START Clinic for Mood and Anxiety Disorders

32 Park Road
Toronto, Ontario
M4W 2N4

Stress ▶ Trauma ▶ Anxiety ▶ Rehabilitation ▶ Treatment

contact information
Phone: 416 598 9344
Fax: 416 598 8198
information@startclinic.ca

A Preliminary Study: The Impact of Executive Dysfunction on Anxiety Severity in Patients with Attention-Deficit/Hyperactivity Disorder Across Gender

Elssa Toumeh[1] , Alexandria Greifenberger[1], Sachinthya Lokuge[1], Kathryn Fotinos[1], Tia Sternat[1,2], Irvin Epstein[1], Martin A. Katzman[1,2,3,4]

[1]S.T.A.R.T. Clinic for Mood and Anxiety Disorders, [2]Adler Graduate Professional School, Lakehead University[3], Northern Ontario School of Medicine[4]

INTRODUCTION

- Up to 34% of people with attention-deficit/hyperactivity disorder (ADHD) have a comorbid anxiety disorder (Hesson & Fowler, 2018; Schatz & Rostain, 2006).
- ADHD is characterized by atypical dopaminergic and noradrenergic signaling, which can lead to issues with executive dysfunction (Katzman et al., 2017). These deficits may result in insufficient regulation of the HPA-axis, which thereby increases the risk of developing an anxiety disorder.
- Across gender, females with ADHD are often misdiagnosed and undertreated, while consistently reporting more symptoms of anxiety and executive dysfunction compared to males (Solberg et al, 2017; Biedermen et al., 1994).
- As a result, higher rates of treatment resistance and inadequate treatment outcomes exist among females with ADHD (Young et al., 2020).

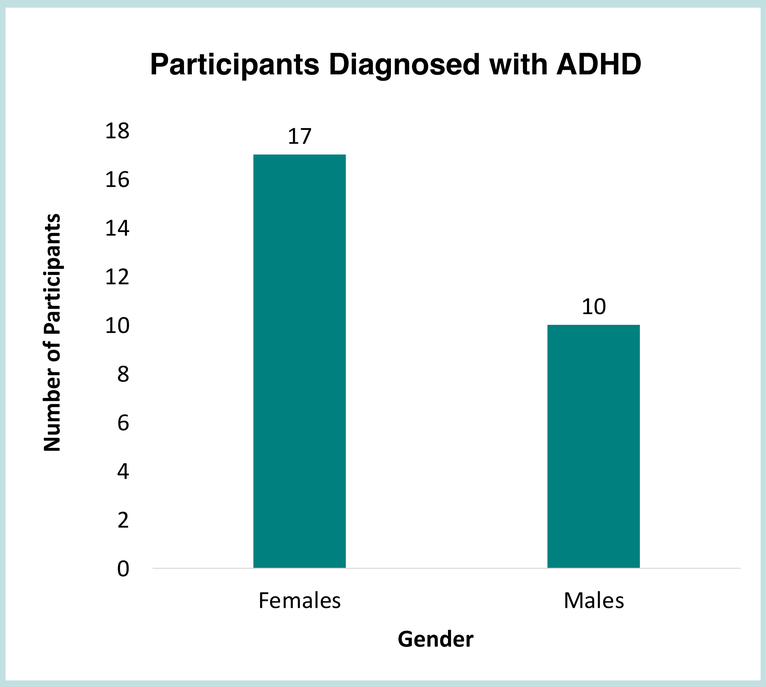
OBJECTIVES

- This study aims to identify unique gender differences in ADHD presentation with respect to the impact of executive dysfunction on generalized anxiety disorder (GAD) severity.
- To emphasize the role of transdiagnostic factors, such as executive dysfunction, in ADHD and GAD severity which may better explain the level of misdiagnosis and delayed treatment of ADHD within the female population.

METHODS

Participants

The sample (n = 27, M_{age} = 33.89, SD = 12.89) consisted of 17 female and 10 male adult psychiatric outpatients diagnosed with ADHD. All participants were referred to the S.T.A.R.T. Clinic for Mood and Anxiety Disorders, a tertiary care psychiatric clinic in Toronto, Canada. Participants underwent a diagnostic interview and completed various mental health measures. Data was retrospectively analyzed. Variables measured included executive dysfunction and GAD severity in those that met criteria for ADHD, as well as comorbid ADHD and GAD.



RESULTS

Instruments

- **Mini-International Neuropsychiatric Interview (MINI) 6.0.0. and MINI Plus ADHD module 5.0.0.** – Diagnostic screening tool for DSM-IV psychiatric disorders, utilized to determine a diagnosis of ADHD and GAD (Sheehan et al., 1998).
- **Generalized Anxiety Disorder-7 Scale (GAD-7)** – Measures severity of GAD; higher scores represent greater GAD severity, with cut-off scores of 5 for mild GAD (Spitzer et al., 2006).
- **Barkley Deficits in Executive Functioning Scale (BDEFS)** – Measures executive dysfunction in ADHD; higher scores suggest worsening ADHD severity (Barkley, 2011).

Independent Samples Test: Differences between Females and Males with ADHD

	P-value	df
GAD-7 Total	**0.008**	49
BDEFS Total	0.244	25

An independent t-test was employed to compare GAD-7 and BDEFS total scores between female and male groups. There was a significant difference in GAD-7 *(t (*49) = 2.751, **p = 0.008**) total scores between groups. There was no significant difference in BDEFS *(t (*25) = 1.194, p = 0.244) total scores.

Linear Regression Model: Does BDEFS predict the severity of GAD in the Female Population?

DV	R^2	Adj. R^2	S.E	P-value
GAD-7 Total	0.405	0.365	4.082	**0.006**

The overall model was significant (F (1,15) = 10.202, **p = 0.006**) and accounted for 36.5% of the variance.

Regression Coefficients in Female Population

IV	*B*	S.E	β	t	P-value
BDEFS	0.091	0.028	0.636	3.194	**0.006**

Executive dysfunction (*t* (1,15) = 3.194, **p = 0.006**) was found to be a significant predictor of GAD severity in females.

Linear Regression Model: Does BDEFS predict the severity of GAD in the Male Population?

DV	R^2	Adj. R^2	S.E	P-value
GAD-7 Total	0.216	0.118	7.820	0.176

The overall model was not significant (F (1,8) = 2.207, p = 0.176) and accounted for 11.8% of the variance.

Regression Coefficients in Male Population

IV	*B*	S.E	β	t	P-value
BDEFS	0.090	0.060	0.465	1.485	0.176

Executive dysfunction (*t* (1,8) = 1.485, p = 0.176) was found <u>not</u> to be a significant predictor of GAD severity in males.

DISCUSSION

Main Findings

- Females with ADHD reported significantly higher levels of GAD severity (M_{score} = 14.16) compared to males (M_{score} = 10.05), while executive dysfunction did not significantly differ across gender.
- Executive dysfunction significantly predicted GAD severity among females, explaining 36.5% of the variance in GAD-7 scores. However, executive dysfunction was not significantly predictive of GAD severity in males.

Clinical/Theoretical Implications

- Executive dysfunction in ADHD manifests differently across genders.
- Specifically, executive dysfunction may be driving increased GAD severity in females with comorbid ADHD but not in males.
  - This aligns with the common differential display of inattentive and internalizing behaviours among females with ADHD, as opposed to externalizing behaviours more often associated with males.
- High prevalence of GAD symptom severity in females may be masking the primary diagnosis of ADHD, leading to increased misdiagnosis and undertreatment
  - This highlights the important consideration of assessing for ADHD in patients suffering from GAD and suggests the potential value of augmenting ADHD treatments in non-responsive female patients displaying symptoms of GAD.

Limitations

- Archival data
- Did not control for other comorbidities
- Factors influencing GAD severity in male populations were not examined
- Small sample size

REFERENCES

Barkley, R. A. (2011). *Barkley deficits in executive functioning scale (BDEFS)*. Guilford Press.

Katzman, M. A., Bilkey, T. S., Chokka, P. R., Fallu, A., & Klassen, L. J. (2017). Adult ADHD and comorbid disorders: Clinical implications of a dimensional approach. *BMC Psychiatry*, *17*(1), 302.

Sheehan, D. V., Lecrubier, Y., Sheehan, K. H., Amorim, P., Janavs, J., Weiller, E., Hergueta, T., Baker, R., & Dunbar, G. C. (1998). The Mini-International Neuropsychiatric Interview (M.I.N.I.): The development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *The Journal of Clinical Psychiatry*, *59 Suppl 20*, 22-33;quiz 34-57.

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A Brief Measure for Assessing Generalized Anxiety Disorder: The GAD-7. *Archives of Internal Medicine*, *166*(10), 1092.

Schatz, D. B., & Rostain, A. L. (2006). ADHD with comorbid anxiety: A review of the current literature. *Journal of Attention Disorders*, *10*(2), 141-149.

Hesson, J., & Fowler, K. (2018). Prevalence and correlates of self-reported ADD/ADHD in a large national sample of Canadian adults. *Journal of Attention Disorders*, *22*(2), 191–200.

Biederman, J., Faraone, S. V., Spencer, T., Wilens, T., Mick, E., & Lapey, K. A. (1994). Gender differences in a sample of adults with attention deficit hyperactivity disorder. *Psychiatry Research*, *53*(1), 13-29.

Solberg, B. S., Halmøy, A., Engeland, A., Igland, J., Haavik, J., & Klungsøyr, K. (2018). Gender differences in psychiatric comorbidity: a population-based study of 40 000 adults with attention deficit hyperactivity disorder. *Acta Psychiatrica Scandinavica*, *137*(3), 176-186.

Young, S., Adamo, N., Ásgeirsdóttir, B. B., Branney, P., Beckett, M., Colley, W., ... & Woodhouse, E. (2020). Females with ADHD: An expert consensus statement taking a lifespan approach providing guidance for the identification and treatment of attention-deficit/hyperactivity disorder in girls and women. *BMC Psychiatry*, *20*(1), 1-27.