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Self-Care mediates the Effect of Psychological Distress on the Subjective Well-Being and Quality of Life among University Students

*Pedro Juárez-Rodríguez [1], Jorge Emiro Restrepo [2], Rosa Martha Meda-Lara [1 *]*

Abstract

Background: University life involves several exposures to risk factors and often coincides with "emerging adulthood," a period characterized by significant change and instability. Furthermore, the COVID-19 pandemic introduced additional lifestyle changes (e.g., a shift to virtual classes, isolation measures, and social distancing) that exacerbated trends in perceived stress, anxiety, depression, and somatization within this subpopulation. This study aimed to assess how university students' health confidence might influence their perception of well-being and mediate their experiences of stress, psychological distress, and somatic symptoms.

Methods: A sample of 1113 university students with a mean age of 19.58 years (*SD* = 3.22), participated in an online survey that gathered data on academic, sociodemographic characteristics, and the following measures: perceived stress scale (*M* = 13.12, *SD* = 3.22), Patient Health Questionnaire 4 items (*M* = 3.44, *SD* = 2.55), and Patient Health Questionnaire 15 items (*M* = 4.30, *SD* = 2.86), as well as Health Confidence Score (*M* = 76.31, *SD* = 15.85), WHO Well-Being Index (*M* = 8.39, SD = 2.44), and Quality of Life Index Spanish version (*M* = 14.24, *SD* = 5.04). Path analysis was employed to examine the total, direct, and indirect effects among variables.

Results: The model demonstrated excellent fit indices and confirmed the study hypotheses. Stress, anxious, depressive, and somatic symptomatology were found to negatively influence health confidence, subjective well-being, and quality of life. Health confidence exerted a direct positive effect on psychological well-being. The negative impacts of psychological distress on well-being were mediated by health confidence. Additionally, health confidence and well-being were found to have an overall positive effect on quality of life.

Conclusions: The findings suggest that health confidence is not merely a measure of self-care but also serves as a mediator of psychological distress and a significant factor related to well-being and quality of life among university students. Consequently, university authorities and public health agencies should prioritize the development and implementation of effective health confidence orientation and training programs for university students.

[1] Department of Basic Psychology, University Center for Health Sciences (CUCS), University of Guadalajara, Guadalajara, Jalisco, México

[2] Faculty of Education and Social Sciences, Tecnológico de Antioquia, Medellín, Colombia

E-mail corresponding author: rosa.meda@academicos.udg.mx

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1. Introduction

University students constitute a vulnerable population due to the convergence of multiple risk factors. University life involves exposure to numerous hazards such as inadequate nutrition, substance use, physical inactivity, poor sleep quality, poor stress management, and insufficient healthcare (Aceijas et al., 2017; Assaf et al., 2019; Zafar & Ansari, 2020). This stage of life is often considered critical for establishing healthy behaviors that can significantly impact health trajectories in adulthood (Arons & Seligman, 2024). Additionally, university life often coincides with "emerging adulthood," characterized as a transitional period marked by identity exploration, high optimism, openness to possibilities, on the one hand, and change and instability on the other (Arnett, 2000; Barrera-Herrera & Vinet, 2017; Nelson, 2021). Furthermore, the COVID-19 international public health emergency introduced additional lifestyle changes for university students, leading to perceived declines in academic performance, poor sleep quality, unhealthy eating habits, and physical inactivity (Gadi et al., 2022; Maldonado-de Santiago et al., 2023; Perez-Dominguez et al., 2021).

Numerous studies have shown that university students experience elevated levels of psychological distress (Granieri et al., 2021), defined as a state of emotional suffering associated with stressors and demands that are difficult to manage in daily life (Arvidsdotter et al., 2016). This distress is characterized by symptoms of depression (e.g., loss of interest, sadness, and hopelessness) and anxiety (e.g., agitation and tension) (Drapeau et al., 2012). Additionally, it is important to note that various factors associated with the COVID-19 pandemic (e.g., the shift to virtual classes, media consumption, isolation measures, and social distancing) have exacerbated these trends. Studies have documented an increase in stress (Gadi et al., 2022; Karyotaki et al., 2020; Michaeli et al., 2022), as well as the presence of anxiety and depressive symptoms (Avila-Carrasco et al., 2023; Gavurova et al., 2022; Truzoli et al., 2023) in this subpopulation.

Mental health is closely related to somatic symptoms (Quezada-Scholz, 2020), as observed in samples of medical students (Sperling et al., 2023). In the longitudinal study by Medisauskaite et al. (2023), up to 50% of students with deteriorated mental health also exhibited somatic symptoms. Similarly, Zegarra-López et al. (2022) found that stress, anxiety, and depression are strongly correlated with somatization, with anxiety being the most significant predictor. Interestingly, the psychobiological study by Yu et al. (2023) suggested that anxiety, depression, and somatization symptoms might share a common neural mechanism. Additionally, Li et al. (2024) determined through network analysis that somatization is part of a comorbidity network that includes depression and anxiety symptoms. Based on these findings, we hypothesize that

in our study sample, the mental health variables (stress, anxiety, depression, and somatization) will also be positively correlated, in line with the existing scientific literature.

Mental health status can also impact physical health by serving as a barrier to engaging in health behaviors or precautionary measures (Olapegba et al., 2022). Notably, individuals experiencing psychological distress tend to neglect health and precautionary behaviors related to COVID-19 (Asmundson & Taylor, 2020; Stickley et al., 2020). Shin et al. (2023) reported that health and precautionary behaviors during the pandemic tend to decrease with the severity of depressive symptoms in both men and women. Similarly, Cho et al. (2022) described the mediating role of precautionary behaviors in the relationship between anxiety and stress with exercise, highlighting the importance of self-care. While there are mixed results regarding the role of mental health as a driver or impediment to self-care and precautionary behaviors, we hypothesize that health confidence influences the relationship between mental health variables (stress, anxiety, depression, and somatization) and well-being variables (subjective well-being and quality of life) among university students.

Similarly, physical health has a crucial influence on mental health and overall well-being (Chekroud et al., 2018; Mahindru et al., 2023). This is evidenced by numerous studies on individuals with chronic illnesses who tend to experience psychological distress (Renna & Shrout, 2024; Section 5: Facilitating Positive Health Behaviors and Well-Being to Improve Health Outcomes, 2024). The longitudinal research by Ebling et al. (2024) conducted during the pandemic highlights the close interrelationship between health behaviors and the perception of well-being. Studies by Tse et al. (2022) and Benson et al. (2019b) describe a positive correlation between health confidence and the perception of well-being. Similarly, Alves et al. (2024) reported a positive correlation between self-efficacy, a concept related to health confidence, and well-being in university students.

During the international health emergency, actions taken by individuals to care for their health gained significant importance. These actions are referred to in the literature as self-care (Coulter & Ellins, 2007), activation (Hibbard & Gilburt, 2014), self-efficacy (Rashid et al., 2018), self-management, engagement, or health confidence (Wasson & Coleman, 2014). In this context, health confidence is a broad construct considered by some authors as an indicator of patient engagement (Wasson & Coleman, 2014) and self-efficacy (Bleacher et al., 2020). Furthermore, health confidence has been linked to other health outcome indicators such as health literacy (Morley & Levin, 2021). Studies have shown inverse correlations between health confidence and disease activity (Kamp et al., 2023; Tse et al., 2023) and healthcare utilization (Nunlist et al., 2016), as well as direct correlations with medication adherence (Tse et al., 2022). However, this variable has not been thoroughly examined outside the healthcare context, particularly among university students.

The measurement proposal for health confidence by Benson et al. (2019a), which is utilized in the present study, encompasses four important dimensions in an ultra-short format: a) Knowledge, i.e., the extent of an individual's understanding of their health and treatment, including basic health literacy; b) Self-management, i.e., the perceived ability to manage one's health, treatment, and lifestyle; c) Access to help, i.e., the competence to obtain the healthcare and support services needed; d) Shared decision-making, i.e., participation in clinical decisions. When health confidence is high, individuals tend to engage more in health self-care behaviors, such as exercising more, eating healthier, and avoiding risks (Benson et al., 2019a).

Based on the above, the present study aims to: 1) Assess health confidence scores, mental health variables (stress, anxiety, depression, and somatic symptoms), well-being, and quality of life. 2) Evaluate the relationships between these variables. 3) Examine the influence of health confidence on these variables in a large sample of health sciences university students during the COVID-19 pandemic.

1.1 Study hypotheses

1) There are: a) positive correlations, ranging from moderate to strong, between perceived stress, psychological distress, and somatization; b) negative correlations, ranging from weak to moderate, between perceived stress, psychological distress, somatization, and health confidence, subjective well-being, and quality of life; and c) positive correlations, ranging from moderate to strong, between health confidence, subjective well-being, and quality of life.
2) Moderate negative direct effects of perceived stress, psychological distress, and somatization on trust in health, subjective well-being, and quality of life; significant negative indirect effects of perceived stress, psychological distress, and somatization on health confidence, subjective well-being, and quality of life; and positive direct effects of health confidence on subjective well-being and quality of life.

2. Materials and Methods

2.1 Participants

We conducted a cross-sectional study with a non-probabilistic sampling. The battery of tests was received by 1614 university students. A response rate of 69% (n = 1113) was achieved, with respondents reporting being healthy. The mean age was 19.58 years (SD = 3.22), ranging from 18 to 53 years. Of the total participants, 79.5% were women, 69.6% were single, and 99.6% did not have children. All participants were students in health sciences fields, both at the technical level (22.8%, e.g., radiology, physical therapy, nursing) and at the undergraduate level (66.1%, e.g., psychology, medicine, nursing). All participants signed an informed consent form after

reading the objectives of the research. The survey included the following questionnaires and psychological scales.

2.2 Instruments

Health Confidence Score (HCS) (Benson et al., 2019a): This is a brief four-item instrument that assesses health knowledge, self-management capability, access to help, and shared decision-making. Each item has four response options: 3 = strongly agree, 2 = agree, 1 = neutral, 0 = disagree. Items are reported both independently and as a summary score. For reporting group results, the mean scores are linearly transformed to a scale from 0 to 100, where a higher score indicates greater health confidence. The original study reported Cronbach's alpha coefficient of .82. In the current study, Cronbach's alpha coefficient was .78.

WHO Well-Being Index (WHO-5) (WHO, 1998): This index is used to assess perceptions of well-being. Each of the scale's five items is rated on a scale from 0 to 5. The WHO-5 is a reliable and valid self-reporting questionnaire for various populations, including patients and students (Caycho-Rodríguez et al., 2023). The study by Caycho-Rodriguez et al. (2023) reported Cronbach's alpha coefficient of .94. In the current study, Cronbach's alpha coefficient was .89.

Quality of Life Index Spanish version (QLI-Sp) (Mezzich et al., 2000): This validated version in the Mexican population (Meda-Lara et al., 2021) includes 10 items representing relevant aspects for evaluating the constructs of physical well-being (e.g., feeling energetic), psychological and emotional well-being (e.g., feeling good about oneself), independent functioning (e.g., performing daily tasks), occupational functioning (e.g., carrying out work), interpersonal functioning (e.g., relating well with family, friends, groups), socio-emotional support (e.g., having people to trust), socio-community and service support (e.g., safe neighborhood, access to resources), personal fulfillment (e.g., feeling of personal balance), spiritual fulfillment (e.g., feeling of faith), and global perception of quality of life (e.g., feeling of satisfaction and happiness in life). Participants respond using a Likert scale from 1 (poor) to 10 (excellent). The final score is obtained by calculating the mean of the scores (1-10) of all items assessed by the participant; a higher score indicates a better quality of life. The study by Mezzich et al. (2000) reported a test re-test coefficient of .89. The Cronbach's alpha reported in the validation study in Mexico was .93, and in the current study, it was .92.

Perceived Stress Scale 10 items (PSS-10) (Cohen et al., 1983): This is a self-report scale validated in the Mexican population (González-Ramírez et al., 2013) that evaluates the level of perceived stress over the last month. It consists of 10 items with a five-point response scale (0 = never, 1 = almost never, 2 = sometimes, 3 = often, 4 = very often). The PSS-10 score is obtained by reversing the scores of items 4, 5, 7, and 8, and summing all 10 items. Scores range from 0 to 40, with higher scores indicating higher perceived stress. The study by González-Ramírez et al.

(2013) reported Cronbach's alpha coefficient of .83. In the current study, Cronbach's alpha coefficient was .86.

Patient Health Questionnaire 4 items (PHQ-4) (Kroenke et al., 2009): This ultra-brief tool consists of two subscales, each with 2 items: the PHQ-2 for depression and the Generalized Anxiety Disorder-2 (GAD-2) for anxiety. Each item is rated on a 4-point Likert scale from 0 (not at all) to 3 (nearly every day). The total score ranges from 0 to 12, with the PHQ-2 ranging from 0 to 6 and the GAD-2 from 0 to 6. Higher scores indicate higher levels of depression and/or anxiety. The original study reported Cronbach's alpha coefficient of .85. In the current study the overall reliability of the scale (two dimensions) obtained through Cronbach's alpha was .80. A confirmatory factor analysis verified that the scale consists of two factors, with the two items of the PHQ-2 assessing depression and the two items of the GAD-2 assessing anxiety, explaining 84% of the total variance.

Patient Health Questionnaire 15 items (PHQ-15) (Kroenke et al., 2002): Validated in the Mexican population (Bravo-Doddoli & Díaz-Rivera, 2023), this self-report scale consists of 15 items regarding somatic symptoms that may have bothered patients over the last 4 weeks: stomach pain, back pain, pain in arms, legs, or joints, menstrual cramps, headaches, chest tightness, dizziness, fainting spells or feeling heart pounding or racing, difficulty breathing, pain or problems during sexual intercourse, constipation/diarrhea, nausea/gas or indigestion, feeling tired or having low energy, and sleep problems. The response format is a five-point Likert scale: 0 = "not bothered"; 1 = "a little"; 2 = "a lot". Total scores range from 0 to 30 points, classifying participants without significant physical symptoms (0-4 points) and with significant physical symptoms (≥5 points). The original study reported Cronbach's alpha coefficient of .80. In the current study, Cronbach's alpha coefficient was .82.

2.3 Procedure

Both the instruments and the informed consent form were converted into an electronic format using the SurveyMonkey platform. This package was emailed to students in the health sciences area residing in the State of Jalisco, Mexico. Data collection took place from February 2 to February 25, 2021, while most students continued their studies in a virtual format due to the COVID-19 pandemic.

2.4 Statistical Analysis

The analyses were conducted using SPSS version 28.0 and AMOS version 26. Frequency analyses were performed for the sociodemographic characteristics of the participants, and descriptive analyses were conducted for the variables. Data normality was assessed using the Kolmogorov-Smirnov test, revealing non-parametric distributions. Spearman's rho coefficient was used to perform correlation analysis between the variables. The psychometric properties of

the instruments were analyzed by estimating internal consistency (Cronbach's alpha and composite omega) and conducting an exploratory factor analysis (EFA) (Byrne, 2016).

The EFA was performed using the generalized least squares method with principal components factoring and Promax rotation to find the best factorial structure for each instrument. Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy determined that the items were sufficiently interrelated to proceed with the factor analysis. Items with communalities below .20 and factor loadings below .40 were considered for elimination. The instruments were treated as unidimensional.

A path analysis was conducted to examine: 1) the direct effects of perceived stress, somatization, and psychological distress on health confidence and subjective well-being; 2) the indirect effects of perceived stress, somatization, and psychological distress on subjective well-being through health confidence; and 3) the direct effect of subjective well-being on quality of life. Multivariate normality was assessed by evaluating skewness using Mardia's coefficient. Since the value was greater than p(p+2), the maximum likelihood method with bootstrapping was used. Standardized total, direct, and indirect effects were calculated using the bootstrap method with a 95% confidence interval (Hayes, 2018).

Model fit was evaluated using the chi-square (χ^2) probability level and the chi-square/degrees of freedom ratio (χ^2/df). A χ^2 probability level equal to or greater than .05 ($p \geq .05$) would indicate a good fit (Jöreskog & Sörbom, 1993), and χ^2/df should be less than 3 (Schermelleh-Engel et al., 2003). Additionally, comparative fit indices such as the Incremental Fit Index (IFI $\geq .90$), the Comparative Fit Index (CFI $\geq .90$), the Goodness of Fit Index (GFI $\geq .90$), and its adjusted counterpart (AGFI $\geq .90$), the Normed Fit Index (NFI $\geq .90$), the Tucker-Lewis Index (TLI $\geq .90$), and the Root Mean Square Error of Approximation (RMSEA $\leq .08$) were used. IFI, CFI, GFI, and AGFI values equal to or greater than .90, and an RMSEA value equal to or less than .08, are considered adequate (Byrne, 2016; Hu & Bentler, 1999; McArdle & Nesselroade, 2014).

3. Results

3.1 Characterization of the University Students

Participants ranged in age from 16 to 53 years (M = 19.6, SD = 3.23). Table 1 presents their educational and sociodemographic characteristics. The majority were women (79.5%), in a relationship (30.4%), pursuing degrees in medicine (18.1%), nursing (15.8%), and psychology (14.2%), without children (96.6%), and not employed (67.7%). The results indicate a predominant demographic profile of female students, mostly single, studying health-related fields, without children, and not employed.

Table 1. Educational and Sociodemographic Characteristics

Characteristic	Frequency (f)	Percentage (%)
Gender		
Women	885	79.5
Men	228	20.5
Relationship Status		
Yes	338	30.4
No	775	69.6
Parental Status		
Yes	38	3.4
No	1075	96.6
Employment Status		
Yes	359	32.3
No	752	67.7
Field of Study		
Medicine	201	18.1
Nursing	176	15.8
Psychology	158	14.2
Sports Science	111	10.0
Dentistry	108	9.7
Nursing Technician	81	7.3
Nutrition	60	5.4
Other	218	24.3

3.2 Characterization of the Mental Health and Well-Being Variables in the University Students

Table 2 contains the summary measures of the variables, the normality test, and the results of the zero-order bivariate correlation analyses between them. According to the results of the Kolmogorov-Smirnov test, all variables had non-parametric distributions. Therefore, Spearman's rank correlation coefficient (rho) was calculated. It was found that students reported low levels of perceived stress, psychological distress, and somatic symptoms, as well as moderate levels of perceived subjective well-being, quality of life, and health confidence. All correlations were statistically significant ($p < .01$).

Table 2. Summary Measures, Normality Test, and Bivariate Correlation Analysis

				Spearman's rho Correlation					
	M	***SD***	**K-S**	**1**	**2**	**3**	**4**	**5**	**6**
1. Perceived Stress	13.12	4.70	.065	1					
2. Psychological Distress	3.44	2.55	.143	.515*	1				
3. Somatization	4.30	2.86	.132	.716*	.535*	1			
4. Subjective Well-Being	8.39	2.44	.098	-.359*	-.299*	-.349*	1		
5. Quality of Life	14.24	5.04	.08	-.611*	-.479*	-.624*	.512*	1	
6. Health Confidence	76.31	15.85	.108	-.571*	-.455*	-.593*	.539*	.765*	1

Note: K-S = Kolmogorov-Smirnov test. * p < .001

3.3 Proposed Path Analysis Model

Figure 1 shows the path analysis conducted to evaluate the total, direct, and indirect effects between the variables. This model had excellent goodness-of-fit indicators: CMIN/DF = 2.786, GFI = .998, SRMR = .010, AGFI = .983, IFI = .998, CFI = .998, RMSEA = .040 (LO 90 = .008, HI 90 = .074), PCLOSE = .637. Table 3 presents the standardized total, direct, and indirect effects between the variables.

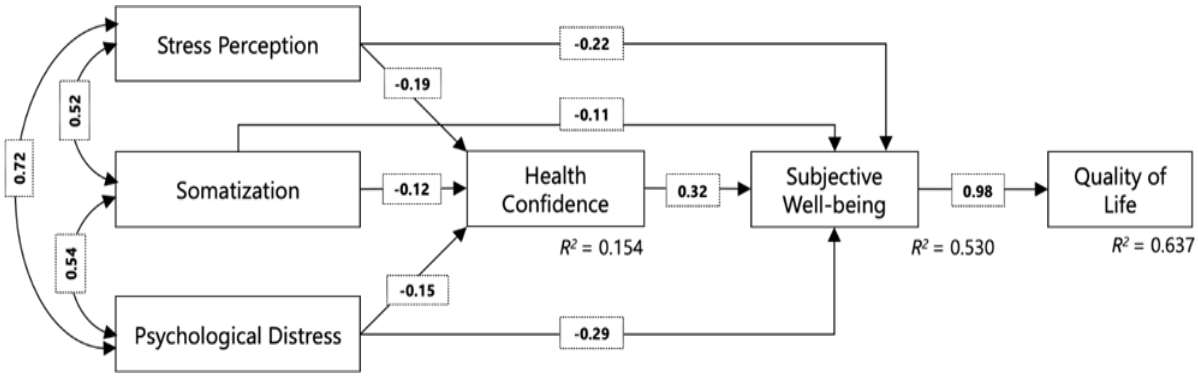

Figure 1. Path Analysis Model

According to these results, mental health variables (stress, somatization, anxiety, and depression) negatively impact health confidence, subjective psychological well-being, and quality of life. Among these variables, psychological distress (anxiety and depression) had the most significant total effect on well-being (β = -.334, p < .001) and quality of life (β = -.327, p < .001). This indicates that the presence of anxiety and depressive symptoms reduces both well-being and quality of life. The direct effects of mental health variables (stress, somatization, anxiety, and depression) on health confidence were weak but consistently negative. Stress, in particular, had the highest total effect on health confidence (β = -.192, p < .001), suggesting that stress slightly diminishes health confidence. Additionally, health confidence had a positive direct effect (β = .317, p < .001) on psychological well-being.

However, the negative effects of mental health variables on well-being are mitigated by health confidence. For instance, the direct negative effect of stress on well-being is reduced from β = -.284 to β = -.061 when mediated by health confidence. Therefore, the presence of health confidence diminishes the negative impact of mental health variables on well-being. Finally, health confidence (β = .310, p < .001) and well-being (β = .978, p < .001) have overall positive effects on quality of life.

Table 3. Standardized Total, Direct, and Indirect Effects

	Effects		
	Health Confidence	**Subjective Well-Being**	**Quality of Life**
	β [CI 95%]	*β* [CI 95%]	*β* [CI 95%]
Perceived Stress			
Total	-.192 [-.269/-.110]*	-.284 [-.341/-.226]*	-.277 [-.332/-.222]*
Direct	-.192 [-.269/-.110]*	-.223[-.278/-.167]*	——
Indirect	——	-.061 [-.088/-.035]*	-.277 [-.332/-.222]*
Somatization			
Total	-.123 [-.195/-.051]*	-.148 [-.198/-.095]*	-.144 [-.193/-.092]*
Direct	-.123 [-.195/-.051]*	-.109 [-.154/-.062]*	——
Indirect	——	-.039 [-.062/-.016]*	-.144 [-.193/-.092]*
Psychological Distress			
Total	-.146 [-.226/-.062]*	-.334 [-.392/-.274]*	-.327 [-.384/-.270]*
Direct	-.146 [-.226/-.062]*	-.288 [-.343/-.234]*	——
Indirect	——	-.046 [-.073/-.019]*	-.327 [-.384/-.270]*
Health Confidence			
Total	——	.317 [.278/.353]*	.310 [.269/.348]*
Direct	——	.317 [.278/.353]*	——
Indirect	——	——	.310 [.269/.348]*
Subjective Well-Being			
Total	——	——	.978 [.940/1.017]*
Direct	——	——	.978 [.940/1.017]*
Indirect	——	——	——
R^2	.154	.530	.637

Note: * $p < .001$

Table 3 presents the total, direct, and indirect effects among the variables using bootstrapping, which enabled the evaluation of the robustness of the indirect effects, the derivation of precise 95% confidence intervals for statistical significance, and the overcoming of limitations associated with the normal distribution of mediation coefficients. Variations in the effect values allowed for the identification of mediation between the variables. Specifically, the effect of perceived stress on subjective well-being decreased from β = -.223 (*CI* 95% [-.278, -.167]) to β = -.061 (*CI* 95% [-.088, -.035]), indicating that trust in health serves as part of the explanatory mechanism between stress and well-being, mitigating the impact of stress on well-being. Similar results were found for the effects of somatization and psychological distress. However, the mediating role of health confidence was more pronounced in the relationship between psychological distress (anxiety and stress) and subjective well-being, where the direct effect decreased from β = -.288 (*CI* 95% [-.343, -.234]) to β = -.046 (*CI* 95% [-.073, -.019]).

4. Discussion

This study aimed to explore health confidence, stress perception, the presence of anxious, depressive, and somatic symptoms, as well as the perception of subjective well-being and quality of life among university students. It sought to evaluate the relationships between these variables

and examine the influence of health confidence on them. The research was conducted during the COVID-19 pandemic as part of the University's effort to assess the mental health status of its students with the goal of developing science-based health promotion and prevention actions to mitigate the effects of stressors on students. Data was collected while students continued their studies in a hybrid model.

The sample of university students showed mild levels of stress, psychological distress, and somatization, contrasting with the global trend described in a recent literature review (Zarowski et al., 2024), which could be attributable to variables not studied in this work, such as cultural background or coping strategies that might have alleviating effects (Luo & Mohammed, 2023). Moderate levels of health confidence, subjective well-being, and quality of life were also recorded in the study sample. According to the proposed model, this is related to the mild perception of mental health problems, similar to what was described in the study by Rogowska et al. (2022), who, through a path model, highlighted that low stress perception can directly predict life satisfaction and symptoms of anxiety and depression among university students.

The results indicate inverse correlations between mental health variables (anxiety, depression and somatization) and health confidence. Similar to what has been found in other research conducted in samples of university students, where correlations in the same direction have been reported between mental health and self-efficacy (Fan et al., 2024; Yıldırım & Güler, 2022; Zhang et al., 2024), a construct closely linked to health confidence (Bleacher et al., 2020). In this regard, health confidence may foster confidence and reduce feelings of helplessness, especially in difficult situations, which in turn may protect against mental health problems such as anxiety or depression.

Individuals experiencing somatization may develop a perception that their health is fragile or unreliable, which can diminish their confidence in their ability to remain healthy or overcome health issues. Hypervigilance and the distorted interpretation of bodily signals contribute to the perception that the body is inherently unreliable or prone to failure, thereby reducing trust in one's health (Rief & Broadbent, 2007). Somatization exacerbates the perception of vulnerability, which in turn reinforces the belief that health is beyond personal control (Martin et al., 2003).

Psychological distress often increases the perception of vulnerability to threats and reduces confidence in the ability to manage health issues (Barry et al., 2020; Beck et al., 1988). Anxiety triggers a hypervigilant response that amplifies attention to negative bodily signals and leads to a catastrophic interpretation of symptoms (Eysenck et al., 2007). Meanwhile, depression is associated with a pessimistic view of overall health, which diminishes confidence in the body's ability to sustain well-being (Beck, 1967). According to the cognitive avoidance model (Borkovec et al., 2004), stress can amplify emotional responses and negative cognitions,

increasing the perception of vulnerability and diminishing trust in the body's ability to cope with these symptoms.

Furthermore, path analyses suggest that mental health issues slightly diminish health confidence among university students, potentially affecting their willingness to engage in self-care activities. In this context, previous research on health-promoting behaviors has shown inconsistent results. Supporting our findings, earlier studies have noted that individuals experiencing psychological distress often neglect health and precautionary behaviors against COVID-19 (Asmundson & Taylor, 2020; Stickley et al., 2020). Similarly, Shin et al. (2023) found that health and precautionary behaviors during the pandemic tend to decrease as depressive symptoms become more severe.

Conversely, some studies present findings contrary to ours. For example, Cho et al. (2022) and Lee et al. (2021) discovered positive associations between psychological distress and increased precautionary behaviors against COVID-19. This suggests that a certain level of anxiety and stress might be necessary for individuals to undertake self-care actions. Moreover, Pinkham et al. (2021) reported that psychological distress did not correlate with preventive behaviors in individuals with severe mental illnesses. However, it's important to note that the samples in these studies had moderate (Lee et al., 2021) and severe (Pinkham et al., 2021) mental health issues, unlike the relatively healthy student sample in our study. This key difference might explain the varied responses to the pandemic, possibly due to the level of psychological distress inherent in the presence of a mental illness.

In the present study, we constructed a model in which health confidence mediates the relationship between mental health variables (stress, anxiety, depression, and somatization) and subjective well-being. While previous works by Tse et al. (2022) and Benson et al. (2019b) describe a positive correlation between health confidence and the perception of well-being, the mediation relationship had not been previously described. This model had not been reported in scientific literature on the subject and further reinforces the close relationship between subjective well-being and perceived quality of life among university students.

Additionally, health confidence and well-being have positive total effects on quality of life. The relationship between subjective well-being and quality of life is well-documented in scientific literature; however, the effect of health confidence on quality of life had not been previously reported. This is likely due to the importance individuals place on physical health when assessing their own quality of life. The instrument used in this research includes various related items (Meda-Lara et al., 2021; Mezzich et al., 2000). These findings suggest that enhancing health confidence could be a significant factor in improving both subjective well-being and overall

quality of life in university students. Future research should continue to explore these relationships and consider additional variables that may influence these outcomes.

The HCS is a generic and brief instrument designed to measure an individual's confidence in their self-care ability. Although health confidence has primarily been evaluated in patients with chronic illnesses, the HCS was originally designed for use in other social contexts as well. It is sensitive to each person's health issues (Benson et al., 2019a), making it a relevant screening tool for university students. Exploring the relationship between health confidence, mental health, and well-being can provide valuable insights for identifying and implementing effective interventions. These interventions could enhance students' health confidence as a preventive strategy to improve health outcomes. By understanding these dynamics, educational institutions can develop targeted programs to support student well-being and mental health, ultimately fostering a healthier and more resilient student population.

5. Strengths, limitations and future research

This study was inspired by the lack of information from previous studies on the influence of health confidence on mental health and well-being. We developed an empirical model capable of explaining how the perception of self-care ability can mediate the effects between the mental health variables studied (stress, anxiety, depression, and somatization) and the perception of subjective well-being and quality of life. This work contributes to the limited field of health confidence research outside the healthcare context. It highlights health confidence as a relevant variable for mental health, subjective well-being, and quality of life in university students in a developing country like Mexico. By expanding the understanding of these relationships, the study provides a foundation for future research and interventions aimed at promoting health confidence and improving overall student health outcomes.

This study also has limitations. Cross-sectional design prevents establishing causal relationships between the study variables. Despite this limitation, the results are encouraging and provide a preliminary exploration of the construct of health confidence outside of a healthcare context, particularly among university students. Future studies should delve deeper into the significance of this variable as a protective factor against psychological distress and a promoter of well-being. Additionally, these hypotheses should be tested under different circumstances, not during an international health emergency, which may have influenced the results given the heightened importance of self-care behaviors at that time. Longitudinal studies are recommended to establish causal relationships between the variables and to observe their dynamic changes over time. Further research is needed to explore the role of health self-care among students and its mediating role between mental health variables (e.g., stress, psychological distress, and somatization) and the perception of psychological well-being and quality of life.

6. Conclusions

It is acknowledged that university students learn to cope with the demands of the academic environment by acquiring competencies and developing adaptive strategies. However, for some students, this is challenging, leading to maladaptive responses to demands and experiencing stress, anxiety, depression, and somatic symptoms that deteriorate their health and alter their perception of subjective well-being and quality of life. Additionally, the COVID-19 health emergency added an extra burden for young people navigating this stage of life. Therefore, promoting health in university settings is paramount to providing students with alternatives to modify pathogenic lifestyles, enhance life skills, and develop greater self-care. This should be reflected in their overall health. Moreover, students' perception of their active role in the socio-cultural and environmental context will enable them to develop psycho-emotional and health competencies that impact their life expectations and pursuit of well-being and quality of life. Promoting a supportive and health-conscious university environment can help students build resilience and better manage the multifaceted challenges they face. By fostering a proactive approach to health and well-being, universities can contribute significantly to the holistic development of their students, preparing them not only for academic success but also for a healthy, balanced, and fulfilling life.

Ethical approval

The research project was evaluated and approved by the Ethics and Research Committee of the University Center for Health Science of the Universidad de Guadalajara (Mexico), with folio number CI-01520 on April 27, 2020. The study was conducted according to the guidelines of the Declaration of Helsinki. Data are stored in a locked and password-protected computer under the principal investigator's safekeeping to maintain confidentiality.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

The data presented in this study are available on request from the corresponding author. The data is not publicly available due to the protection of personal data that could compromise the privacy of research participants.

Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any potential conflict of interest.

Authors' Contribution

Conceptualization, PJ-R and RMM-L; methodology, JE-R; validation, PJ-R, RMM-L and JE-R; formal analysis, JE-R; investigation, PJ-R and RMM-L; resources, RMM-L; data curation, PJ-R and JE-R; writing—original draft preparation, PJ-R, RMM-L and JE-R; writing—review and editing, PJ-R, RMM-L and JE-R; visualization, JE-R; supervision, RMM-L and PJ-R; project administration, RMM-L. All authors have read and agreed to the published version of the manuscript.

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