2022

The Effect of Exercise and Dietary Patterns on Mental Health Disorder before, during, and late COVID-19 on Males and Females

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ABSTRACT

The emerging field of nutritional neuroscience has revealed the modulatory role of **diet and sleep on mental health**. **Nutrients such as fruits, vegetables, nuts, fish, and whole grains were described as supporting brain functions, and sleep deprivation has been associated with a disruption in brain functions**. **Exercise is another effective modulator of mental health.** The outbreak of the global pandemic COVID-19 has produced a sudden disruption in people's routines. **Factors such as sickness, loss of lives and jobs, and remote work heavily impact mental health. During the COVID-19 lockdown, the food chain supply and exercise routine were interrupted.** So, studying the effects of dietary and exercise patterns on the mental health of men and women **pre-COVID, during-COVID, and post-COVID** may provide significant insight into the effect of these modulators on mental health.

DATASET

- Secondary dataset collected by the Health and Wellness Studies department at Binghamton University
- Data is collected between September 2018 and November 2021 and contains 2320 records.
- Before March 19, 2020, is considered pre-COVID, between March 19, 2020, and May 1, 2021, is considered during COVID lockdown, and after May 1, 2021, is considered post-COVID restrictions.

METHODOLOGY

1. Ordinal Logistic Regression

An **event-based difference-in-difference study** based on the **exercise pattern and COVID-19 era** was used to estimate the impact of COVID-19 on an individual's mental distress. Our dependent variable is categorical, so we performed an **Ordinal Logistic Regression** to analyze factors related to mental health. The independent variables used in the model were: **breakfast, sleep duration, caffeine, HGI food, dairy, meat, seafood, fast food, exercise type**.

2. Probabilities

Using probabilities (Margins) we calculated the **average predicted probability for each outcome** of our ordinal dependent variable.

REGRESSION RESULT

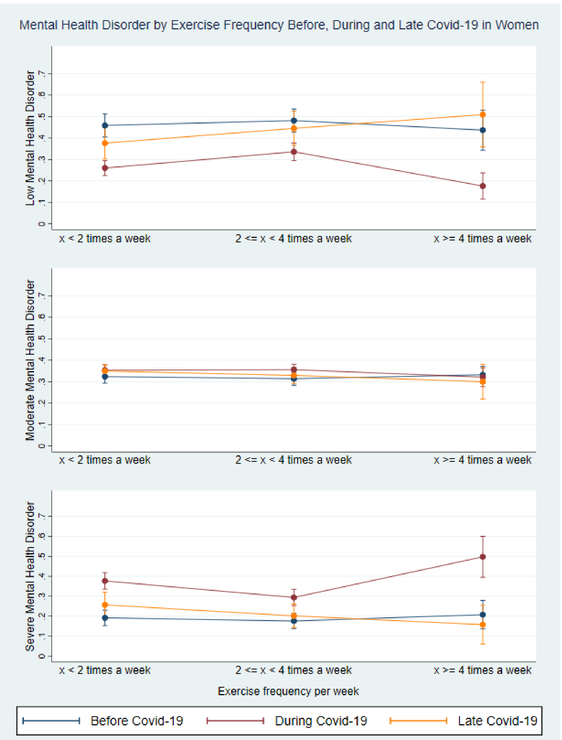
COVID-19 Era	Exercise Frequency	Coefficient	Standard Error	Z	P>|z|	[95% confidence Interval]	
Before COVID-19	x < 2 times per week			Baseline			
	2 ≤ x < 4 times per week	-0.104	0.187	-0.560	0.578	-0.471	0.263
	x ≥ 4 times per week	0.121	0.268	0.450	0.653	-0.405	0.646
During COVID-19	**x < 2 times per week**	**1.022**	**0.161**	**6.370**	**0.000**	**0.708**	**1.337**
	2 ≤ x < 4 times per week	**0.609**	**0.170**	**3.580**	**0.000**	**0.276**	**0.943**
	x ≥ 4 times per week	**1.586**	**0.269**	**5.900**	**0.000**	**1.059**	**2.114**
Late COVID-19	**x < 2 times per week**	**0.430**	**0.220**	**1.960**	**0.050**	**-0.001**	**0.860**
	2 ≤ x < 4 times per week	0.053	0.236	0.230	0.822	-0.409	0.515
	x ≥ 4 times per week	-0.227	0.415	-0.550	0.584	-1.040	0.585

The interaction of COVID-19 era and exercise frequency on mental health disorder on female

Feature	Coefficient	Standard Error	Z	P > |z|	95% Confidence Interval	
Breakfast Pattern	**-0.076**	**0.024**	**-3.220**	**0.001**	**-0.122**	**-0.030**
Sleep Duration	**-0.273**	**0.057**	**-4.780**	**0.000**	**-0.385**	**-0.161**
Caffeine Intake	0.016	0.026	0.610	0.541	-0.035	0.068
Rice/Pasta Consumption	**0.097**	**0.035**	**2.770**	**0.006**	**0.029**	**0.166**
Dairy Products Consumption	-0.007	0.029	-0.250	0.802	-0.065	0.050
Meat/Chicken/Turkey Consump-	-0.033	0.029	-1.150	0.249	-0.089	0.023
Seafood Consumption	**-0.081**	**0.041**	**-2.000**	**0.046**	**-0.161**	**-0.002**
Fast food Consumption	**0.222**	**0.037**	**6.030**	**0.000**	**0.150**	**0.294**
Distance to Gym	**0.246**	**0.054**	**4.590**	**0.000**	**0.141**	**0.351**
Exercise Type	**-0.197**	**0.047**	**-4.210**	**0.000**	**-0.289**	**-0.106**

Features associated with mental health disorder on female

PROBABILITIES



CONCLUSION

- Women's mental health disorders were more affected by COVID-19 than men's.
- Having a sedentary lifestyle will increase the risk of having moderate and severe mental health disorders in both males and females.
- Factors such as increasing the frequency of consuming breakfast, sleep duration, exercise type, and consuming seafood were associated with mental health disorders in men and women.
- Longer distance to the gym, consuming fast food, caffeine intake, and HGI food consumption will deteriorate the mental health disorder in men and women.

REFERENCE

1.Grocke-Dewey, Michelle, et al. "Examining the relationship between physical activity and mental health during the COVID-19 pandemic across five US States." Preventive Medicine Reports 24 (2021): 101537.