for social science to revise, code, tabulate, and enter the data into the PC. Each parameter's data will be analysed in accordance with the kind of data that was gathered.

3.Results

Age, gender, BMI, place of residence, and marital status don't seem to make a substantial difference between the groups in this table. a dining room table (1)

Mean illness duration was 4.23 2.54 years and the average age of start was 26.71 2.67 years, according to this table's data a table and chairs for two people (2)

An analysis of case and control groups showed that brain-derived neurotrophic factor levels are greater in the former group. The cortisol levels in patients were lower than in controls, but the difference was not statistically significant. a dining room table (3)

Table 1 demonstrates that as compared to controls, outcomes on the Stroop test were considerably lower in the patients. a dining room table (4)

Hamilton's anxiety rating scale was much lower in the cases than in the controls, as can be seen in the table below. a table and chairs for two people (5)

Short-term, verbal, visual, and total memory were all considerably worse in patients than in controls as seen in the following table. a table and chairs for two people (6)

According to the data in this table, cases had considerably lower rates of accurate replies, total mistakes, and non-perseverative errors than did controls. a table and chairs for two people (7)

BDNF seems to have a substantial association with illness duration and the Hamilton Anxiety Rating Scale. Stroop test and cortisol levels showed a substantial positive connection. a table and chairs for two people (8)

Table (1) Demographic characteristics between the two groups.

Variables		Cases (n=80)	Controls (n=80)	Test	P
Age (years) Mean± SD		30.69 ± 6.29	29.35 ± 5.58	1.43	.156
Sex	**Male** **Female**	39 (48.8%) 41 (51.2%)	35 (43.8%) 45 (56.2%)	.402	.526
BMI (kg/m^2) Mean± SD		26.45 ± 2.35	25.91 ± 2.56	1.39	.167
Residence	**Rural** **Urban**	36 (45%) 44 (55%)	39 (48.8%) 41 (51.2%)	.226	.635
Marital status	**Married** **Single**	59 (73.8%) 21 (26.2%)	52 (65%) 28 (35%)	.144	.231

Table (2) Clinical characteristics between the two groups.

Variables	Cases (n=80)
Disease duration (years)	4.23 ± 2.54
Age of onset (years)	26.71 ± 2.67

Table (3) Cortisol and BDNF levels between the two groups.

Variables	Cases (n=80)	Controls (n=80)	t	P
Cortisol level (µg/dL) Mean± SD	11.29 ± 4.52	11.84 ± 5.49	.692	.491
BDNF (pg/mL) Mean± SD	92.51 ± 50.32	41.63 ± 22.78	**8.24**	**.000**

BDNF: Brain Derived Neurotrophic Factor.

Table (4) Stroop test between the two groups**.**

Variables	Cases (n=80)	Controls (n=80)	t	P
Stroop test Mean± SD	52.98 ± 25.17	96.86 ± 12.58	**2.21**	**.030**

Table (5) Hamilton Anxiety Rating Scale between the two studied groups.

Variables	Cases (n=80)	Controls (n=80)	t	P
Hamilton Anxiety Rating Scale Mean± SD	18.39 ± 4.72	9.15 ± 1.31	**16.9**	**.000**

Table (6) Memory assessment between the two studied groups.

Variables	Cases (n=80)	Controls (n=80)	t	P
Short memory Mean± SD	54.85 ± 4.63	63.81 ± 8.75	**8.1**	**.000**
Verbal memory Mean± SD	75.79 ± 8.35	86.45 ± 5.62	**9.5**	**.000**
Visual memory Mean± SD	57.61 ± 3.65	67.78 ± 8.62	**9.7**	**.000**
Total memory Mean± SD	63.17 ± 5.79	75.41 ± 7.38	**11.7**	**.000**

Table (7) Executive function using wisconison card sorting test between the two studied groups.

Variables	Cases (n=80)	Controls (n=80)	t	P
Correct responses Mean± SD	75.81 ± 5.43	81.52 ± 2.75	**8.39**	**.000**
Total errors Mean± SD	39.22 ± 3.74	34.62 ± 2.36	**9.3**	**.000**
Perseverative responses Mean± SD	27.98 ± 5.26	28.66 ± 3.64	.951	.343
Non-perseverative errors Mean± SD	11.58 ± 5.72	7.35 ± 2.53	**6.05**	**.000**
Trials to complete Mean± SD	15.91 ± 6.53	15.23 ± 4.72	.755	.452
Failure to maintain Mean± SD	1.25 ± 0.964	1.08 ± 0.817	1.21	.231

Table (8) Correlation between BDNF and cortisol with other parameters in cases group.

Variables	BDNF		Cortisol	
	r	P	R	P
Disease duration	**.303**	**.035**	.254	.101
Stroop test	.095	.402	**.322**	**.015**
Hamilton Anxiety Rating Scale	**.381**	**.002**	.206	.116
Short memory	.122	.110	.208	.279
Verbal memory	.132	.256	.211	.109
Visual memory	.138	.238	.164	.155
Total memory	.124	.304	.192	.162

4. Discussion

One of the most frequent mental disorders is generalised anxiety disorder (GAD). GAD is characterised by an excessive level of concern or anxiety, as well as a decreased ability to interact socially or professionally. Obsessive–compulsive disorder and post-traumatic stress disorder have been linked to impaired neuropsychological performance in attention and memory, respectively [7].

In this investigation, a sample of adult patients with generalised anxiety disorder was evaluated for cognitive impairments, serum cortisol levels, and serum brain-derived neurotrophic factors.

The case group's mean age was 30.69 6.29 SD, while the control group's was 29.35 5.58 SD. There were no significant differences between the groups in terms of age, sex, BMI, residence, or marital status, and no significant differences existed between the two groups in terms of socioeconomic status, either.

Our results were corroborated by Rashad et al., [8] who evaluated 45 BD patients and 30 healthy control participants of the same sex and age, with 77% of the subjects being men and 22% being women. Between 18 and 60 years of age, they had a mean age of 34.2710.70 years. 57.6 percent of patients reported being married. As a comparison group, 30 people of a similar age and gender were included in the research. Patients with GAD (68.9 percent) and control participants (50 percent) were both found to be located in the centre of the socioeconomic spectrum.

667 individuals diagnosed with MDD were included in this research by Zhou et al. [9]. They were between the ages of 18 and 71, with a standard variation of 11.0 years. Among the 366 participants, 54.9% were female and 7.9% were divorced, separated, or widowed. Only 15 percent of the patients (n = 100) had a high school diploma or less.

The average illness duration was 4.23 2.54 years, and the average onset age was 26.71 2.67 years in the present research.

A mean AOO for all anxiety disorders was found to be 21.3 years in a meta-analysis by Lijster et al. [10] (95 percent CI 17.46 to 25.07). In contrast to the AOO of agoraphobia, obsessive-compulsive disorder, posttraumatic stress disorder, panic disorder, and generalised anxiety disorder, which began on average between 21.1 and 34.9 years ago, separation anxiety disorder, specific phobia, and social phobia began on average before the age of 15 years.

The levels of brain derived neurotrophic factor were substantially greater in patients than in controls, in addition to the previous results. The cortisol levels in patients were lower than in controls, but the difference was not statistically significant.

Cross-sectional, case-controlled research was also undertaken in Brazil by Hauck et al. [11]. Outpatients with ASD or PTSD were compared to 34 healthy controls of similar ages and genders (21 had suffered a trauma in the year before to evaluation, 13 had experienced it over 4 years prior to testing). There was a statistically significant difference between the mean age of the patients and the mean age of the controls: 35.2 13 years vs. 36.2 9.2 years, respectively. There was a substantial difference in BDNF levels between individuals who had recently been traumatised and those who had not. In terms of PTSD symptoms, the two patient groups did vary, according to the investigators. Even yet, BDNF levels were shown to have no association with any of the clinical evaluation measures employed. Even though not all patients were drug-free, this did not have an effect on BDNF levels in the sample.

Using a cross-sectional investigation, Dos Santos and colleagues [12] compared 25 un-medicated OCD outpatients with 25 healthy controls. There was no connection detected between BMI and BDNF levels. Comorbid depression and anxiety disorders were found in 64% and 44% of patients, respectively (PTSD: 24 percent ; PD: 24 percent ; SAD: 20 percent ; GAD: 16 percent ; AGP: 8 percent). In addition, 8% had a skin-picking condition, and 4% had body dysmorphic disorder. – When comparing the OCD group to the control group, BDNF levels were shown to be considerably lower in the OCD group than in the control group (0.0470–0.038 Pg/ml; 0.0747–0.060 pg/ml). Patients with higher levels of BDNF had more severe sexual/religious symptoms, a longer duration of symptoms, and a history of sadness or SAD.

We discovered that Stroop test scores were substantially lower in cases compared to controls, and the Hamilton anxiety rating scale was significantly greater in cases compared to controls in the current research.

Donige's [13] NeuroTrax Stroop performance showed acceptable convergence validity with the classic

paper administration of the Stroop Color-Word Test (r = 0.52; p 0.01); this is comparable to or greater than the convergence validity typically observed between computerised and paper Stroop administrations.

GAD individuals were slower and less accurate on the Stroop task than healthy controls (= 1.03, p =.014), according to Hallion et al. [14]. In terms of accuracy (= 1.38, p =.001) and response time (= 1.59, p .001), trait anxiety predicted more variation in Stroop performance. Stroop performance above GAD status was not significantly predicted by trait concern (0.25, p .374).

Short-term memory, verbal recall, visual recall, and overall memory were all considerably weaker in patients than in controls, according to the results of the research we conducted.

Anxious people were shown to be less capable of recalling short-term and long-term memories compared to their healthy, non-anxious counterparts. When it comes to delayed memory and identifying, depressed respondents fared worse than their non-depressed counterparts. There was no significant difference in cognitive performance between anxious and depressed patients.

The Wisconsin card sorting test is one of the most often used methods for determining whether or not a patient has CF (WCST). WCST measures perseverative mistakes and the number of completed categories, both of which are intimately linked to OCD dysfunctions [16].

There was a substantial difference between cases and controls in accurate replies, total mistakes, and non-perseverative errors.

According to Rosa-Alcázar et al., [17], the GAD group obtained strong correlations between scores of the Penn State Worry Questionnaire and Stroop colours (r=0.54, p = 0.003), Interference Stroop (r=0.39,p=0.042), Total Digit (r=0.44), and backward Corsi Span (r=0.41; p=0.035).

A link between illness duration and the Hamilton Anxiety Rating Scale (HARS) was found in this research as well. Stroop test and cortisol levels showed a substantial positive connection. Finally, we found no association between BDNF and cortisol with wisconison card sorting.

We found that MDD patients had lower BDNF levels than healthy controls, which is consistent with a meta-analysis by Molendijk et al. [18] that included 9484 people.

Cortisol levels were shown to be positively associated with GAD levels in previous investigations, and these two variables interacted to predict depressed behaviours [19].

5. Conclusion

The results of this research show that GAD patients have lower amounts of BDNF and cortisol in their blood, which may be used to identify them from healthy individuals. A more accurate diagnosis and early changeover to an appropriate treatment plan might benefit from these results. Anxiety reduction is prioritised above task performance in top-down control processes, as shown by our results that GAD patients have difficulty disengaging from danger and engaging in hard WM processes concurrently.

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