

### BACKGROUND

- Attention-deficit/hyperactivity disorder (ADHD) is one of the most common neuropsychiatric disorders that affects both children and adults; interfering with and reducing the quality of social, school, or work functioning
- With the addition of the pandemic quarantine, virtual learning environments, and restricted access to a daily routine, young adults are negatively impacted with the loss of environmental structure

### OBJECTIVES

To assess the impact of virtual learning due to the COVID-19 pandemic on ADHD symptoms

### METHODS

#### Study Design:

- Prospective, observational, cross-sectional
- 43-item quantitative/qualitative survey with two invitations

#### Study Population:

- SIUE students
- Age 18 to 25
- With or without clinical diagnosis of ADHD

#### Outcome measures

- Primary outcome: impact of pandemic-associated virtual learning on self-reported symptoms of ADHD
- Secondary outcomes:
  - Changes in ADHD symptoms between those with diagnosis and those without
  - Changes in symptoms between those treated and those untreated by healthcare professional
  - Changes in symptoms in those without diagnosis but with suspicion of ADHD
  - Prevalence of self-treatment for ADHD symptoms during pandemic / virtual learning

#### Data Analysis:

- Analysis with IBM SPSS 26.0
- Basic descriptive statistics are presented
- Continuous data was compared using student's t-test, nominal data was compared using Pearson chi-square

Demographics Information and Corresponding History of Diagnosis			
Characteristics		Diagnosis N (%)	No Diagnosis N (%)
Gender	Male	23 (.19)	178 (.21)
	Female	92 (.76)	641 (.76)
	Non-Binary/Third Gender	5 (.04)	23 (.02)
	Prefer Not to Say	1 (.008)	6 (.007)
Current treatment for ADHD by a Healthcare Professional	Yes	75 (.62)	
	No	46 (.38)	
Self-Treatment for ADHD-like Symptoms	Yes		94 (.11)
	No		746 (.89)

Table 1. Baseline characteristics of participants including current treatment and self-treatment.

#### Response rate:

- The questionnaire was sent to 13,010 participants with 969 responding, yielding a response rate of 7.5%
- 1,247 participants started the survey, 278 were omitted for lack of significant response

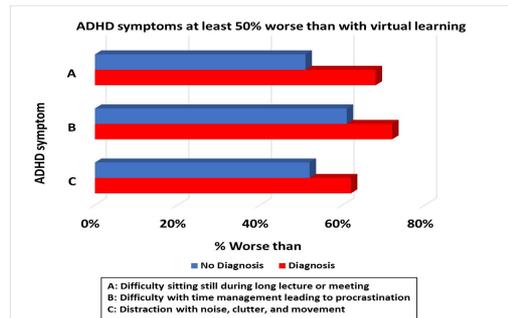


Figure 1. Symptoms reported at least 50% worse by participants with and without recorded diagnosis. This data suggests that virtual learning due to the COVID-19 pandemic worsened these specific symptoms among all students regardless of ADHD diagnosis.

\*\*For purposes of brevity, results of the survey were truncated to be reported as worse or not worse\*\*

### RESULTS

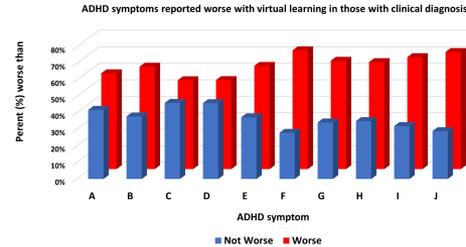


Figure 2. Participants with a clinical diagnosis of ADHD reported worsening in 10 out of 18 symptoms. This data suggests that virtual learning due to the COVID-19 pandemic affects all students, even those with a clinical diagnosis and management of treatment by a healthcare professional. According to the results of this study, students may not be able to achieve optimal success without a controlled environment or access to additional resources to supplement overall education.

- Restless or fidgety
- Difficulty sitting through long lecture of meeting
- Difficulty sitting still, always moving hands or feet, fidgeting in chair
- Distracted by work, chores, or talking to someone
- Difficulty staying focused during tasks that are boring or repetitive
- Difficulty with time management leading to procrastination
- Leaving things half done and starting on another project
- Difficulty concentrating on what people say to you, even when they are speaking directly to you
- Distracted by noise, clutter, and movement
- Make careless mistakes when completing an assignment or project

Comparison of ADHD Symptoms Reported Worse Due to Virtual Learning			
Symptoms	Diagnosis N (%)	No Diagnosis N (%)	P-value
How often do you feel restless or fidgety?	61 (.19)	267 (.81)	.043
Can almost anything get your mind off what you are doing, such as work, chores, or if you're talking to someone?	54 (.19)	224 (.81)	.012
Do you to put items in the same place each time, otherwise you will lose them?	38 (.2)	151 (.8)	.040
How often do you make careless mistakes when completing an assignment or a project?	71 (.19)	312 (.81)	.028

Table 2. Statistical analysis of specific reported symptoms between those diagnosed and undiagnosed with corresponding p-value. According to these results, there was a statistically significant impact on specific ADHD symptoms in those who had no clinical diagnosis.

### LIMITATIONS

- Only 62% of those clinically diagnosed were on therapy, therefore the impact on self-reported ADHD symptoms can also be affected by compounded factors such as lack of healthcare, financial instability, stigma, and cultural barriers
- Single-study site, results of survey may not be applicable to all university settings

### DISCUSSION

- Results suggest that university students are more likely to have increased self-reported ADHD symptoms due to the impact of virtual learning
- Contributing factors could include loss of a controlled environment, limited access to additional support services, and social determinants of health
- The three common symptoms reported at least 50% worse by all participants could be due to lack of academic structure, routine, and increased environmental distractions

### FUTURE RESEARCH

- Does environment affect university students' ability to manage their symptoms, regardless of ADHD diagnosis and treatment?
- Is virtual learning a useful educational tool for the majority of university students regardless of ADHD diagnosis?

### REFERENCES

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