

Prevalence and socio-demographic characteristics associated with depression, anxiety, and stress among university students

Prevalencia y características sociodemográficas asociadas con la depresión, la ansiedad y el estrés en estudiantes universitarios

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University students are a risk group for several mental health problems due to their psychological, social, and academic demands. The aim of this study was to determine the prevalence of symptoms associated with depression, anxiety, and stress among university students from northern Chile and their association with specific socio-demographic characteristics. The study was carried out with 696 participants selected through stratified probabilistic sampling. The depression, anxiety, and stress symptoms were assessed with the DASS-21 scale. The scale's reliability was evaluated with Cronbach's α , and for data analysis, we performed summary measures, frequencies, ANOVA, and Scheffé's test in SPSS 26 ®. Additionally, Cohen's d was calculated for effect size. The results show prevalence of depression was 42.3%, anxiety was 53.5%, and stress was 49.6%. Depression was statistically higher in female than male students with low socioeconomic income and with another sexual orientation from heterosexual. Anxiety was higher in females and in students with low socioeconomic incomes, and, in the case of stress, it was most frequent in women. We found a high prevalence of depression, anxiety, and stress, which highlights the need to develop educational strategies, identify high-risk students, and initiate mental health interventions opportunistically.

Keywords: mental health, prevalence, university students, risk factors

Los estudiantes universitarios son un grupo de riesgo para varios problemas de salud mental debido a sus demandas psicológicas, sociales y académicas. El objetivo de este estudio fue determinar la prevalencia de síntomas asociados con la depresión, la ansiedad y el estrés entre los estudiantes universitarios del norte de Chile y su asociación con características sociodemográficas específicas. El estudio se llevó a cabo con 696 participantes seleccionados a través de un muestreo probabilístico estratificado. Los síntomas de depresión, ansiedad y estrés se evaluaron con la escala DASS-21. La fiabilidad de la escala se evaluó con el α de Cronbach, y para el análisis de datos, realizamos mediciones resumidas, frecuencias, ANOVA y la prueba de Scheffé en SPSS 26 ®. Además, la d de Cohen se calculó para el tamaño del efecto. Los resultados muestran que la prevalencia de depresión fue del 42,3%, la ansiedad del 53,5% y el estrés fue del 49,6%. La depresión fue estadísticamente mayor en estudiantes femeninas que en hombres con bajos ingresos socioeconómicos y con otra orientación sexual diferente a la heterosexual. La ansiedad era mayor en las mujeres y en los estudiantes con bajos ingresos socioeconómicos, y, en el caso del estrés, era más frecuente en las mujeres. Encontramos una alta prevalencia de depresión, ansiedad y estrés, lo que destaca la necesidad de desarrollar estrategias educativas, identificar a los estudiantes de alto riesgo e iniciar intervenciones de salud mental de manera oportuna.

Palabras clave: salud mental, prevalencia, estudiantes universitarios, factores de riesgo



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1. INTRODUCTION

This research examines the mental health problems faced by Chilean university students. It also analyzes the challenges posed by the growing number of students with psychological problems, as reported in international (Woodhead et al., 2020) and national research (First National Survey of University Mental Health, 2019). The implications of mental health problems for the students themselves, as well as for academics, officials, and university organizations in the Chilean context, are also discussed. It has been demonstrated that university students' mental health problems are significant predictors of their low academic performance (De Luca et al., 2016). Global estimates from the WHO (Auerbach, et al., 2018) indicate that 35% of university students present at least one of these mental health problems: severe depression, mania/hypomania, generalized anxiety disorder, panic disorder, and alcohol and drug use disorder. Studies conducted in the USA, where anxiety and depression have been identified as the most common problems among students, establish that 53.8% of students suffer from moderate to severe depression (Garlow et al., 2008), and 52.8% present moderate to severe anxiety (Rosenthal & Schreiner, 2000).

Similarly, a survey (American College Health Association-National College Health Assessment, ACHA-NCHA) carried out in 2015 evaluated mental health problems and suicidal tendencies in a sample of 67,308 university students from 108 institutions. The study proved that high levels of stress are strongly associated with a higher probability of suicide attempts and severe mental health diagnoses. It was also found that bisexual students were more likely to report mental health problems and suicidal tendencies than straight and gay/lesbian students. More than half of the bisexual students reported suicidal ideation. More than one-quarter reported having made suicide attempts. Transgender students reported higher mental health problems and suicidal tendencies than both male and female students.

All these investigations emphasize the importance of addressing the mental health of university students. Not only is this necessary to improve their quality of life and psychological well-being, but it is also essential for their future professional contribution to their country's social and economic development.

1.1 Mental health in Chile

Chile's mental health problems have alarming figures (Vicente et al., 2016). According to the WHO (Vicente et al., 2016), Chile is among the countries with the highest burden of psychiatric disorders, with depression and alcohol abuse being the leading causes of disability among adults. Additionally, Chile leads the suicide rate in Latin America (Vicente et al., 2016).

However, mental health problems in Chile have rarely been addressed. Although the country has had a na-

tional mental health and psychiatry plan since 2000, its development has been deficient. For instance, regarding state budget expenditure, Chile allocated a mere 1.9% of its total general health budget towards mental health services in 2019. This is notably less than the 5% raised stipulated in its national mental health plan (MINSAL, 2015). This allocation falls significantly below the corresponding figures observed in countries affiliated with the Organization for Economic Cooperation and Development (OECD). In contrast, countries such as Australia, Sweden, and New Zealand exhibit a commendable commitment to mental health services by directing approximately 9.6–11% of their health budget (MINSAL, 2015).

Other points of concern regarding Chile's public mental health policy are the high percentage of funds allocated to both outpatient and inpatient specialized care (about 60%), leaving little room for mental health promotion and prevention activities (MINSAL, 2015). Moreover, there are significant differences between the resources allocated to the capital of Greater Santiago and regions farther away, such as northern Chile (MINSAL, 2015).

Although mental health problems affect all ages, Chilean public policy in recent years has focused on addressing the mental health needs of vulnerable groups such as children, adolescents, and the elderly (Aravena et al., 2019; De la Barra et al., 2019; Vicente et al., 2012; Olivari & Mellado, 2019), leaving aside the stage of emerging adulthood in which mental health problems have a significant presence (Tanner, 2016). In fact, Chile's Eighth National Youth Survey (2015) conducted with 9,393 young people, 49% of them university students, revealed that one out of four young people (25%) acknowledged having presented marked depressive symptomatology. These symptoms were more significant in women and youth aged 15 to 19 years, from urban areas, of low socioeconomic status, and who had experienced violence and cyberbullying (INJUV, 2015). Furthermore, access to mental health services for this population is challenging; only 6% of the young people interviewed reported having access to psychological, medical, or mental health treatment. Nearly half of the youth with depressive symptomatology (25%) reported that it is "not at all" or "not possible" to afford an extended period in medical consultations with a psychologist or psychiatrist (45%), medications for psychological or psychiatric treatment (49%), or examinations requested by a psychiatrist (48%). Among them, 51% considered it "very possible" to afford psychological treatment (INJUV, 2015).

1.2. Higher education and mental health in Chile

Chile's higher education network comprises 56 institutions, mainly divided into two types: the so-called public universities administered by the state (32.1%) and private universities administered by private consortiums (67.9%).

According to the latest national census by the Na-

tional Statistics Institute (INE, 2018), 29.8% of the Chilean population has enrolled in higher education. This percentage has grown over the last 30 years; in 1992, only 11.7% of Chileans had any higher education. Chile is a Latin American country that increased its higher education coverage between 2000 and 2010 by 19.3% (Poggi, 2014). The 2020 National Socioeconomic Characterization Survey (CASEN) showed that 24% of the people over 18 years old in Chile have completed higher education, while 13% have not. However, according to an OECD report, only 16% of those who enter university finish the formal duration of their degree, presenting a high level of dropout or permanence.

Additionally, there are still gaps in access to higher education since women, people from regions other than the capital, and people with lower incomes have less access to university education. However, in recent times, the participation of the poorest people in university education has been changing (Pumarino & Garrido, 2015). Since universities in Chile aim to train advanced human capital for the country's development, supporting students' academic performance is a fundamental task. In this context, it has been found that the psychosocial conditions of students, such as socioeconomic difficulties and mental health problems, can be an essential factor in their poor academic performance or their dropout rate (Labarca & Fuhrman, 2011). Expanding coverage in higher education has also resulted in the inclusion of groups with high psychosocial problems. While universities have attempted to address this issue by developing their own mental health care facilities, these are isolated initiatives and do not constitute a public mental health policy for university students. Developing better detection, promotion, and prevention of mental health problems remain pending tasks (Mac-Ginty et al., 2021).

1.3. Mental health of Chilean students

Similar to the gap in intervention programs aimed at preventing mental health problems in college students, there is also a gap in academic research on this topic since the research on college student's mental health has been relatively new, and some parts of the country are underrepresented, such as the extreme north of Chile. Several researchers have found that Chilean university students' mental health is a significant problem. For example, Micin and Bagladi (2011) reported that notable disorders affecting Chilean university students are adaptive disorders, specific anxiety disorders, depressive disorders, problematic alcohol and drug use, eating disorders, and personality disorders. Furthermore, Antúnez and Vinet (2013), in a sample from south Chile, found that the most frequent symptomatology in university students was depressive and anxious symptomatology (between 30% and 20% of the total sample), which was accentuated in first-year students (approximately 60% with anxiety-depressive symptomatology). Other Chilean studies have

noted that 27% of students meet the diagnostic criteria for depression, 10.4% had bipolar disorder, 5.3% posed a moderate to severe risk of committing suicide, 24.2% presented problematic consumption of alcohol, and 15.3% had some type of eating disorder (Baader et al., 2014). Recently, this data was confirmed by the First National College Mental Health Survey (2019), which reported that 46% of college students had depressive symptoms, 46% had anxiety, 54% suffered from stress, and 29.7% suffered from all three. Rossi et al. (2019) found a higher proportion of symptoms of depression in a sample of university students in Chile's capital of Santiago than what has been reported in the general population, with a higher incidence of symptoms among women. While being female has been confirmed as a vulnerability factor for suffering mental health problems in two Chilean studies (Antúnez & Vinet, 2013; Micin & Bagladi, 2011, 2013), socioeconomic status as a risk factor is less evident in the Chilean national context. One study reported a higher presence of mental health problems in the country's higher socioeconomic strata (Rossi et al., 2019), while others have described a more significant presence of this symptomatology in lower socioeconomic strata (Antúnez & Vinet, 2013).

Given the above, in the present study we incorporate binary gender and socioeconomic level as social factors associated with university mental health, mainly because they are variables that have accumulated more evidence in previous studies of various parts of the Chilean territory (Barrera-Herrera & San Martín, 2021; Guzmán-Utreras et al., 2023; Muñoz-Albarracín et al., 2023) so obtaining data from the north of Chile, is relevant and relevant since it allows us to approach the problem and strengthen the investigation of this problem in Chile. We also include sexual orientation and marital status as these social factors have been included in previous studies from other countries (Cranford et al., 2009; Gonzales et al., 2020), where its importance has been highlighted. However, in Chile they have been incorporated incipiently.

1.4. The present study

This study aims to address some of the above limitations in research on the mental health of university students conducted internationally (Garlow et al., 2008) and in Chile (Antúnez & Vinet, 2013; Baader et al., 2014; Rossi et al., 2019). Studies conducted outside of Chile, mainly in English-speaking countries, have limitations in the type of sample (large sample of first-year students and very small sample of other years; Auerbach et al., 2018) and the use of electronic instruments, which leads to a high response rejection rate. Although studies on university mental health have been conducted in low- and middle-income countries, no samples of Hispanic students or Chilean subjects have been included (Auerbach et al., 2018; Grotan et al., 2019). In the case of Chilean studies, the gaps include the use of clinical samples, as opposed to

the use of samples from the general student population (Micin & Bagladi, 2011, 2011), as well as the use of samples from specific geographic areas such as the south and the capital of Chile, scarcely addressing the geographic, cultural, and economic differences in each geographic area of the country. Furthermore, few Chilean studies have focused on determining the sociodemographic (in addition to gender) characteristics associated with mental health problems in university students, as has been done in foreign studies (Baader et al., 2014). Although Chilean studies have established the prevalence of mental health problems in Chilean university students, it is not entirely clear if these figures are similar in all geographic areas. The present study attempts to approach the subject of mental health in university students, specifically depression, anxiety, and stress, in a specific geographic territory (north of Chile), considering some of the limitations of the previous studies on this subject. In this context, the following questions were developed: What is the prevalence of symptoms of depression, anxiety, and stress in university students in the extreme north of Chile? What are the sociodemographic characteristics that influence the development of this type of symptomatology in students? As a general objective of the study, it was proposed to estimate the prevalence of indicators of depression, anxiety, and stress, the more recurrent problems of mental health mentioned in international literature. Moreover, it also aims to assess whether gender identity, age, level of education, social status, type of education, economic condition, and sexual orientation are related to the symptoms of depression, anxiety, and stress in university students in the north.

2. METHOD

2.1. Design

This is an observational analytical study with a cross-sectional design aimed at establishing the prevalence of depression, anxiety, and stress and the characteristics associated with these indicators in university students from extreme northern Chile. In analytical observational studies, researchers try to establish an association between exposure (s) and outcome (s) (Ranganathan & Aggarwal, 2019).

2.2. Participants

The study was conducted in a city in the extreme north of Chile, considering all university students enrolled in the largest public university in the region (n=7120). The sample size was estimated using simple random sampling formulas. Two-stage cluster sampling without replacement was used. The university institution was divided into 12 clusters, from which 5 clusters were randomly selected (Faculties). Using an expected proportion of 50%, a confidence interval of 99%, and a sampling error of 5%, that data yielded 719 as the estimated sample size. The number of students for the program was as follows: 171 in engineering, 115 in education, 159 in social sciences, 251 in health sciences, and 23 in agronomy. The sample included students of all different programs from five different faculties. Students were randomly chosen from each of the clusters, proportionally to the undergraduate program of each Faculty. The final sample was composed of 696 university students. The sociodemographic characteristics of the participants are presented in Table 1.

Table 1
Sociodemographic characteristics of sample

Variable	Male		Female		Total	
Age	N	%	N	%	N	%
17-20	167	50.3	191	52.5	358	51.4
21-24	139	41.9	139	38.2	278	39.9
25-29	26	7.8	34	9.3	60	8.6
Marital status						
Single	261	78.9	254	70.0	515	74.2
Partner relations	55	16.6	90	24.8	145	20.9
Cohabiting	15	4.5	19	5.2	34	4.9
Income level*						
Lowest	41	12.8	39	11.0	80	11.9
Low	88	27.5	118	33.3	206	30.6
Middle	143	44.7	148	41.8	291	43.2
Middle High	36	11.3	36	10.2	72	10.7
Highest	12	3.8	13	3.7	25	3.7
Sexual orientation						
Heterosexual	309	94.2	334	92.8	643	93.5
Non-heterosexual**	19	5.8	26	7.2	45	6.5

*Income level = NSE lowest > USD 272; NSE low: between USD 273-544; NSE middle USD 545-1630; NSE middle high USD 1632-2716; NSE highest < USD 2718

** Non-heterosexual included homosexual, bisexual, and others sexual orientations as asexual persons, pansexual, androphilia, or another sexual orientation

2.3. Instrument

2.3.1. Socio-demographic questionnaire

A questionnaire was administered with seven socio-demographic questions related, including: gender, age, marital status, sexual orientation, and the family income level (set by the Chilean national socio-economical standards set by INE). The question “*What is your gender?*” has the following alternatives: male, female, or other (please specify). Similarly, the question “*Do you consider yourself:*” regarding people’s sexual orientation had the following alternatives: heterosexual, homosexual, bisexual, or other.

2.3.2. Depression, Anxiety, and Stress Scale (DASS-21; Lovibond & Lovibond, 1995a).

The DASS-21 is a self-report questionnaire adapted for the young Chilean population (Román et al., 2014). The instrument consists of 21 items that comprise three subscales (depression, anxiety, and stress) with seven items each. The depression subscale evaluates aspects related to low positive affect, such as dysphoria, hopelessness, sadness, and anhedonia. The anxiety subscale evaluates phases related to psychophysiological activation or autonomic excitement (sweating hands, tremor, and others), and subjective anxiety experiences. The stress subscale identifies the difficulty of being relaxed, nervous excitement, agitation, irritability, and impatience. Each item is answered using a Likert-type scale of four points of severity/frequency that measures the extent of the states experienced during the past week. Some examples of items for the depression subscale are: *Please, for each of the following phrases or questions, choose the option most applicable to you in the last seven days. I felt sad or depressed.* For the anxiety subscale, *I had difficulty breathing*, and for the stress subscale, *I overreacted to certain situations*.

The DASS-21 is based on a dimensional perspective of mental health problems rather than on a categorical conception of psychological disorder. The premise on which it is based (confirmed by research data), is that the differences between depression, anxiety, and stress experienced by community sample subjects and clinical samples actually differ in degree (Lovibond & Lovibond, 1995b). The instrument’s correction allows us to obtain a general score of psychological discomfort (distress) and three disaggregated scores of depression, anxiety, and stress. The DASS-21 has demonstrated good psychometric properties in international and national studies. In Chile, the study by Román, Santibáñez, and Vinet (2016) demonstrated the instrument’s ability to discriminate between general and clinical populations. In another national study, analyses of psychometric properties yielded a Cronbach’s alpha of .85 and .83 for the depression and stress subscales, respectively, while an alpha of .73 was obtained for the anxiety subscale Roman et al. (2016).

Overall, the items that comprise the DASS-21 presented an alpha of .91 (Antúnez & Vinet, 2012). In the present study, the alpha indices obtained were .91 for the whole scale, .80 for depression, .81 for anxiety, and .82 for stress.

2.4. Procedure

The project was carried out following the ethical principles of the Declaration of Helsinki (1975) for research on human beings. Considering the defined sampling, permission was requested from all professors of the university courses to deliver the questionnaires during class hours and explain the research objectives to the attending students. The students were also asked to collaborate in the present study voluntarily and were told that they could stop participating in the research at any time. The printed booklet with the questionnaire included informed consent, which was required prior to participation. The instruments were administered by members of the research group who were final-year psychology students specially trained to carry out fieldwork. Participants answered the questionnaires in the classroom. Out of a total of 719 distributed, 696 were answered. They were also provided with the research team’s e-mail address in case they had doubts about the research or needed any help related to the questionnaire. However, there were no requests for information or assistance.

2.5. Data analysis

First, the prevalence of mental health problems was calculated by obtaining descriptive statistics for the subscales of depression, anxiety, and stress of DASS-21; the values of the DASS-21 scale were calculated by multiplying each subscale by two; for each state, the typology used was normal, mild, moderate, severe, and extremely severe. Participants who presented significant clinical indicators of depression, anxiety, and stress in the last seven days were identified. The response rate was 96.8%. Once the data was analyzed, variance analysis (ANOVA) and post-hoc analysis, employing Scheffé’s test, were conducted to identify the risk factors. Specifically, Scheffé’s test was used to determine which pairs of means were significant. The effect size (Cohen’s *d*) was also calculated. For all analyses, a relationship was considered statistically significant when $p < .05$. SPSS® (version 26) was used to analyze the data.

3. RESULTS

3.1. Levels of depression, anxiety, and stress

The indicators of depression, anxiety, and stress used in this study are presented in Table 2. Fifty-seven percent of the students reported a normal affective state on the depression subscale, and 42.3% reported clinically significant levels of depression; this was distributed from low (15.5%) to very high (4.4%). In this indicator, the high-

hest percentage of young participants was grouped in the category of moderate depression (16.4%). Regarding anxiety, 46.5% presented an affective state at a normal level, and 53.5% presented clinically significant symptoms ranging from low (16.3%) to very high (15.1%). Finally, regarding stress, half of the participants referred to a normal affective state (50.4%), and 49.6% showed significant clinical indicators ranging from low (14.5%) to very severe (4.0%), while 17.2% of the students presented moderate symptoms of stress. In different subscales, clinical significance indicators were considered in a proportion that fluctuated between 42% and 55% of the participants.

3.2. Differences in depression, anxiety, and stress according to sociodemographic characteristics

According to the means data obtained (Table 3), the highest probability of depression among university students was found in young women. Likewise, the variance analysis showed significant differences in the variable gender for the symptoms associated with depression ($F=5.69$, $p < .05$, $d = .18$), presenting a small size effect. The ANOVA test did not report significant differences in terms of age and marital status. The means show a higher probability of depression among those who declared very low or low income. The variance analysis sho-

Table 2

Depression, anxiety and stress symptoms

Symptomatology	Depression, anxiety and stress symptomatology (%)					
	Normal	Low	Moderate	High	Very high	Total
Depression	57.7	15.5	16.4	6.0	4.4	100.0
Anxiety	46.5	16.3	14.0	8.2	15.1	100.0
Stress	50.4	14.5	17.2	13.9	4.0	100.0

Table 3

Analysis of Variance (ANOVA) between depression and sociodemographic characteristics

	Statistics		Between Groups Diff.		Pos hoc		
	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	<i>Scheffe</i>	<i>p</i>	<i>d</i>
Gender							
(1) Male	4.30	4.02					
(2) Female	5.09	4.40	5.69	.017*			.18
Age							
(1) 17-20	5.02	4.27			1/2	.193	
(2) 21-24	4.40	4.28	1.65	.193	1/3	.907	
(3) 25-29	4.76	4.23			2/3	.842	
Marital status							
(1) Single	4.86	4.33			1/2	.583	
(2) Partner relations	4.43	4.22	0.63	.531	1/3	.862	
(3) Cohabiting	4.43	3.82			2/3	.990	
Income level							
(1) Lowest	6.33	5.09	3.88	.004*	1/2	.147	
(2) Low	4.87	4.55			1/3	.017*	.43
(3) Middle	4.38	3.87			1/4	.024*	.44
(4) Middle high	4.32	3.83			1/5	.086	
(5) Highest	4.08	3.92			2/3	.859	
					2/4	.856	
					2/5	.866	
					3/4	.999	
					3/5	.996	
					4/5	.999	
Sexual orientation							
(1) Heterosexual	4.62	4.17					
(2) Non-heterosexual	6.24	5.21	7.14	.008**			.16

* $p < .05$, ** $p < .01$, *** $p < .001$; d = Cohen's effect size

wed that income contributed significantly to depression ($F=3.88$, $p < .05$). The results obtained after the application of Scheffé's show significant differences ($p < .05$) in the variable income level for depression between very low and medium-income levels ($d = .43$), and medium-high income levels ($d = .44$). Concerning sexual orientation, the ANOVA showed that non-heterosexual students reported significantly higher scores in the DASS-21 depression items than heterosexual students ($F = 7.14$; $p > .01$).

When analyzing the variables anxiety and gender (Table 4), mean differences were higher for females. Likewise, the analysis showed significant differences in the variable anxiety according to gender ($F=23.42$, $p < .001$, $d = .37$). In the economic status variable, a higher mean was observed in the anxiety variable for the group of university students with very low and low incomes. Since the analysis of variance was significant for these differences ($F=3.82$, $p > .05$) when using Scheffé's test, it can be seen that the differences are between the very low-income group and the middle-income group ($d = .45$), and between the very low-income group and the high-income group

($d = .60$). For the variables age, marital status, and sexual orientation, the variance analysis did not show significant differences.

Finally, concerning the variable stress and gender (Table 5), the means support a higher probability of stress in women. Additionally, the variance analysis showed significant differences in the stress variable according to gender, as reported by the students ($F=20.77$, $p < .001$, $d = .35$). These differences represent the mean effect size. The variance analyses for the variables age, marital status, economic income, and sexual orientation were not significant.

4. DISCUSSION

The present study attempted to estimate the prevalence of indicators of depression, anxiety, stress, and sociodemographic characteristics among university students in northern Chile. The data shows that mental health indicators among university students fluctuate between 42.3% for depression, 53.6% for anxiety, and 45.6% for stress, coinciding with the results of other national studies

Table 4

Analysis of Variance (ANOVA) between anxiety and sociodemographic characteristics

	Statistics		Between Groups Diff.		Pos hoc		
	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	<i>Scheffe</i>	<i>p</i>	<i>d</i>
Gender							
(1) Male	4.13	3.72					
(2) Female	5.73	4.67	23.42	.000***			.037
Age							
(1) 17-20	5.16	4.23			1/2	.447	
(2) 21-24	4.71	4.31	0.95	.387	1/3	.982	
(3) 25-29	5.27	4.79			2/3	.656	
Marital status							
(1) Single	4.97	4.20			1/2	.990	
(2) Partner relations	5.03	4.68	0.01	.982	1/3	.990	
(3) Cohabiting	5.08	4.64			2/3	.998	
Income level							
(1) Lowest	6.41	4.61	3.82	.004*	1/2	.393	
(2) Low	5.25	4.82			1/3	.027*	.45
(3) Middle	4.52	3.71			1/4	.098	
(4) Middle high	4.71	4.28			1/5	.045*	.60
(5) Highest	3.88	3.67			2/3	.580	
					2/4	.862	
					2/5	.453	
					3/4	.997	
					3/5	.937	
					4/5	.871	
Sexual orientation							
(1) Heterosexual	4.92	4.26					
(2) Non-heterosexual	5.77	4.92	1.94	.164			

* $p < .05$, ** $p < .01$, *** $p < .001$; d = Cohen's effect size

(Barrera-Herrera, 2019), and surpassing the indexes indicated by other measurements in Chile (Barraza et al., 2017), Latin America (González et al., 2018), or other countries outside Latin America (Wenjua et al., 2020).

It also significantly exceeds the average rates of depression and anxiety reported by PAHO (2017) among 18-25-year-old youngsters across the world, which are 10% and 11%, respectively. The most frequent clinical indicators in the university population at the national and international levels are anxiety and depressive symptoms, and their presence is widely documented as a variable associated with poor mental health conditions and low academic performance (Arevalo, 2019; Holm-Hadulla, & Koutsoukou-Argyraki, 2015; Micin & Bagladi, 2011, 2011; Montoya et al., 2010; Ortiz, 2016; Villacura et al., 2015).

The stress indicators found in the present study also exceed those found in other international studies. For instance, using the DASS 21, Wenjua et al. (2020) found that stress in young university students ranged from 29% to 18%. Similarly, Meyers et al. (2013) reported that high levels of stress in medical and nursing students were as

high as 38.7%. However, these rates are still lower than those found in our study, where high stress levels are almost present in half of the sample.

Review studies point out that the reporting of depression, anxiety, stress, and psychological discomfort symptoms prevalence is highly heterogeneous across studies (De Paula et al., 2020; Martínez et al., 2021). Nevertheless, most of them report levels of depression, anxiety, and stress they define as moderate (Ramón-Arbués et al., 2020). However, higher than those observed in the general population (De Paula et al., 2020; Pereira et al., 2020). In relation to the predisposing or risk factors, family stability, and support, the presence of economic difficulties, and belonging to the non-binary gender are counted (Pereira et al., 2020).

There is agreement across national and international studies that women present a significantly higher presence of mental health problems than men. Particularly, the present study replicated this trend in depression symptomatology (Antúnez & Vinet, 2013; Arévalo et al., 2019; Baader et al., 2014; Fouilloux et al., 2013; Montoya et al.,

Table 5

Analysis of Variance (ANOVA) between stress and sociodemographic characteristics

	Statistics		Between Groups Diff.		Pos hoc		
	<i>M</i>	<i>DT</i>	<i>F</i>	<i>p</i>	<i>Scheffe</i>	<i>p</i>	<i>d</i>
Gender							
(1) Male	7.03	4.49					
(2) Female	8.66	4.69	20.77	.000***			.35
Age							
(1) 17-20	8.35	4.50			1/2	.107	
(2) 21-24	7.54	4.84	2.63	.073	1/3	.373	
(3) 25-29	7.43	5.02			2/3	.985	
Marital status							
(1) Single	7.85	4.56			1/2	.990	
(2) Partner relations	8.25	5.19	0.41	.658	1/3	.990	
(3) Cohabiting	8.17	4.87			2/3	.990	
Income level							
(1) Lowest	9.21	5.00	1.96	.098	1/2	.389	
(2) Low	7.94	4.95			1/3	.118	
(3) Middle	7.52	4.20			1/4	.258	
(4) Middle high	7.67	4.64			1/5	.643	
(5) Highest	7.81	5.07			2/3	.937	
					2/4	.992	
					2/5	.990	
					3/4	.999	
					3/5	.998	
					4/5	.990	
Sexual orientation							
(1) Heterosexual	9.16	5.50					
(2) Non-heterosexual	9.96	5.64	1.04	.306			

p* < .05, *p* < .01, ****p* < .001; *d* = Cohen's effect size

2010; Ortiz, 2016; Ríos et al., 2019). However, there is less agreement when it comes to ascertaining if women experience higher anxiety and stress symptomatology than men or not (Ramón-Arбуés et al., 2020; Martínez et al., 2021), with some reports showing the opposite trend (ul Haq, 2018). While some studies (Micin & Bagladi, 2011) report a higher prevalence of anxiety disorders in men, others report a higher prevalence in women (Barra-Herrera et al., 2019; Ortiz, 2016). As already mentioned, the inequality of gender in mental health indicators observed in most studies of the university population reflects the general population's situation (MINSAL, 2017; PAHO, 2017). Among the adolescent population in the same northern area where this study was conducted, higher rates of depression and anxiety have been observed in women (Caqueo-Urizar et al., 2020).

Most of the literature suggests that the causes of depression in women are usually explained in terms of biological vulnerability, overlooking the structural conditions of inequality affecting women that can result in precarious living conditions, which, in turn, can lead to depression (Pastorino et al., 2017; Pastorino, 2019). Along these lines, Pastorino (2019) points out that the more significant detection of depression in women could be due to men's use of drugs and alcohol as coping strategies, which mask depression. These strategies can also explain the higher rates of suicide among the male population (MINSAL, 2017).

While the present findings of the high prevalence of depression, anxiety, and stress in university women in northern Chile confirm what has been reported in previous research, it also highlights the need to analyze the factors influencing these gender differences in the local context of northern Chile. Beyond the explanation of individual factors of depression in young women, it is necessary to clarify the conditions of inequality they face, such as socioeconomic conditions, equal opportunities, or family and work overload, and how this could influence mental health problems. Gender inequality is prevalent throughout Chile (Mora, 2013), and economic inequality has been added to the development of remote regions compared to the country's capital and center regions (Aroca, 2009). Another relevant factor that could have an influence on the mental health of young university women in northern Chile is gender violence; a study conducted by Garces et al. (2020) found that gender violence is present in the educational spaces and practices of universities in northern Chile, forming part of a continuum of multiple aggressions in different contexts of socialization, and is particularly hidden in the formative experiences of students. Likewise, different manifestations, scenarios, and actors in the practices of violence at the university were revealed (Garces et al., 2020). It is therefore essential to seriously question the role of structural conditions on the mental health problems of young university women in northern Chile. Regarding sexual orientation, those who identify

themselves as non-heterosexual showed higher rates of depression symptoms, as it has been previously found that non-binary gender identities and sexual orientations are determinants of university students' mental health (Arévalo et al., 2019).

Some studies have found that, despite the perception of greater acceptance of different sexual orientations in recent years, Chilean transgender and homosexual youth still perceive violence, invisibility, and difficulties of inclusion (González et al., 2020; Lempereur et al., 2019). Furthermore, the study by Lempereur et al. (2019) suggests that the higher education experience is protective, with the presence of significant support networks, so the rates of depression could be related to experiences of discrimination outside the university environment. Economic status is presented as a factor of significant differences in this study, with lower levels being excluded and presenting more significant clinical indicators of mental health. As discussed in previous sections, in Chile, greater access to higher education has modified the entry profile of university students, with a current increase in students from sectors with fewer economic resources who seek to improve their and their families' living conditions through education (Améstica et al., 2020). In light of the present results showing differences with respect to the economic income levels of students and mental health problems, it should be considered whether students of greater socioeconomic vulnerability also face life situations that affect their academic performance, such as being working students, overcrowded living conditions, difficulty in accessing electronic devices or the Internet; all situations that could increase emotional stress and the presence of mental health problems. In this sense, it should not be forgotten that most of the students of regional universities (especially in geographically remote areas) finance their studies from state benefits due to their low socioeconomic conditions (Ferrer-Urbina et al., 2019). In contrast, young people with higher economic resources and social support will perform better through this vital stage (Antúnez & Vinet, 2013; Wood et al., 2018). Although Barrera-Herrera et al. (2019) reported significant differences in the DASS-21 mental health indicators at the expense of the higher socioeconomic level, which presented higher levels of clinical indicators, their results should be considered with caution because of the sample selection process they adopted. In addition, the criteria of socioeconomic evaluation are different in both studies since, in the present study, the level of family economic income was considered as a criterion.

Finally, a special analysis of stress as a mental health issue is required since our results indicate high stress levels in students without significant differences, according to practically all the variables studied. This has been observed in other studies as well, especially in students of health-related undergraduate programs (Meyer et al., 2013). In this context, the presence of general

stress in students has been associated with the development of various roles, stressful life events, and life transitions. Likewise, the role of academic stress has been documented, which could accentuate and cause anxiety and depressive symptoms. The sources of this academic stress are found in the academic load, evaluations in the form of exams, peer competition, decisions associated with passing or failing courses, lack of time, and tutoring style (Castillo-Pimienta et al., 2016; Montoya et al., 2010; Toribio-Ferrer & Franco-Barcenas, 2016). Montoya et al. (2010) proposed that academic stressors increase the risk of symptoms.

4.1. Limitations

Despite its contributions, this study has several limitations. Due to its representative sample of university students in northern Chile, its results are not generalizable across the rest of the Chilean university student population. Another limitation is that owing to the characteristics of the adopted design, it was only possible to obtain data for a limited period. In the future, a nationwide study including a broad and representative sample of Chilean students from several regions, including longitudinal data, could be attempted. It would also be relevant to have researchers converge on defining variables and their measures, especially socioeconomic factors since this is a fundamental issue for Chilean society. Detecting in which socioeconomic sectors of our population mental health problems are most frequently concentrated is a relevant issue in terms of youth policy.

4.2. Practical implications

The prevalence of mental health problems in young people needs to be addressed by national public policies. It is also a challenge for higher education institutions, which bring together a large number of young people between 18-29 years of age. Although universities are not institutions dedicated to delivering mental health services, they must take care of their student body. It has been documented that early intervention, social support, management of the organizational climate, regulation of the academic load, and intervention concerning personal vulnerability not only improve students' mental health and well-being indices but also result in better academic performance and increased student retention (Suárez-Montes & Díaz-Subieta, 2015; Winzer et al., 2018). It is relevant to offer brief and widely available psychological interventions for students, considering the prevalence of clinical indicators of mental health. Interventions such as brief psychotherapy, crisis intervention, telephonic psychological care, and telephonic support for suicide attempts have demonstrated the effectiveness, responsiveness, and adherence of students.

In contrast, their brief duration allows for adequate coverage (Holm-Hadulla, & Koutsoukou-Argyryaki, 2015). Promoting supervised practices (tutoring) has been

shown to be more effective than classical therapeutic intervention for preventing some mental health issues among university students (Colleen et al., 2015), which aligns with the consideration of social support as a protective factor in mental health. The convergent results regarding the differential risk factors by gender and sexual orientation emphasize the need to consider gender determinants when addressing youth mental health and adopting targeted strategies.

In this context, universities in remote areas, such as northern Chile, should review their curricula, evaluate whether the academic load realistically considers the conditions that young people face while learning, and ensure that students' capabilities and resources are matched with the delivery of appropriate professional training. Similarly, institutions should evaluate the relevance of implementing induction programs that effectively prepare students to meet the demands of university life, while improving their strategies for coping with academic and daily stress, stress management, and conflict resolution. Inclusive programs for students with complex life circumstances (maternity, paternity, and working students) should also be developed, considering a gender approach. At the same time, any support provided to students should respect their autonomy and promote an active role in their own formation rather than placing the entire responsibility on the university. Personal factors of the students, elements associated with the institution, and its functioning should be considered (Jáuregui et al., 2020), as well as elements of the young person's social context, as possible intervening factors in his or her state of mental health (Jáuregui et al., 2020). In order to reduce the individual focus of the intervention, counselors can organize instances of group student participation that provide key information to structure any support program and, at the same time, allow students to take an active role in these programs. It is proposed that the university can be seen as an actor in the promotion, prevention, detection, and first-level intervention in student mental health and should be supported by the relevant public agencies. Promoting students' active role in implementing interventions at all levels is also recommended.

5. CONCLUSIONS

This study showed that students in the extreme north of Chile present clinical significance indicators in the dimensions of depression, anxiety, and stress, 42.3%, 53.6%, and 45.6%, respectively. These results show a higher prevalence of mental health problems in the youth population than estimated by other national and international studies. The presence of mental health problems in university youth is differentiated by gender, with a higher prevalence among women for the three dimensions evaluated. This finding is consistent with most national and international studies. Prevalence for anxiety and depression are also differentiated by sexual orientation and eco-

conomic status, both of which are also widely documented in the literature. The prevalence of stress is only gender-specific. The presence of mental health problems in university students does not vary according to age or marital status for any of the three mental health conditions studied.

Altogether, our study states that lower-income students who are either women or belong to a sex/gender minority are more likely to develop mental health problems than those who are not. These findings should be evaluated considering the implications of mental health problems in the general population, specifically in the young population and university institutions.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflicts of interest.

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