

Article

Self-Reported Depressive Symptomatology Among University Students: Evidence from the PROTEGER-SE Project

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Abstract

This study aimed to assess the self-reported depressive symptomatology of university students during their first therapeutic online consultation and intervention at PROTEGER-SE Project, using the Patient Health Questionnaire-9 (PHQ-9) as a screening instrument. A cross-sectional, retrospective, and analytical study was conducted with 350 records of university students from 2020–2023 collected immediately after their first appointment. Many students presented moderate to severe depressive symptoms, with one-third classified as severe. Logistic regression showed that female sex was associated with higher symptomatology severity, while lower PHQ-9 scores and Humanities field of study enrollment predicted perceived improvement after consultation. Findings reinforce the importance of university-based mental health support, gender-sensitive approaches, and the systematic use of PHQ-9 for early screening and continuous monitoring.

Keywords: depression; university students; mental health; PHQ-9; online intervention; higher education



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1. Introduction

Psychological distress has become increasingly prevalent worldwide, revealing the fragility of health systems in addressing this growing demand. In 2019, prior to the COVID-19 pandemic, an estimated 301 million people globally suffered from anxiety disorders, and approximately 280 million experienced depressive disorders [1]. The onset of the pandemic exacerbated this already concerning scenario. The World Health Organization (WHO) estimates that in the first year of the health crisis alone, there was an approximate 25% increase in the global prevalence of anxiety and depression, with a disproportionate impact on women and young adults [2].

In this context, mental health has emerged as a priority public health issue, demanding coordinated actions, care policies, specialized services, and sustained scientific research. A key approach to addressing this challenge involves the analysis of data linking sociodemographic factors to mental health outcomes. As highlighted, social determinants operating across the life course play a central role in shaping both the distribution of mental disorders and opportunities for prevention. Variables such as age, sex, race/ethnicity, educational attainment, and marital status influence not only the occurrence of symptoms but also how psychological distress is experienced, as well as how mental health care is accessed and evaluated. These factors should therefore be systematically considered in the development of targeted and preventive mental health strategies [3].

Research indicates that the university population was particularly affected by factors such as social isolation, the interruption of in-person academic activities, increased professional uncertainty, and emotional exhaustion [4,5]. These aspects, combined with academic overload, financial insecurity, and barriers to accessing mental health services, all of which were accentuated in the post-pandemic period, contribute to the chronification of psychological distress among this population [6]. This has resulted in substantial levels of psychological distress among university students, including suicidal ideation, which has been reported in a considerable proportion of participants during the pandemic [4,7]. Furthermore, evidence shows that women and young adults exhibit greater vulnerability to mental health problems, highlighting the role of sociodemographic factors. Consequently, early, structured, and context-sensitive interventions, particularly those that expand access to care and promote prevention, have the potential to reduce the overall burden of mental disorders [3].

Given this context, developing mental health support strategies sensitive to individual and contextual diversities became essential, especially within the university setting. Thus, in April 2020, the PROTEGER-SE Project (a Portuguese acronym for “Therapeutic Online Management Project—Staff and Students”) was established as an emergency, multiprofessional university extension initiative at the Universidade Federal de Uberlândia (UFU) to mitigate the psychosocial effects of the COVID-19 pandemic. Initially, a single-session therapeutic service was offered, with the aim of providing immediate support in the context of the pandemic. Subsequently, the project expanded the services offered, increasing the possibility for the user, after the single session, to be referred to other services, such as brief therapeutic follow-up of three to 12 sessions.

The consolidation of the actions carried out by the project resulted in a database of initial consultations, enabling the analysis of symptoms and sociodemographic profiles. Based on these records, the primary objective of this study is to assess the self-reported depressive symptomatology of university students during their first therapeutic online consultation at PROTEGER-SE, using the Patient Health Questionnaire-9 (PHQ-9) as a screening instrument. Secondary objectives include investigating the influence of sociodemographic profiles on symptom severity and the perception of improvement following the

consultation. Ultimately, this work aims to provide evidence to inform the development of more equitable and effective mental health care strategies within the university context.

2. Materials and Methods

2.1. Pandemic Context Considerations

Although the literature highlights the temporal evolution of the COVID-19 pandemic as a relevant factor for understanding depressive symptom trajectories [8,9], it was not possible in the present study to robustly incorporate this temporal and behavioral dimension into the analytical models. This methodological decision was based on concrete limitations related to the availability, consistency, and quality of the data required for such characterization.

The study sample comprised individuals affiliated with multiple university campuses located in different municipalities, and information regarding participants' place of residence or location at the time of care was not collected. Consequently, some participants may have been residing in their cities of origin rather than in the campus cities of the institution. Furthermore, municipalities in the region adopted heterogeneous strategies regarding lockdown measures, easing of restrictions, and vaccination campaigns, implemented at varying times and intensities and without standardized or consistently available public records [10]. This heterogeneity precluded the construction of a unified and comparable temporal indicator across municipalities.

In addition, there was no systematic individual-level information on vaccination status, adherence to social distancing measures, or history of COVID-19 infection, nor were sufficiently detailed local epidemiological data available at the municipal level to allow for the precise delineation of different pandemic "waves" [11].

Data on pandemic waves and circulating variants were scarce and fragmented even for the city hosting the main university campus. Under these circumstances, any attempt to stratify analyses according to pandemic periods would have relied on arbitrary classifications, substantially increasing the risk of misclassification and analytical bias. Therefore, this contextual variable was not formally included in the analytical models. Its potential influence on the findings is addressed in the Discussion section, in accordance with the methodological and statistical rigor adopted in similar studies conducted in the region.

2.2. Study Design and Participants

This cross-sectional, retrospective, and analytical study used secondary data from consultations conducted by the PROTEGER-SE extension project at the Federal University of Uberlândia (UFU) between 2020 and 2023. The data analyzed were extracted from electronic spreadsheets automatically generated from standardized online forms completed by PROTEGER-SE users immediately after their first multiprofessional mental health consultation. Subsequent consultations were not considered in order to ensure sample consistency, since individuals' symptoms upon returning to the service were generally more severe or persistent.

These forms included sociodemographic, academic, and clinical information. The inclusion criteria comprised records of university students aged 18 years or older at the time of consultation, obtained from fully completed forms corresponding to the first online multiprofessional mental health consultation. Exclusion criteria included records of minors ($n = 17$), individuals from the external community ($n = 48$), UFU staff members ($n = 18$), one record with incomplete data, and 103 follow-up records. Follow-up records generally referred to individuals enrolled in extended care modalities (up to three sessions, with subsequent sessions scheduled directly with the clinician) or brief therapeutic care (BTC) (up to 12 sessions, also scheduled directly with the clinician). These records were excluded

to ensure that only the first consultation for each student was analyzed. Additionally, forms containing incomplete or inconsistent information were removed.

After applying all eligibility criteria, the final analytical sample consisted of 350 university student records.

Regarding ethical considerations, the study was conducted in accordance with the Declaration of Helsinki and approved by the Research Ethics Committee of the Federal University of Uberlândia (CEP/UFU) (CAAE: 52575620.8.0000.5152; approval number: 5.214.606; approval date: 27 January 2022). Institutional ethics committee has approved the secondary use of survey data in this study. As the study used anonymized secondary data previously collected for institutional purposes, the requirement for written informed consent was waived. The researchers had no access to personally identifiable information and worked exclusively with data derived from standardized collection instruments.

2.3. Instruments and Variables

Data were obtained from the electronic spreadsheets of the PROTEGER-SE extension project and included sociodemographic variables such as age (in completed years), sex assigned at birth, self-declared race/ethnicity, field of study, and academic level at the time of the consultation. Clinical variables included self-reported comorbidities—defined as psychiatric and/or general medical conditions reported by participants at the time of the consultation—scores on individual items and the total score of the Patient Health Questionnaire-9 (PHQ-9).

The PHQ-9 is a standardized instrument validated in Brazil [12] and widely used internationally as a screening tool for depressive symptoms. It is recommended by the World Health Organization and supported by the extensive scientific literature for application in clinical, community, and educational settings [9,13]. The instrument consists of nine items, each scored from 0 (not at all) to 3 (nearly every day), reflecting the frequency of depressive symptoms during the two weeks preceding the first consultation. Total scores range from 0 to 27 and were categorized as minimal (0–4), mild (5–9), moderate (10–14), moderately severe (15–19), and severe (20–27).

Participants' subjective well-being was assessed immediately before and after the consultation to identify perceived short-term changes. Perceived improvement was evaluated using two open-ended questions included in the questionnaire: "How did you feel before the consultation?" and "How do you feel after the consultation?". Responses were analyzed using a sentiment analysis approach, as described in [14]. Based on this method, participants were classified into three categories: (1) improvement, defined as a change from negative to positive emotional polarity; (2) worsening, defined as an increase in the intensity of negative emotional expressions; and (3) neutral, defined as the absence of significant variation between pre- and post-consultation responses. For statistical analyses, neutral and worsening responses were combined into a single category representing the absence of perceived improvement. This methodological framework provided predefined and standardized criteria for classifying textual responses according to sentiment polarity.

The categorization phase was supervised by researchers/consultants to ensure the consistent application of the established methodological criteria.

2.4. Statistical Analysis

Quantitative variables were described using means and 95% Confidence Intervals (95% CIs), as well as medians and interquartile ranges. Categorical variables were presented as absolute and relative frequencies with corresponding 95% CIs. Multiple logistic regression models were applied to examine associations between sociodemographic variables and two primary outcomes: (1) the presence of severe depressive symptomatology ($\text{PHQ-9} \geq 20$)

and (2) self-reported improvement after the consultation. For analytical purposes, PHQ-9 severity was dichotomized to improve model stability and facilitate interpretation of the regression analyses.

Variable selection was performed using backward elimination based on the Wald test ($p > 0.05$). Results were reported as odds ratios (ORs) with 95% CIs. Statistical significance was set at $p < 0.05$.

For this study, analyses were restricted to data from the first consultation (single-service setting). Information on re-attendance, referrals, or continuity of care was included solely for descriptive purposes, to characterize the care flow and indicate the potential for subsequent follow-up.

3. Results

Of the total participants, 17.14% (95% CI: 13.19–21.09) were referred, after the first consultation (single-service setting), to follow-up services within the project, while 82.86% (95% CI: 78.91–86.81) used exclusively the single-service consultation. Females represented 67.43% of the sample (95% CI: 62.52–72.34), followed by males (32.57%; 95% CI: 27.66–37.48). The self-reported race/ethnicity was distributed as follows: 48.86% White (95% CI: 43.62–54.09), 31.43% Brown/Mixed-race (Pardo) (95% CI: 26.56–36.29), and 19.71% Black (95% CI: 15.23–23.89).

Nearly all students were affiliated with UFU (98.86%; 95% CI: 97.74–99.97). The distribution by field of study was balanced: Biological Sciences (36.29%; 95% CI: 31.25–41.32), Humanities (30.86%; 95% CI: 26.02–35.7), and Exact Sciences (32.86%; 95% CI: 27.94–37.78). Most students were enrolled in undergraduate programs (95.14%; 95% CI: 92.89–97.4), followed by postgraduate programs (4.29%; 95% CI: 2.16–6.41) and technical courses (2.86%; 95% CI: 1.11–4.6). Note here that one student was affiliated with more than one program. The presence of comorbidities was reported by 18.57% (95% CI: 14.50–22.65). Following the consultation, 86.29% (95% CI: 82.68–89.89) reported a perceived improvement, whereas 13.71% (95% CI: 10.11–17.32) reported no improvement (Table 1).

Table 1. Demographic characteristics of university students who received care from the PROTEGER-SE online therapeutic project at the Universidade Federal de Uberlândia (UFU) between 2020 and 2023.

Variable	Statistic	Value
Age in years	Mean (95%CI, n)	23.89 (23.31; 24.47, 350)
	Range (Median; IQR)	18.00–59.00 (22.50; 21–25)
Variable	Level	% (95%CI, n)
Service Re-attendance	No	82.86 (78.91; 86.81, 290)
	Yes	17.14 (13.19; 21.09, 60)
Female Biological Sex	No	32.57 (27.66; 37.48, 114)
	Yes	67.43 (62.52; 72.34, 236)
Self-reported Race/ethnicity	White	48.86 (43.62; 54.09, 171)
	Mixed races	31.43 (26.56; 36.29, 110)
	Black	19.71 (15.55; 23.88, 69)
Students from outside of UFU	No	98.86 (97.74; 99.97, 346)
	Yes	1.14 (0.03; 2.26, 4)
Training Area	Biological	36.29 (31.25; 41.32, 127)
	Humanities	30.86 (26.02; 35.7, 108)
	Exact Sciences	32.86 (27.94; 37.78, 115)

Table 1. Cont.

Variable	Statistic	Value
Undergraduate student?	No	4.86 (2.60; 7.11, 17)
	Yes	95.14 (92.89; 97.4, 333)
Technical courses student?	No	97.14 (95.40; 98.89, 340)
	Yes	2.86 (1.11; 4.60, 10)
Postgraduate student?	No	95.71 (93.59; 97.84, 335)
	Yes	4.29 (2.16; 6.41, 15)
Presence of comorbidities?	No	81.43 (77.35; 85.50, 285)
	Yes	18.57 (14.50; 22.65, 65)
Perceived improvement	No	13.71 (10.11; 17.32, 48)
	Yes	86.29 (82.68; 89.89, 302)

The mean PHQ-9 score was 16.0 (95% CI: 15.30–16.70), with a median of 17.0 and an interquartile range (IQR) of 11.0 to 21.0. Regarding the severity of depressive symptoms, 14 participants (4.00%) presented with minimal symptoms, 54 (15.43%) with mild symptoms, 69 (19.71%) with moderate symptoms, 96 (27.43%) with moderately severe symptoms, and 117 (33.43%) with severe symptoms. The most frequently reported symptoms were feeling tired or having little energy (item 4; mean: 2.11), feelings of worthlessness or guilt (item 6; mean: 2.03), and trouble concentrating (item 7; mean: 2.02). Item 9 of the PHQ-9, which assesses the presence of thoughts of death or self-harm, had a mean score of 0.88 (95% CI: 0.77–1.00), a median of 0, and an IQR of 0 to 2 (Table 2).

In the logistic regression analysis for the outcome of PHQ-9 severe symptomatology, the full model showed that female sex was associated with higher odds of presenting severe symptoms (OR = 1.866; 95% CI: 1.12–3.107; $p = 0.017$). No other variables, including age, self-reported race/ethnicity, field of study, or the presence of comorbidities, were significantly associated with the outcome ($p > 0.05$). In the reduced model, female sex remained significantly associated with severe symptoms (OR = 1.86; 95% CI: 1.127–3.069; $p = 0.015$).

For the outcome of perceived improvement after consultation, the full model demonstrated a negative association between PHQ-9 scores and the likelihood of reporting improvement (OR = 0.933; 95% CI: 0.884–0.984; $p = 0.011$). Additionally, students from the Humanities showed higher odds of reporting improvement (OR = 3.628; 95% CI: 1.166–11.289; $p = 0.026$). In the reduced model, significant predictors included the field of study in Humanities (OR = 3.878; 95% CI: 1.255–11.988; $p = 0.019$) and PHQ-9 score (OR = 0.929; 95% CI: 0.881–0.980; $p = 0.007$) (Table 3).

Students who reported improvement had a lower mean age (23.71 vs. 25.08 years) and lower PHQ-9 scores (15.58 vs. 18.65 points) compared to those who did not perceive improvement. The proportion of females was slightly lower in the group with improvement (65.9%) than in the group without improvement (77.1%).

Regarding the field of study, among the students who improved, those from Humanities were the most frequent (34.9%), followed by Biological Sciences (36.4%) and Exact Sciences (29.1%). The presence of comorbidities was slightly lower among those who reported improvement (16.6% vs. 18.8%).

Table 2. Self-reported depressive symptomatology assessed by the PHQ-9 instrument in university students who received care from the Proteger-se project at the Universidad Federal de Uberlândia (UFU) between 2020 and 2023.

Variable	Quantitative Variables (n = 350)	
	Mean (95%CI)	Range (Median; IQR)
PHQ9—Item 1	1.89 (1.78; 2.00)	0–3 (2; 1–3)
PHQ9—Item 2	1.99 (1.89; 2.09)	0–3 (2; 1–3)
PHQ9—Item 3	1.87 (1.75; 1.99)	0–3 (2; 1–3)
PHQ9—Item 4	2.11 (2.01; 2.21)	0–3 (2; 1–3)
PHQ9—Item 5	1.83 (1.71; 1.95)	0–3 (2; 1–3)
PHQ9—Item 6	2.03 (1.92; 2.14)	0–3 (2; 1–3)
PHQ9—Item 7	2.02 (1.91; 2.12)	0–3 (2; 1–3)
PHQ9—Item 8	1.39 (1.27; 1.50)	0–3 (1; 0–2)
PHQ9—Item 9	0.88 (0.77; 1.00)	0–3 (0; 0–2)
PHQ9—Score	16.00 (15.30; 16.70)	0–27 (17; 11–21)
	Qualitative Variables (n = 350)	
	Level	% (95%CI, n)
PHQ9—Functional impairment item	Not difficult at all	4.86 (2.60; 7.11, 17)
	Somewhat difficult	38.00 (32.91; 43.09, 133)
	Very difficult	39.71 (34.5; 44.84, 139)
	Extremely difficult	17.43 (13.45; 21.40, 61)
PHQ9—Categories	Minimal	4.00 (1.95; 6.05, 14)
	Mild	15.43 (11.64; 19.21, 54)
	Moderate	19.71 (15.55; 23.88, 69)
	Moderately severe	27.43 (22.75; 32.10, 96)
	Severe	33.43 (28.49; 38.37, 117)
PHQ9—Severity (dichotomized)	Other categories	66.57 (61.63; 71.51, 233)
	Severe	33.43 (28.49; 38.37, 117)

Legend: 95%CI: 95% Confidence Interval, IQR: Interquartile Range. PHQ-9 Items: PHQ-9—Item 1. Little interest or pleasure in doing things; PHQ-9—Item 2. Feeling down, depressed, or hopeless; PHQ-9—Item 3. Trouble falling or staying asleep or sleeping too much; PHQ-9—Item 4. Feeling tired or having little energy; PHQ-9—Item 5. Poor appetite or overeating; PHQ-9—Item 6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down; PHQ-9—Item 7. Trouble concentrating on things, such as reading the newspaper or watching television; PHQ-9—Item 8. Moving or speaking so slowly that other people could have noticed? Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual; PHQ-9—Item 9. Thoughts that you would be better off dead, or of hurting yourself in some way; difficulty question: If you checked off ANY problems, how DIFFICULT have these problems made it for you to do your work, take care of things at home, or get along with other people?

In the subgroup with severe depression, a higher frequency of females (76.1%) and a lower proportion of perceived improvement (79.5%) were observed compared to the rest of the sample (89.7%). Table 4.

Table 3. Logistic regression analysis for depression severity and perceived improvement after consultation among students in the Proteger-se project at the Universidad Federal de Uberlândia (UFU) between 2020 and 2023.

Outcome: PHQ9—Severe					
Variable	p	OR	LL	UL	
Full Model					
Age in years	0.225	1.025	0.985	1.068	
Female Sex	0.017	1.866	1.120	3.107	
Race: White (ref)	0.915				
Race: Mixed-race	0.978	1.007	0.602	1.685	
Race: Black	0.698	0.886	0.481	1.632	
Training Area: Biological Sciences (ref)	0.535				
Training Area: Humanities	0.275	0.732	0.418	1.281	
Training Area: Exact Sciences	0.782	0.927	0.541	1.588	
Presence of Comorbidities	0.787	1.086	0.598	1.971	
Constant	0.005	0.201			
Reduced Model					
Female Sex	0.015	1.860	1.127	3.069	
Constant	<0.01	0.326			
Outcome: Improved after consultation					
Variable	p	OR	LL	UL	
Full Model					
Age in Years	0.187	0.965	0.915	1.018	
Female Sex	0.169	0.586	0.273	1.256	
Race: White (ref)	0.768				
Race: Mixed races	0.467	0.764	0.370	1.578	
Race: Black	0.774	0.879	0.363	2.127	
Training Area: Biological Sciences (ref)	0.001				
Training Area: Humanities	0.026	3.628	1.166	11.289	
Training Area: Exact Sciences	0.033	0.468	0.233	0.939	
Presence of Comorbidities	0.562	1.294	0.541	3.092	
PHQ9	0.011	0.933	0.884	0.984	
Constant	<0.01	84.953			
Reduced Model					
Training Area: Biological Sciences (ref)	0.001				
Training Area: Humanities	0.019	3.878	1.255	11.988	
Training Area: Exact Sciences	0.051	0.509	0.258	1.002	
PHQ9	0.007	0.929	0.881	0.980	
Constant	<0.01	22.932			

Legend: 95% CI: 95% Confidence Interval, LL: lower limit 95% Confidence Interval, UL: upper limit 95% Confidence Interval, p: probability, OR: Odds Ratio.

Table 4. Comparison of the sociodemographic and clinical characteristics of university students in the Proteger-se project at the Universidade Federal de Uberlândia (UFU) in relation to perceived improvement and severity of depression between 2020 and 2023.

		Mean or % (95%CI, n)	
		Felt Better After Consultation	
Variable	Level or Unit	No	Yes
Age	years	25.08 (23.44; 26.72, 48)	23.71 (23.09; 24.32, 302)
PHQ9	points	18.65 (17.09; 20.2, 48)	15.58 (14.82; 16.34, 302)
Female Sex	Yes	77.08 (65.19; 88.97, 37)	65.89 (60.55; 71.24, 199)
Self-reported Race	White	45.83 (31.74; 59.93, 22)	49.34 (43.7; 54.98, 149)
	Mixed-race	35.42 (21.89; 48.95, 17)	30.79 (25.59; 36, 93)
	Black	18.75 (7.71; 29.79, 9)	19.87 (15.37; 24.37, 60)
Field of study	Biological	35.42 (21.89; 48.95, 17)	36.42 (31; 41.85, 110)
	Humanities	8.33 (0.51; 16.15, 4)	34.44 (29.08; 39.8, 104)
	Exact Sciences	56.25 (42.22; 70.28, 27)	29.14 (24.01; 34.26, 88)
Presence of Comorbidities	Yes	16.67 (6.12; 27.21, 8)	18.87 (14.46; 23.29, 57)
PHQ9—Severity (dichotomized)	Yes	50.00 (35.85; 64.15, 24)	30.79 (25.59; 36, 93)
		PHQ9—Severe	
Variable	Level or unit	No	Yes
Age	Years	23.61 (22.89; 24.34, 233)	24.45 (23.48; 25.42, 117)
PHQ9	Points	12.36 (11.73; 12.99, 233)	23.26 (22.84; 23.67; 117)
Female Sex	Yes	63.09 (56.89; 69.29, 147)	76.07 (68.34; 83.8, 89)
Self-reported Race	White	48.93 (42.51; 55.35, 114)	48.72 (39.66; 57.78, 57)
	Mixed-race	30.90 (24.97; 36.83, 72)	32.48 (23.99; 40.96, 38)
	Black	20.17 (15.02; 25.32, 47)	18.80 (11.72; 25.88, 22)
Training Area	Biological	34.33 (28.24; 40.43, 80)	40.17 (31.29; 49.05, 47)
	Humanities	33.05 (27.01; 39.09, 77)	26.5 (18.5; 34.49, 31)
	Exact Sciences	32.62 (26.6; 38.64, 76)	33.33 (24.79; 41.88, 39)
Presence of Comorbidities	Yes	18.03 (13.09; 22.96, 42)	19.66 (12.46; 26.86, 23)
Improvement	Yes	89.70 (85.8; 93.6, 209)	79.49 (72.17; 86.8, 93)

4. Discussion

The mean age of 23.89 years found in this study corresponds to an early stage of adulthood, a period characterized by academic and professional transitions. In this context, the COVID-19 pandemic acted as an exacerbating factor, adding uncertainties and social barriers that increased vulnerability to psychological distress. Evidence from international studies indicates that young people were particularly affected during the pandemic, presenting high levels of anxiety and depressive symptoms, while national data also highlight structural inequalities and vulnerabilities affecting university students in Brazil [15,16].

Furthermore, in the Brazilian context, sociodemographic markers such as race/ethnicity constitute structural factors of inequality that impact mental health in universities. In the present study, approximately 20% of the records corresponded to Black individuals. According to data from the National Forum of Pro-Rectors of Community and Student Affairs (FONAPRACE), although affirmative action policies and racial quotas have expanded

access, Black students remain underrepresented in public universities compared to their White and mixed-race peers, reflecting persistent historical barriers to access and retention. In this context, beyond academic transitions and the uncertainties imposed by the pandemic, Black students may experience additional layers of vulnerability shaped by intersecting social and racial inequalities, which can contribute to increased psychological distress and highlight the need for more equitable institutional support policies [15].

Most of the students surveyed presented moderate to severe symptoms of depression, with one-third being classified in the severe category. These results are consistent with those described in [17], which found that 35% of these tested positive for at least one of the common disorders assessed throughout their lives, and 31% tested positive for at least one disorder in the last 12 months. Additionally, the presence of suicidal ideation was identified in a portion of the participants, an aspect that, although of lower mean intensity, constitutes a significant and noteworthy risk, as corroborated by [18] which raises the question of whether the increase in the prevalence of major depressive disorder and anxiety disorders that we found was accompanied by a significant increase in suicide rates.

In Brazil, specifically, studies conducted during the COVID-19 pandemic among university students reported high levels of psychological distress, often exceeding 50%, with prevalence rates reaching approximately 58–63% for symptoms of anxiety and depression [13,14,19]. These findings reinforce the global trend of worsening mental health among young university students in the context of a health crisis. Large-scale international research, such as the WHO World Mental Health Surveys International College Student (WMH-ICS) project, identifies that severe depression in young university students is primarily characterized by early onset, significant functional impairment—including a higher risk of academic dropout—and an increased risk of suicide, the latter being considered the most critical aspect in public health terms [20].

Furthermore, female students showed a higher likelihood of severe depression, which reinforces the greater vulnerability of women to depressive symptoms, influenced by biological, social, and cultural factors [21]. Despite this, women also tend to seek more mental health support, which can function as a protective factor [22]. Interventions targeting this population could include gender-sensitive institutional programs, peer psychosocial support groups, and continuous digital monitoring for the early detection of symptom worsening—strategies that have already been identified potentially beneficial in reducing inequalities in access to mental health care [15,22,23].

This finding underscores the emotional vulnerability within the university context and the need to understand the factors that contribute to the aggravation or attenuation of this distress. Among the most frequently reported risk factors are academic and financial stressors, social isolation, and low levels of social support, all of which are associated with increased depressive and anxiety symptoms [15,24,25]. Conversely, protective factors include the adoption of adaptive coping strategies and proactive help-seeking behaviors, which are linked to improved mental health outcomes and better management of psychological distress [25,26] suggest that interventions strengthening these protective factors may help reduce symptom severity and support psychological resilience among young adults.

In addition to symptom intensity, the students predominantly presented with depressed mood and anhedonia, which are core symptoms described in Criterion A of the DSM-5 for a Major Depressive Episode. This diagnostic criterion states that, for the disorder to be characterized, at least one of these two symptoms must be present, along with others such as changes in sleep, appetite, concentration, energy, and feelings of worthlessness or guilt.

This set of symptoms can be explained by several interconnected factors: intense academic pressure and uncertainties about the professional future may affect brain reward circuits, reducing pleasure and motivation; alterations in sleep patterns and quality,

common in this age group, increase vulnerability to depression; social isolation during the pandemic and excessive use of digital media may have amplified negative emotional impact and reduced engagement in rewarding activities, as observed in university populations during COVID-19 [27]; furthermore, neuroinflammatory processes may compromise the functional connectivity of the ventral striatum and the prefrontal cortex, promoting the onset of anhedonia. These findings are consistent with large-scale international data on college student mental health [28].

This study found an occurrence of suicidal thinking, which constitutes a serious warning sign as it represents a risk of death among university students. A multicenter study reported prevalence rates of suicidal ideation among university students ranging from 17% to 32%, particularly in young adults and women [25,29]. Similarly, a high-impact systematic review confirms that in high-pressure academic settings, these rates can exceed 20%, making it an important risk. Thus, the mean score found in this study approaches the higher rates reported internationally, reinforcing the need for preventive and early support interventions in this context [29].

Regarding the perception of improvement, 86.3% of participants reported an immediate benefit following online consultation. The finding of a greater response among students from the Humanities and a lower response among those from the Exact Sciences should be interpreted as exploratory, given the subgroup distribution and variability. Studies suggest that differences in help-seeking behavior and emotional expression across academic disciplines may influence engagement with psychological interventions, with students in the Humanities often demonstrating greater openness to discussing emotional distress, which may partially explain their greater perceived benefit [25,28].

In contrast, students from the Exact Sciences may require more structured and targeted interventions, possibly due to the characteristics of these fields. Research suggests that students in the Exact Sciences tend to have a greater focus on logical reasoning, problem-solving, and academic competitiveness but may report greater difficulties in expressing emotions and seeking social support [25,28]. This profile may shape both the expression of depressive symptoms and engagement with mental health care strategies, favoring approaches that are clearer, more structured, and goal-oriented. For this population, relevant strategies may include gender-sensitive institutional initiatives, peer-based psychosocial support groups, and ongoing digital monitoring for early identification of symptom worsening—approaches that have been associated with improved equity in access to mental health care [28,30].

The PHQ-9 score showed an inverse association with the perception of improvement, suggesting that individuals with more severe symptoms may be less likely to report immediate perceived improvement following a single session, potentially indicating the need for ongoing care, whereas patients with less intense symptoms tend to respond better to the initial consultation. In this regard, the PHQ-9 stands out as a robust screening tool whose application extends beyond the initial identification of depressive symptoms. International evidence has shown that its use is associated with increased detection of symptoms and improved functional outcomes, especially when integrated into continuous care pathways in primary care [31]. In addition to its high sensitivity and specificity for detecting depression, the instrument also has good predictive capacity for adverse clinical outcomes, including suicide risk [31,32].

In young populations, such as university students, its systematic use allows not only for the quantification of symptom severity but also for the early identification of students who will require prolonged and structured support, thereby preventing the chronification of the condition [33]. This is particularly relevant, as unidentified and untreated depression is associated with a higher risk of chronification, academic impairment, interpersonal

difficulties, and compromised global functioning [33,34]. Late diagnosis, in turn, often results in worsening symptoms, increased suicidal ideation, and higher rates of academic dropout [31,33,34].

Thus, within the PROTEGER-SE Project, the PHQ-9 functions not only as a research instrument but also as a clinical and strategic resource to help identify situations that may benefit from brief interventions versus those that may require more intensive monitoring and prolonged therapeutic support. Early screening may facilitate the identification of the disorder and support timely interventions, which have been associated with improved outcomes in previous studies for reducing severity, preventing recurrences, and mitigating long-term adverse outcomes [35,36]. It is therefore recommended that students identified with higher scores be referred to specialized services, while mild and moderate cases can be managed through psychoeducation, brief online interventions, and emotional health promotion programs in the academic environment [32,33].

Finally, institutional policies for university mental health must consider the specifics of gender, age group, and field of study [37]. Evidence-based strategies, such as remote support, structured screenings, and peer support programs, have shown a significant impact on reducing symptoms and promoting sustainable emotional health [30]. Incorporating such mechanisms into the academic routine in a systematic and student-diversity-sensitive manner is not only a therapeutic measure but also a commitment to retention, inclusion, and well-being at the university. Furthermore, the findings of this study highlight the role of single-session online consultations as a mental health support strategy in the university context. It was observed that most participants reported an immediate perception of improvement after the remote session. Although a large portion of these were not patients with severe symptoms, this suggests that brief, timely, and structured interventions conducted by a multiprofessional team may be associated with relief from emotional distress. This result is consistent with international evidence that highlights associations with perceived immediate improvement of short-duration consultations combined with empathic listening and the development of coping strategies in the initial management of depression and suicidal ideation [36].

The experience of the PROTEGER-SE Project, by combining accessibility, promptness, and sensitivity to the pandemic context, suggests potential to be associated with immediate perceived symptom relief and to strengthen students' perception of institutional support. Such findings indicate that university programs adopting brief, online intervention models may function as a strategic gateway, with potential immediate impact on student well-being and relevance for the prevention of more severe outcomes.

Limitations

This study has several limitations. It is based on self-reported secondary data from students who sought care through an institutional mental health support service, which may limit the generalizability of the findings. The measure of perceived immediate improvement was derived from qualitative responses analyzed using a structured supervised sentiment analysis approach, enabling the assessment of perceived emotional changes. The assessment was conducted at a single time point, without formal clinical diagnoses or longitudinal follow-up. Therefore, the findings reflect perceived changes immediately after the consultation and do not support inferences regarding sustained therapeutic effects over time. Furthermore, the study has limited capacity to account for temporal effects related to different phases of the pandemic and the post-pandemic context.

5. Conclusions

The findings of this study suggest that the self-reported depressive symptomatology among university students served by the PROTEGER-SE Project is substantial, with one-third of the sample presenting severe symptoms, indicating the emotional vulnerability of this group within the university context. The PHQ-9 appeared to be a useful instrument for screening the severity of depression, identifying critical symptoms, including thoughts of death or self-harm, even if at a lower frequency, pointing to the potential relevance of continuous monitoring and preventive interventions.

The logistic regression analysis revealed that the female sex is associated with a higher probability of severe depression, whereas lower PHQ-9 scores and a field of study in the Humanities were associated with a perception of improvement following the consultation. The finding related to Humanities students should be interpreted as exploratory, given the subgroup distribution and the width of the Confidence Intervals. Such findings suggest that sociodemographic and academic characteristics may influence the response to therapeutic care, indicating the importance of individualized and targeted care strategies. The results reinforce the need for evidence-based university support policies and practices that consider sociodemographic factors, academic profiles, and symptom severity to promote more equitable, assertive, and preventive mental health care interventions. These results should be interpreted with caution, considering the limitations of the study design and the observational nature of the analysis, making it impossible to establish causal relationships.

The PROTEGER-SE Project, with its multiprofessional care—initially in an on-call therapeutic service format and later expanded to include brief, structured sessions—was shown to be effective, with 86% of students perceiving an improvement. The project's continuity since its creation in 2020, with subsequent expansion to address post-pandemic emotional demands and the broader university internal and external community, demonstrates its crucial role in mitigating the psychosocial impacts of COVID-19 and strengthening mental health in the academic environment.

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Data Availability Statement: The anonymized datasets generated and analyzed during the current study are available from the corresponding author on reasonable request. Data are not publicly available due to privacy and institutional restrictions.

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Abbreviations

The following abbreviations are used in this manuscript:

BTC	Brief Therapeutic Care
95%CI	95% Confidence Interval
DSM-5	Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
IQR	Interquartile Range
OR	Odds Ratio
p	Probability
PHQ-9	Patient Health Questionnaire-9
PROTEGER-SE	Therapeutic Online Management Project—Staff and Students
UFU	Universidade Federal de Uberlândia (Federal University of Uberlândia)
WHO	World Health Organization
WMH-ICS	World Mental Health Surveys International College Student

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