Cognitive Deficits in Generalized Anxiety Disorder: Impairments in Attention, Executive Functioning, and Cognitive Flexibility Among Young Adults

Nasr M. Asfour [1*], Sherif A. M. Helal [1], Alsadek H. A. Almahdi [1], Ahmed M. A.M. Basha [1]

Abstract

Background: Generalized Anxiety Disorder (GAD) is a chronic mental health condition marked by excessive, uncontrollable worry, which can significantly impair daily functioning. While cognitive deficits have been well-documented in other mental disorders, the specific impact of GAD on cognitive functioning, particularly in young adults, remains under-explored. Previous studies have primarily focused on cognitive impairments in other anxiety disorders, leaving GAD less researched. Methods: This study aimed to assess cognitive functioning in young adults with GAD compared to healthy controls. A total of 30 patients diagnosed with GAD and 30 age- and gender-matched healthy controls participated. A neuropsychological battery, including the Continuous Performance Test (CPT), Wisconsin Card Sorting Test (WCST), Trail Making Test (TMT), and Stroop Task, was administered to assess attention, executive functioning, and cognitive flexibility. Results: GAD patients showed significantly poorer performance on tasks measuring attention and cognitive control, particularly on the CPT, where they exhibited increased reaction times and higher error rates. The WCST revealed difficulties in adapting to changing rules, indicating impaired cognitive flexibility. Additionally, the TMT indicated slower task-switching efficiency in GAD patients. The Stroop Test showed delays in task completion, but no significant difference in interference scores between groups. Conclusion: Our findings suggest that GAD is associated with significant cognitive impairments, particularly in areas of attention, cognitive flexibility, and processing speed. These deficits are closely linked to the severity of anxiety symptoms and highlight the need for further research into the neurobiological mechanisms behind these cognitive dysfunctions. Addressing these cognitive deficits in therapeutic interventions could improve outcomes for individuals with GAD, enhancing both emotional and cognitive well-being.

Keywords: Generalized Anxiety Disorder, cognitive deficits, attention, executive functioning, neuropsychological assessment.

Significance | This study showed the cognitive impairments in GAD, emphasizing attention, cognitive flexibility, and processing speed, impacting daily functioning and decision-making.

*Correspondence. Nasr M. Asfour, Psychiatry Department, Al Mahad General Hospital, Ministry of Health, Medina 41912, Saudi Arabia.
E-mail: As4n@hotmail.com

Editor Md Shamsuddin Sultan Khan And accepted by the Editorial Board November 07, 2024 (received for review August 11, 2024)

Introduction

Generalized Anxiety Disorder (GAD) represents a chronic and debilitating mental health condition, characterized by excessive worry that is often disproportionate to the actual source of concern (Rahman, Ariaratnam, Hashim, & Azhar, 2024). Historically, GAD was considered a residual diagnostic category in the DSM-III, but its classification has evolved significantly over time. The DSM-IV defines GAD as involving persistent, uncontrollable worry about various everyday situations that lasts for at least six months (Kikas, Werner-Seidler, Upton, & Newby, 2024). Despite this standardized definition, the diagnostic validity of GAD remains contested, as

Author Affiliation.
[1] Psychiatry Department, Al Mahad General Hospital, Ministry of Health, Medina 41912, Saudi Arabia.

Please Cite This:
Nasr M. Asfour, Sherif A. M. Helal, Alsadek H. A. Almahdi, Ahmed M. A.M. Basha (2024). "Cognitive Deficits in Generalized Anxiety Disorder: Impairments in Attention, Executive Functioning, and Cognitive Flexibility Among Young Adults", Journal of Angiotherapy, 8(11),1-7,10029

individuals may experience substantial distress without fully meeting the DSM-IV criteria (Mishra & Varma, 2023).

Cognitive deficits are a recognized hallmark of severe mental illnesses like schizophrenia and bipolar disorder (Isakulyan & Marachev, 2024). However, the link between anxiety disorders and cognitive functioning has been less explored. Research has shown that individuals with anxiety disorders, including GAD, may exhibit structural brain abnormalities that correlate with neuropsychological deficits (Gkintoni & Ortiz, 2023). Additionally, chronic stress and dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis in anxiety disorders have been associated with reduced cognitive performance (Kulakova, Graumann, & Wingenfeld, 2024). Patients frequently report subjective cognitive impairments, which include difficulties in concentration, memory, and problem-solving (Allott et al., 2020; Smit et al., 2024). Despite these findings, understanding the specific cognitive impairments linked to GAD, particularly among young adults, remains limited (Leonard & Abramovitch, 2019).

Previous studies have primarily focused on cognitive impairments associated with obsessive-compulsive disorder (OCD), leaving other anxiety subtypes, including GAD, under-researched (Gillan et al., 2020). Emerging research suggests that the severity of GAD symptoms directly correlates with the degree of cognitive dysfunction. Anxiety-related impairments may manifest in executive functioning, attention, and working memory, though the extent and nature of these deficits vary across different anxiety subtypes (Leonard & Abramovitch, 2019).

This study aimed to explore cognitive functioning among young adults with GAD compared to normal controls. Using a comprehensive neuropsychological battery, including the Continuous Performance Test (CPT), Wisconsin Card Sorting Test (WCST), Trail Making Test (TMT), and Stroop Task, it evaluated specific domains such as attention, executive functioning, and cognitive flexibility. Findings indicated that patients with GAD demonstrated significantly poorer performance on tasks assessing attention and cognitive control, particularly in reaction time and error rates on the CPT and task-switching efficiency on the TMT. Additionally, WCST results highlighted difficulties in adapting to changing rules, suggesting deficits in cognitive flexibility. These impairments underscore the profound impact of anxiety disorders on everyday functioning and decision-making.

2. **Materials and Methods**

2.1 Study Design and Participants

This study included 30 patients diagnosed with Generalized Anxiety Disorder (GAD) and 30 apparently healthy individuals as a control group, matched for age and gender. Participants were aged between 18 and 50 years. The study was conducted in the Neuropsychiatry Department, Faculty of Medicine, Tanta University, from April 2011 to June 2012. Ethical approval was obtained from the ethical committee at Tanta University, and written informed consent was secured from all participants before inclusion.

2.2 Inclusion and Exclusion Criteria

Patients were included in the study if they had a confirmed diagnosis of Generalized Anxiety Disorder (GAD), established through clinical evaluation. Exclusion criteria included the presence of medical conditions that could affect cognitive functions, comorbid Axis-I psychiatric disorders, intellectual disabilities or pervasive developmental disorders, and pregnancy. Healthy control participants were carefully screened to ensure the absence of any psychiatric or medical conditions that might influence cognitive functioning.

2.3 Clinical and Neuropsychological Assessments

All participants underwent thorough individual evaluations comprising clinical and cognitive assessments. The clinical assessment included the MINI International Neuropsychiatric Interview (MINI), which was used to confirm the diagnosis of Generalized Anxiety Disorder (GAD) in patients and to exclude psychiatric disorders in the control group. The Generalized Anxiety Disorder 7-item (GAD-7) Scale was also employed to assess the severity of GAD symptoms in patients. For cognitive function testing, the Psychological Experiment Building Language (PEBL) software version 0.12 was utilized to administer a series of tests, including the Continuous Performance Test (CPT), the Wisconsin Card Sorting Test (WCST), the Trail Making Test (TMT), and the Stroop Task.

2.4 Cognitive Tests

The Continuous Performance Test (CPT) was administered to evaluate sustained and selective attention as well as impulsivity. During the test, participants were presented with a sequence of letters displayed on a screen and were instructed to press the spacebar for all stimuli except the letter "X." The test comprised 360 trials. Performance metrics included reaction time, which measured the speed of information processing; omission errors, which indicated lapses in attention when participants failed to respond to target stimuli; and commission errors, which highlighted impulsivity or deficits in response inhibition when participants responded to non-target stimuli.

2.5 Wisconsin Card Sorting Test (WCST)

The Wisconsin Card Sorting Test (WCST) was used to assess cognitive flexibility and problem-solving skills. In this test, participants matched cards based on different attributes such as color, number, or design, without being given explicit instructions about the sorting rule. After each match, feedback

was provided to indicate whether the match was correct or incorrect. Periodically, the sorting rule changed, requiring participants to adapt to the new rule. Key performance metrics included the total number of errors made, perseverative errors indicating a failure to adjust to new rules, and the number of categories successfully completed.

2.6 Trail Making Test (TMT)

The Trail Making Test (TMT) was utilized to evaluate visual attention and task-switching abilities. The test is divided into two parts. In TMT A, participants were required to connect 25 numbered circles sequentially as quickly as possible. In TMT B, the task was made more complex by requiring participants to alternate between numbers and letters in ascending order, such as 1-A-2-B. Performance was measured based on the total time taken to complete each part. Any errors made during the test were immediately corrected, and the correction time was included in the overall completion time.

2.7 Stroop Task

The Stroop Task was employed to evaluate cognitive control and mental flexibility. This task required participants to name the ink color of printed words while ignoring the semantic meaning of the words themselves. The stimuli presented included consistent trials, where the word's meaning matched its ink color (e.g., the word "red" printed in red ink), and inconsistent trials, where the word's meaning and ink color differed (e.g., the word "green" printed in blue ink). Participants alternated between reading the word and naming the ink color. Performance was assessed using metrics such as response accuracy and reaction times for both consistent and inconsistent trials, providing insights into their cognitive processing and inhibitory control.

2.8 Statistical Analysis

Data were analyzed using SPSS version 26 (IBM Inc., Chicago, IL, USA). Quantitative variables were summarized as means and standard deviations (SDs), and comparisons between the GAD and control groups were performed using unpaired Student's t-tests. Qualitative variables were presented as frequencies and percentages and analyzed using the Chi-square test or Fisher's exact test as appropriate. A two-tailed p-value < 0.05 was considered statistically significant.

3. Results

There were no significant differences in age, sex, marital status, or socioeconomic class between the patient and control groups (Table 1). In terms of Generalized Anxiety Disorder (GAD) symptom severity, the distribution of scores according to the GAD-7 was as follows: 2 patients (6.7%) had mild symptoms, 3 (10%) had moderate symptoms, 7 (23.3%) had severe symptoms, and 18 (60%) had very severe symptoms (Table 2).

The patient group showed significantly higher scores on the Wisconsin Card Sorting Test (WCST) in the following areas: Learning to Learn ($p = 0.044$), Correct Responses ($p = 0.009$), Preservative Errors ($p = 0.017$), and Preservative Responses ($p = 0.007$), compared to the control group (Table 3). Additionally, the patient group exhibited significantly higher Continuous Performance Test (CPT) scores, including in Commission Errors ($p = 0.015$), Omission Errors ($p = 0.001$), and Correct Reaction Time ($p = 0.003$) (Table 3).

The Trail Making Test results indicated that the patient group had significantly higher scores ($p = 0.042$) than the control group (Table 3). The Stroop Test showed no significant difference between the groups in interference ($p = 0.362$); however, the patient group had significantly higher Time Taken ($p = 0.047$), Responses Made ($p = 0.019$), and interference ($p = 0.028$) scores (Table 3). Furthermore, there was a significant increase in Trail Making Test results for Organic, Functional, and Normal categories in Trail A and Trail B in the patient group compared to the control group ($p < 0.05$) (Table 4).

These findings highlight notable cognitive dysfunction in the GAD patient group, particularly in tasks related to cognitive flexibility, attention, and processing speed.

4. Discussion

We have conducted this study to investigate cognitive deficits among patients with Generalized Anxiety Disorder (GAD), with a focus on understanding whether cognitive impairments are associated with the severity of anxiety symptoms. The findings indicated significant cognitive deficits in GAD patients, particularly in areas related to cognitive flexibility, attention, and processing speed. Our study's results contribute to the growing body of research suggesting that GAD not only affects emotional regulation but also impairs cognitive functioning.

The results from the current study showed no significant demographic differences between the GAD and control groups in terms of age, sex, marital status, or socioeconomic class, which is consistent with several previous studies (Leonard & Abramovitch, 2019). For instance, Leonard and Abramovitch (2019) noted that age, a common demographic factor, is often correlated with cognitive performance among individuals with GAD; however, our study did not find any significant differences between the two groups with respect to age. This may be explained by the specific age range of participants or the particular clinical setting. Similarly, Gkintoni et al. (2023) found no evidence of cognitive decline in GAD patients, suggesting that factors such as age and the methodological approach can significantly impact outcomes in studies on GAD-related cognitive dysfunction. Moreover, research by Vesga-López et al. (2008) has indicated that, in young adults, GAD is often

Table 1. Demographic data of the patients and control group

		Patients (n=30)	Control (n=30)	X^2	P
Age		29.56±8.37)	31.10± 8.06	0.722	0.473
Sex	**Female**	15 (50.0%)	15 (50.0%)	1.00	0.999
	Male	15 (50.0%)	15 (50.0%)		
Marital status	**Married**	11 (36.7%)	(10 33.3%)	0.073	0.255
	Single	19 (63.3%)	20 (66.7%)		
Social class	**High**	3 (10.0%)	11 (36.7%)	6.571	0.069
	Middle	11 (36.7%)	9 30.0%		
	Low	13 (10.0%)	7 (23.3%)		
	Very low	3 (10.0%)	3 (10.0%)		

Data are presented as mean ± SD and frequency (%).

Table 2. Severity of GAD symptoms according to GAD-7

	N=30
Mild	2 (6.7%)
Moderate	3 (10%)
Severe	7 (23.3%)
Very Severe	18 (60%)

Data is presented as frequency (%). GAD: Generalized Anxiety Disorder

Table 3. WCST, WCST items, CPT, CPT items, trail making test, Stroop test and Stroop test items for patients in comparison to control

		Patients (n=30)	Control (n=30)	t. test	P
WCST		60.19 ±15.96	45.63± 14.08	**4.211**	**0.001***
WCST items	**Learning to Learn**	-6.36±1.25	-4.25±0.42	**3.205**	**0.044***
	Correct Responses	42.62±10.23	32.62±5.32	**7.250**	**0.009***
	Preservative Errors	16.57±8.63	10.96±4.28	**2.369**	**0.017***
	Preservative Responses	29.63±9.31	19.63±6.41	**5.325**	**0.007***
CPT		328.4± 34.43	204.45± 29.6	**3.402**	**0.001***
CPT items	**Commission Errors**	3.63±1.32	1.32±0.69	**2.365**	**0.015***
	Omission Errors	73.58±15.69	58.3±10.25	**5.639**	**0.001***
	Correct RT	136.5±47.5	95.36±22.4	**4.770**	**0.003***
Trail making test		238.95± 85.18	214.63±76.25	**4.528**	**0.042***
Stroop test		1.7± 0.39	1.9± 0.33	**0.889**	0.362
Stroop Task	**Time taken Intrusions**	35.41±4.58	29.63±7.58	**2.325**	**0.047***
	Responses made	48.74±10.58	31.47±8.63	**3.095**	**0.019***
	interference	14.58±3.58	11.25±2.25	**1.253**	**0.028***

Data are presented as mean ± SD. WCST: Wisconsin card sorting test, CPT: Continuous performance test. *: Significant as p< 0.05.

Table 4. The mean value of trail making test for patients and control

Control	Trail Making Test					
	Trail A			Trail B		
	control	patients	p	control	patients	p
Organic	144.5+12.6	210.5+32.6	**0.001***	269.6+19.3	472.6+22.5	**0.001***
Functional	72.33+11.52	92.63+10.50	**0.003***	188.30+32.9	219.82+21.9	**0.002***
Normal	48.61+77	50.69+7.21	**0.425***	161.36+15.2	171.36+19.5	**0.049***

Data are presented as mean ± SD. *: Significant as $p < 0.05$.

associated with minor cognitive deficits, which may explain the lack of significant findings in our study for patients under 50 years of age.

Gender differences in cognitive functioning among individuals with GAD have been another topic of debate. In our study, no significant differences were found between males and females, echoing the findings of Leonard and Abramovitch (2019), who also reported no notable cognitive impairments based on sex in GAD patients. This is in contrast to Zhou et al. (2017), who found a higher prevalence of comorbid GAD among females. The lack of gender-based differences in cognitive performance in our study may be attributable to the relatively small sample size or the lack of consideration for other potential confounding variables, such as hormonal influences or comorbidities that might affect cognitive performance differently in males and females.

Another important demographic variable in the study was marital status. Our findings showed no significant differences in cognitive functioning between married and non-married individuals, a result that diverges from the findings of Zhou et al. (2017), who noted that patients with comorbid GAD were more likely to be unmarried. This discrepancy may reflect variations in the psychosocial factors related to GAD that differ across cultural contexts. For example, in some societies, marital status may be a significant source of stress or social support, which could, in turn, affect cognitive performance. This could also explain the significant increase in cognitive impairment observed in married individuals in some cross-sectional studies, such as Nyberg et al. (2021), which posited that marital stress can exacerbate cognitive deficits due to the higher levels of psychosocial stress experienced by married individuals with GAD. The impact of marital status on cognitive performance warrants further exploration, particularly in relation to stress and coping mechanisms.

The current study also examined the relationship between socioeconomic position (SEP) and cognitive functioning. While no significant correlations were found in our study between SEP and cognitive impairment, literature on this subject is mixed. For instance, Barlow and Di Nardo (1991) and Muntaner et al. (2004) have suggested that lower SEP is associated with a higher risk of anxiety disorders, and by extension, potentially more severe cognitive deficits. However, Lorant et al. (2003) found that SEP factors, while contributing to the onset of anxiety, are less consistently related to cognitive decline. The inconsistent findings in our study suggest that other unmeasured variables, such as educational level or stress from financial instability, could better explain the complex relationship between SEP and GAD-related cognitive dysfunction.

Perhaps one of the most striking findings in our study was the significant positive correlation between the severity of GAD symptoms and cognitive dysfunction, which was consistent across various cognitive tasks, including the Wisconsin Card Sorting Test (WCST), Continuous Performance Test (CPT), and Trail Making Test. These results align with previous research that has suggested a reciprocal relationship between GAD and cognitive deficits. Beaudreau and O'Hara (2008) argued that cognitive impairments in GAD patients are not merely a consequence of comorbid conditions but rather part of the disorder's broader neurobiological profile. Additionally, structural brain abnormalities, such as those found in the amygdala and prefrontal cortex, may contribute to both the emotional and cognitive deficits observed in GAD patients (de Mendonça Filho et al., 2021; Scheepens et al., 2020). This underscores the need for further research into the neurobiological underpinnings of cognitive impairments in GAD patients.

The limitations of this study are important to acknowledge. First, the study's cross-sectional design makes it impossible to draw causal conclusions regarding the relationship between GAD and cognitive impairment. Future longitudinal studies would be valuable in determining whether cognitive deficits precede the onset of GAD symptoms or develop as a result of prolonged anxiety. The small sample size of this study also limits the generalizability of the findings, and larger, more diverse samples are needed to confirm these results and provide a clearer picture of the cognitive deficits associated with GAD. Furthermore, the study does not explore potential mediators or moderators of the relationship between GAD and cognitive impairment, such as medication use, comorbid psychiatric conditions, or lifestyle factors like sleep quality and physical activity, all of which could influence cognitive performance.

5. Conclusion

In conclusion, our study found that cognitive impairment in patients with GAD is positively correlated with the severity of anxiety symptoms, particularly in tasks assessing attention, cognitive flexibility, and processing speed. The findings highlight the need for further research into the mechanisms underlying these cognitive deficits, particularly structural brain abnormalities and the effects of chronic stress. Understanding these mechanisms could lead to more effective interventions that not only address the emotional symptoms of GAD but also improve cognitive functioning, ultimately enhancing the quality of life for those affected by this disorder.

Author contributions

N.M.A, S.A.M.H, and A.H.A.A prepared the materials, collected the data, and performed the data analysis. A.M.A.M.B wrote the draft of the manuscript. All authors contributed to the study conception and design, read and approved the final manuscript.

Acknowledgment

The authors were grateful to their department.

Competing financial interests

The authors have no conflict of interest.

References

Allott, K., Gao, C., Hetrick, S. E., Filia, K. M., Menssink, J. M., Fisher, C., . . . Cotton, S. M. (2020). Subjective cognitive functioning in relation to changes in levels of depression and anxiety in youth over 3 months of treatment. BJPsych Open, 6(5), e84. doi:10.1192/bjo.2020.68

Barlow, D. H., & Di Nardo, P. A. (1991). The diagnosis of generalized anxiety disorder: development, current status, and future directions. american psychological association, 55(7), 79-80.

Beaudreau, S. A., & O'Hara, R. (2008). Late-life anxiety and cognitive impairment: a review. Am J Geriatr Psychiatry, 16(10), 790-803. doi:10.1097/JGP.0b013e31817945c3

de Mendonça Filho, E. J., Alves, M. B., & Silveira, P. P. (2021). Brain structural abnormalities in six major psychiatric disorders: shared variation and network perspectives. F1000Res, 10, 356. doi:10.12688/f1000research.51475.2

Gillan, C. M., Kalanthroff, E., Evans, M., Weingarden, H. M., Jacoby, R. J., Gershkovich, M., . . . Simpson, H. B. (2020). Comparison of the association between goal-directed planning and self-reported compulsivity vs obsessive-compulsive disorder diagnosis. JAMA Psychiatry, 77(1), 77-85. doi:10.1001/jamapsychiatry.2019.2998

Gkintoni, E., & Ortiz, P. S. (2023). Neuropsychology of generalized anxiety disorder in clinical setting: A systematic evaluation. Healthcare (Basel), 11(17), 57-89. doi:10.3390/healthcare11172446

Gkintoni, E., & Ortiz, P. S. (2023). Neuropsychology of Generalized Anxiety Disorder in Clinical Setting: A Systematic Evaluation. Healthcare, 11(17), 2446. Retrieved from https://www.mdpi.com/2227-9032/11/17/2446

Isakulyan, E. L., & Marachev, M. P. (2024). Features of cognitive functions in generalized anxiety disorder: narrative review. Eur Psychiatry, 67(S1), 424-425. doi:10.1192/j.eurpsy.2024.879

Jäncke, L. (2018). Sex/gender differences in cognition, neurophysiology, and neuroanatomy. F1000Res, 7. doi:10.12688/f1000research.13917.1

Kikas, K., Werner-Seidler, A., Upton, E., & Newby, J. (2024). Illness anxiety disorder: A review of the current research and future directions. Curr Psychiatry Rep, 26(7), 331-339. doi:10.1007/s11920-024-01507-2

Kulakova, E., Graumann, L., & Wingenfeld, K. (2024). The hypothalamus-pituitary-adrenal axis and social cognition in borderline personality disorder. Curr Neuropharmacol, 22(3), 378-394. doi:10.2174/1570159x21666230804085639

Leonard, K., & Abramovitch, A. (2019). Cognitive functions in young adults with generalized anxiety disorder. Eur Psychiatry, 56, 1-7. doi:10.1016/j.eurpsy.2018.10.008

Lorant, V., Deliège, D., Eaton, W., Robert, A., Philippot, P., & Ansseau, M. (2003). Socioeconomic inequalities in depression: a meta-analysis. Am J Epidemiol, 157(2), 98-112. doi:10.1093/aje/kwf182

Mishra, A. K., & Varma, A. R. (2023). A comprehensive review of the generalized anxiety disorder. Cureus, 15(9), e46115. doi:10.7759/cureus.46115

Muntaner, C., Eaton, W. W., Miech, R., & O'campo, P. (2004). Socioeconomic position and major mental disorders. Epidemiol Rev, 26(1), 53-62.

Nyberg, J., Henriksson, M., Wall, A., Vestberg, T., Westerlund, M., Walser, M., . . . Åberg, M. (2021). Anxiety severity and cognitive function in primary care patients with anxiety disorder: a cross-sectional study. BMC Psychiatry, 21(1), 617. doi:10.1186/s12888-021-03618-z

Rahman, N. A., Ariaratnam, S., Hashim, N. A., & Azhar, Z. I. (2024). Prevalence and factors associated with generalized anxiety disorder among patients with chronic pain: A single center cross sectional study in Malaysia. PLOS ONE, 19(7), e0307992. doi:10.1371/journal.pone.0307992

Scheepens, D. S., van Waarde, J. A., Lok, A., de Vries, G., Denys, D., & van Wingen, G. A. (2020). The link between structural and functional brain abnormalities in depression: A systematic review of multimodal neuroimaging studies. Front Psychiatry, 11, 485. doi:10.3389/fpsyt.2020.00485

Smit, D., Koerts, J., Bangma, D. F., Fuermaier, A. B. M., Tucha, L., & Tucha, O. (2024). Look who is complaining: Psychological factors predicting subjective cognitive complaints in a large community sample of older adults. Appl Neuropsychol Adult, 31(3), 203-217. doi:10.1080/23279095.2021.2007387

Vesga-López, O., Schneier, F. R., Wang, S., Heimberg, R. G., Liu, S. M., Hasin, D. S., & Blanco, C. (2008). Gender differences in generalized anxiety disorder: Results from the national epidemiologic survey on alcohol and related conditions (nesarc). J Clin Psychiatry, 69(10), 1606-1616.

Zhou, Y., Cao, Z., Yang, M., Xi, X., Guo, Y., Fang, M., . . . Du, Y. (2017). Comorbid generalized anxiety disorder and its association with quality of life in patients with major depressive disorder. Sci Rep, 7, 40511. doi:10.1038/srep40511