Determinants of mental health and its relationship with academic indicators in Technical/Professional Higher Education during the Covid-19 pandemic

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Abstract. Mental health problems gained greater significance during the pandemic, with adolescents and young people being one of the most affected groups. This study examines the factors that influence anxiety and depression symptoms in first-year students at a technical and vocational institution, and how these symptoms affected their academic indicators during the pandemic. The study included 18,753 students from different disciplinary areas. Using an ordered probit model, factors associated with a higher prevalence of anxiety and depression symptoms were identified. These factors included being female, younger age, Chilean nationality, having some form of disability, not responsible for minors, having an inadequate space to study, or, experiencing a decrease in income or having a family member sick due to pandemic. In a secondary analysis, it was found that higher symptomatology had a greater detrimental effect on academic performance. These findings can be useful for informing mental health support strategies.

Keywords: Academic Achievement, Mental Health, Vocational Education.

1   Introduction

The prevalence of mental health symptoms increased during the pandemic (Javed et al., 2020; Pierce et al., 2020), and young people in higher education were a particularly affected group due to the impact on their emotions, behavior, and well-being (Copeland et al., 2021). Academic performance is also affected by decreased motivation, concentration, and social interactions (Unger, 2007). This study provides new insights into the analysis of mental health during COVID-19 and academic performance. We examined a technical/professional institution with over 18,000 first-year students, considering a wide set of characterization variables.

2 Theoretical Framework

The factors that influence students' mental health are contextual and can be affected by the social or geographic environment (Sanhueza et al., 2017), requiring consideration of previous academic background, personal biography, and family history (Gallardo et al., 2019). Wathelet et al. (2020) suggests that mental health disorders are associated with female and non-binary gender, economic problems, history of psychiatric follow-up, social isolation, among others.

Various studies have shown that the pandemic worsened the mood of university students, with a more critical situation in depressive and anxious symptoms among women, which could be linked to increased caregiving and domestic tasks (Energici et al., 2021). Another affected group was students with economic difficulties and lower parental education level (MacGinty et al., 2021).

Psychological factors such as stress, anxiety, and suicidal tendencies are associated with lower grade averages among students (Bhattacharya & Bhattacharya, 2015), and this effect increases over time, with the first academic year being the best stage for institutional intervention (Wyatt et al., 2017).

3 Methods

Anxiety and depression levels were measured using self-reported questionnaires GAD-7 and PHQ-8 (Kroenke et al., 2009; Spitzer et al., 2006). Characterization variables such as gender, age, employment status, income level, household composition, nationality, ethnicity, household headship, responsibility for minors, caregiving, disability, high school grade average, pandemic-related issues, and academic variables including schedule, type of degree, school, and campus are utilized. The dependent variable corresponds to the final grades of each subject and average semester.

The determinants of mental health symptoms (anxiety or depression) are characterized, quantifying the effect of each variable through an ordered probabilistic model. Subsequently, the effects of each symptom level on academic performance are estimated using a linear regression model (OLS).

4 Results

The conditions most strongly associated with mental health problems are: having a disability, not having an adequate study space, being female, experiencing a decrease in income or having a sick family member during the pandemic, having Chilean nationality, younger age, and not responsible for minors (see Fig. 1 and Fig. 2). The marginal effect estimation of each covariate on the probability of experiencing each symptom level is shown. The remaining characterization variables are not significant.
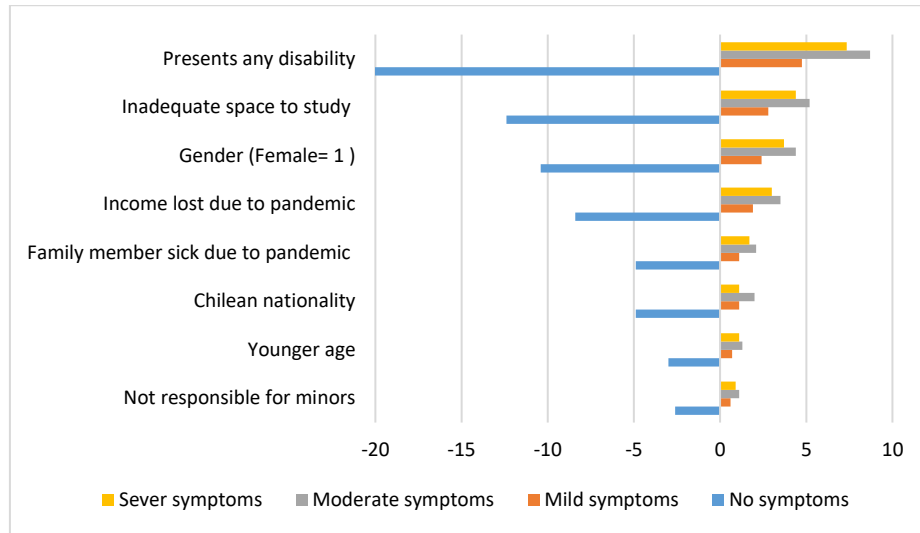
Fig. 1. Estimation of marginal effect with ordered probit for anxiety symptoms (in percentage points).
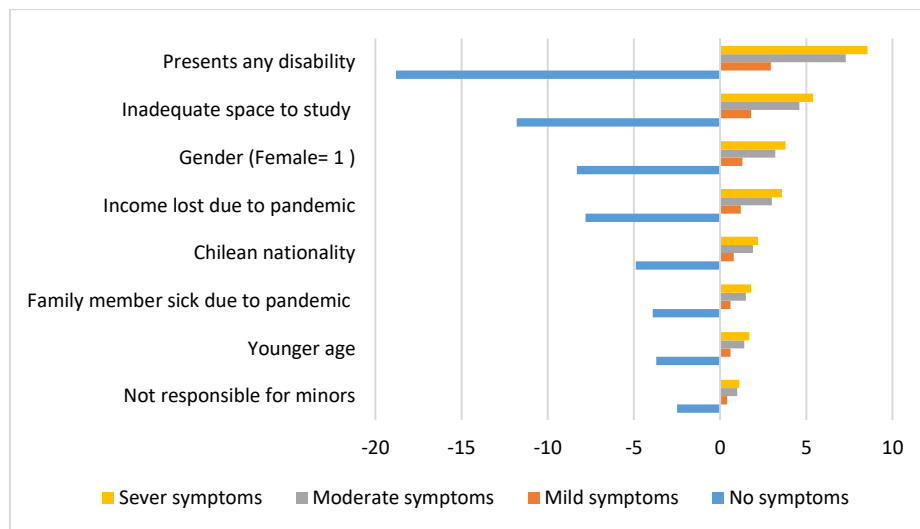

Fig. 2. Estimation of marginal effect with ordered probit for depression symptoms (in percentage points).

When estimating the effect on the final grade of the course and the weighted overall average, it is possible to observe a negative impact on the academic outcomes of students with severe symptoms of anxiety and depression compared to those without these symptoms. Furthermore, it is observed that the magnitude of the negative effect increases in conjunction with the level of symptoms. Additionally, a greater effect is

observed in students who report symptoms of depression compared to those with symptoms of anxiety.

Table 1. Estimation of academic indicators and mental health symptoms (in standard deviations).

	Anxiety		Depression	
	Final course grade	Semester average	Final course grade	Semester average
Mild symptoms	-0,008	-0,027	-0,020	-0,051***
	(0,013)	(0,018)	(0,013)	(0,019)
Moderate symptoms	-0,042***	-0,075***	-0,054***	-0,107***
	(0,017)	(0,025)	(0,017)	(0,025)
Severe symptoms	-0,068***	-0,166***	-0,098***	-0,201***
	(0,025)	(0,034)	(0,022)	(0,030)
Observations	98.753	18.531	98.753	18.531

Standard error in parentheses. We control for variables characterizing the student, home and program. * $p<0.1$, **$p<0.05$, *** $p<0.01$.

5   Discussion

It was observed that women have higher levels of depression and anxiety symptoms, which is consistent with national studies (Suárez-Barba et al., 2021). Meanwhile, age decreases the likelihood of presenting symptoms (Jorm, 2000).

Financial problems or having a sick family member were associated with a higher probability of experiencing anxiety or depression (Browning et al., 2021), while having an adequate study space reduces it (Hubbard et al., 2021).

Contrary to previous studies, there was inconclusive evidence regarding being the head of household and employment. However, students without responsibility for minors increased the likelihood of presenting high levels of anxiety symptoms (Macari et al., 2005; Pierce et al., 2020).

Psychological disability has a greater influence on the probability of experiencing anxiety or depression symptoms. This condition causes difficulties in learning or performing simple or complex tasks, and limits the ability to communicate and socialize.

Studying the relationship between academic performance and negative mental health symptoms, it was found that the negative effect on performance increases as the level of symptoms becomes more severe. Specifically, for moderate and severe symptoms of anxiety and depression.

6   Conclusions

During the pandemic, there were groups of students in higher education who showed a tendency to develop higher levels of depression and anxiety symptoms, which subsequently affected their academic performance. This is relevant for higher education institutions and the mental health care of their students in a context with the highest incidence rate of psychopathologies (Micin & Bagladi, 2011).

Although there is no ideal model for addressing student well-being, it is important to develop educational and preventive programs based on the characteristics and needs of students. The invitation is to provide differentiated support for groups with higher prevalence and promote supervised exercises of mindfulness, cognitive-behavioral therapy techniques, relaxation actions (Martineau et al., 2017), and the use of technological resources for stress management (Harrer et al., 2018).

7   Limitations and Future Research

Self-selection among survey respondents can introduce bias if they possess distinguishing characteristics compared to those who do not respond.

Another limitation is the interpretation of the results, which should not be interpreted causally due to unobserved factors that simultaneously influence academic performance and mental health. Although we conducted sensitivity analyses indicating that this does not pose a significant threat.

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