ISSN 0185-3325
e-ISSN 0186-761X

salud mental

VOLUME 49 • ISSUE 3 • MAY - JUNE 2026

- Variables Associated with Bereaved Individuals’ Quality of Life and Hopelessness
- Internet-Based Brief Intervention to Reduce Alcohol Consumption in College Students: An Exploratory Randomized Clinical Trial
- Sleep Quality, Anxiety, and Depression in Medical Students: A Mediation Model
- Self-esteem of Women with Breast Cancer Undergoing Oncological Treatment: A Crosssectional Study

Instituto Nacional de Psiquiatría
Ramón de la Fuente Muñiz

INSTITUTO NACIONAL DE PSIQUIATRÍA
RAMÓN DE LA FUENTE MUÑIZ

Directorio

Salud Mental, Año 49, No. 3, Mayo-Junio 2026, es una publicación bimestral, editada por el Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz. Calzada México-Xochimilco No. 101, Col. San Lorenzo Huipulco, Alcaldía Tlalpan, C.P. 14370, Ciudad de México, Tel. 55 4160-5128. Página web: https://revistasaludmental.gob.mx, correo electrónico: revistasaludmental@gmail.com. Editor responsable: Dr. Héctor Pérez-Rincón García. Reservas de Derechos al Uso Exclusivo No. 04-1979-000000000-506-102 e ISSN: 0185-3325, otorgados por el Instituto Nacional del Derecho de Autor. Certificado de Licitud de Título y Contenido de la Comisión Calificadora de Publicaciones y Revistas Ilustradas de la Secretaría de Gobernación número 17472. Se terminó de imprimir en Editorial Cigome S.A. de C.V. Priv. de Oyamel S/N, Col. El Refugio, C.P. 50255, Toluca Estado de México. este número se terminó de imprimir en mayo del 2026, con un tiraje de 200 ejemplares. Distribuido por José Leobardo Romero Ibarra, Paseo de los Sauces 117, Casa Blanca, Metepec, Estado de México.

Salud Mental

Since 1977, the SALUD MENTAL as the official publication of the National Institute of Psychiatry Ramón de la Fuente National Muñiz has Sought to respond to the publishing needs of researchers working in the area of mental health, basing on four fundamental criteria: continuous education, updating, information and a multidisciplinary approach.
Four decades after its foundation, SALUD MENTAL becomes a international scientific communication forum for national an international researchers in the areas of psychiatry, neurosciences and psychology.
SALUD MENTAL receives for publication original works on topics about psychiatry, neurosciences, psychology, epidemiology, addictions, psychopathology, neuropsychology, psychiatry and social psychology, history of psychiatry and related disciplines. The manuscripts will be submitted exclusively through our editorial assistant, available at https://revistasaludmental.gob.mx.
SALUD MENTAL has been published bimonthly uninterruptedly since its foundation in accordance with the good practices of scientific publication. The manuscripts are initially ruled by an internal review committee and, if approved, they are subsequently refereed in a double-blind process by experts on the different themes. SALUD MENTAL also publishes additional monographic supplements on various topics in the area of mental health.
SALUD MENTAL is indexed in Academic Search Ultimate (EBSCO), CAPES-QUALIS, DIALNET (Universidad de la Rioja), Current Contents Connect (Clarivate), Imbiomed, IRESIE (Índice de Revistas de Educación Superior e Investigación Educativa, UNAM), Journal Citation Report (Clarivate), Latindex, Medigraphic, MIAR, Periódica (Índice de Revistas Latinoamericanas en Ciencias) PsycInfo (American Psychological Association – APA), Psicodoc (Colegio Oficial de la Psicología de Madrid [EBSCO], RedALyC,SciELO Citation Index (Clarivate), SciELO Scientific Electronic Library Online, Scopus (Elsevier), Sistema de clasificación de Revistas Mexicanas de Ciencia y Tecnología (CONAHCYT), Social Sciences Citation Index (Clarivate), Sociology Source Ultimate (EBSCO), Web of Science Core Collection (Clarivate).

Calz. México-Xochimilco 101, San Lorenzo Huipulco, Tlalpan, 14370 México, CDMX
Teléfono: 55 4160-5128, Sitio web: https://revistasaludmental.gob.mx
E-mail: revistasaludmental@gmail.com

ISSN 0185-3325

salud mental

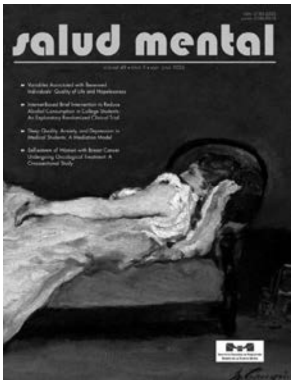
Volume 49 Issue 3 May-June 2026

CONTENT

EDITORIAL

ORIGINAL ARTICLES

NEWS



Cover illustration
Mette Gauguin dormant sur un canapé [Fragment] 1875.
Gauguin, P. (1848-1903).
Catalogues raisonnés
Wildenstein, G. (1964). *Gauguin: I. Catalogue*. Les Beaux-Arts.
Wildenstein, D. (2001). *Gauguin: Catalogue de l'œuvre peint, 1873-1888* (No. 22). Seuil.
Source/photographer: The Athenaeum

salud mental

EDITORIAL
Volume 49, Issue 3, May-June 2026
10.17711/SM.0185-3325.2026.14

Beyond Symptom Reduction: Toward Structural and Preventive Paradigms in Mental Health

Diana Guízar-Sánchez,[1] Gabriela Martínez-Levy,[2] Raúl Sampieri-Cabrera[3]

[1] Department of Physiology, School of Medicine, National Autonomous University of Mexico, Mexico City, Mexico.
[2] Departamento de Genética , Dirección de Investigaciones Biomédicas en Salud Mental, Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz.
[3] Center for Complexity Sciences, National Autonomous University of Mexico, Mexico City, Mexico.

Correspondence:
Diana Guízar-Sánchez
Laboratorio de Ciencias del Aprendizaje, Departamento de Fisiología, Facultad de Medicina, Universidad Nacional Autónoma de México. Ciudad de México, México.
Phone: +52 (55) 5248-0211
Email: dguizar@facmed.unam.mx

Citation:
Guízar-Sánchez, D., Martínez-Levy, G., & Sampieri-Cabrera, R. (2026). Beyond Symptom Reduction: Toward Structural and Preventive Paradigms in Mental Health. *Salud Mental*, *49*(3), 99–101 https://doi.org/10.17711/SM.0185-3325.2026.14

Mental health has increasingly emerged as a major global public health priority. Contemporary perspectives challenge the traditional view of mental disorders as isolated clinical phenomena, instead recognizing mental health as a multidimensional construct influenced by psychological, social, and structural determinants (World Health Organization [WHO], 2022, 2025a). Current mental health research faces an important limitation: symptom remission does not necessarily translate into psychological well-being, resilience and quality of life. Psychological distress cannot be understood through exclusively biomedical approaches. Rather, mental health should be approached as a dynamic continuum influenced by social relationships, institutional environments, and chronic stress exposure.

The manuscripts included in this issue collectively reinforce this perspective by examining psychological well-being, self-esteem, emotional vulnerability, quality of life, and psychosocial adaptation across populations exposed to chronic illness, social adversity, and high-stress environments. Collectively, these studies support an evolving understanding of mental health that extends beyond symptom reduction toward broader dimensions of wellbeing. Lower levels of depression and anxiety do not necessarily imply greater meaning, resilience, or psychological flourishing, a distinction with important implications for research and public policy (Vander Weele, 2017). Consequently, contemporary mental health frameworks must evolve beyond exclusively symptom-centered models toward approaches capable of understanding how institutional, educational, occupational, and social environments actively shape emotional well-being and psychosocial functioning.

Multidimensional models increasingly guide contemporary mental health research. Hedonic approaches conceptualize well-being through life satisfaction and affective balance, whereas eudaimonic perspectives emphasize meaning, autonomy, growth, and purpose in life (Diener, 1984). Ryff's model of psychological well-being operationalizes this eudaimonic perspective through six dimensions: autonomy, environmental mastery, personal growth, positive relationships, purpose in life, and self-acceptance (Ryff, 1989, 2014). More recent integrative proposals, such as the Hierarchical Framework of Well-Being, seek to reconcile subjective, psychological, and social well-being within a unified multidimensional model. These conceptual developments are particularly significant because they challenge the persistent tendency to equate mental health solely with the absence of psychiatric symptoms.

This distinction is particularly evident in medical education. Medical students represent one of the most psychologically vulnerable academic populations worldwide, consistently reporting higher rates of depression, anxiety, burnout, suicidal ideation, and impaired quality of life than their age-matched peers (Puthran et al., 2016). However, these indicators may still underestimate the broader deterioration in well-being that occurs within medical training environments. Emotional exhaustion, cynicism, loss of meaning, impaired social connectedness, and reduced professional efficacy often progress longitudinally, despite partial improvements in depressive symptoms.

This paradox raises important questions for future research. Are current interventions excessively focused on symptom management while neglecting institutional and structural contributors to psychological suffering? To what extent do educational systems function as chronically stressful environments capable of undermining psychological development, professional identity formation, and emotional resilience? These questions are particularly relevant when considering that burnout trajectories frequently worsen toward the end of medical training, precisely when students transition into professional responsibilities and clinical practice. These findings suggest that medical education should not be viewed solely as an academic process but also as a psychosocial environment capable of either protecting or progressively undermining students' mental health and well-being.

Beyond medical education, contemporary populations face converging threats to mental health that extend beyond traditional psychiatric classifications. Loneliness, digital hyperconnectivity, economic instability, chronic illness, bereavement, and social fragmentation increasingly shape emotional well-being across the lifespan (WHO, 2022, 2025c). Notably, social isolation has emerged as one of the strongest predictors of both physical and mental morbidity, associated not only with depression and anxiety but also with cardiovascular disease, cognitive decline, and premature mortality (U.S. Department of Health and Human Services, 2023; WHO, 2025b). These findings reinforce the need to conceptualize social connections as public health assets rather than merely individual psychosocial variables.

Similarly, the relationship between digital technology and mental health remains the subject of ongoing debate. Problematic social media use has been associated with anxiety, depressive symptoms, impulsivity, attentional difficulties, although digital environments may also facilitate social support and access to mental health resources when used adaptively (WHO, 2025). This duality underscores the limitations of simplistic interpretations and highlights the need for longitudinal and mechanistic research capable of clarifying how digital behaviors interact with social and developmental processes.

Another major theme emerging from literature is the importance of the structural and social determinants of mental health. Poverty, gender inequality, educational disadvantages, violence, discrimination, and labor instability profoundly shape psychological outcomes across populations (WHO, 2022). Importantly, these determinants frequently interact with individual vulnerabilities in synergistic ways rather than operating independently of them. Consequently, purely individualized interventions may prove insufficient if the institutional and structural conditions that perpetuate chronic stress remain unaddressed. This perspective complements evidence-based clinical approaches by incorporating broader psychosocial and structural dimensions of mental health.

This issue is particularly relevant in low- and middle-income countries (LMICs), where treatment gaps remain especially pronounced. Despite the growing global burden of mental disorders, mental health continues to receive approximately 2% of national health budgets worldwide, with profound disparities between high-income and resource-limited settings (WHO, 2024). The persistence of these inequities raises critical ethical and political questions regarding the global organization of mental health systems, particularly given that vulnerable populations often experience the greatest burden of psychological distress while simultaneously facing the lowest access to evidence-based care.

The evidence reviewed here also suggests that preventive and promotional approaches deserve substantially greater attention. Protective factors, such as social support, resilience, physical activity, meaningful relationships, institutional belonging, and psychological safety, consistently emerge as important buffers against emotional distress. Positive psychology interventions, mindfulness-based programs, and community-oriented strategies have demonstrated modest but meaningful effects on subjective and psychological well-being (Seligman, 2011). However, literature remains limited by short follow-up periods, methodological heterogeneity, and insufficient attention to cultural adaptation and contextual factors. Many interventions continue to prioritize individual coping while underexploring how organizational culture, power asymmetries, and institutional violence shape emotional outcomes across populations. Therefore, preventive mental health should not be restricted to the early detection of psychopathology but should instead expand toward the active promotion of flourishing, resilience, social connectedness, and psychological well-being across diverse populations and settings.

Future research will likely require more integrative and longitudinal approaches capable of understanding mental health as a dynamic and context-dependent process. Greater integration of biological, psychological, social, occupational, educational, and digital determinants may help clarify how emotional well-being evolves across developmental, professional, and societal transitions. Likewise, qualitative and mixed-methods research may provide deeper insight into dimensions frequently overlooked by symptom-based models, including identity formation, meaning-making, institutional belonging, and emotional safety. Expanding culturally contextualized research in LMICs and Latin American populations will also be essential for understanding how sociocultural and structural conditions shape distinct forms of vulnerability, adaptation, and resilience.

Taken together, the evidence presented in these manuscripts illustrates the diversity and complexity of contemporary mental health challenges. Psychological distress does not emerge exclusively within psychiatric settings, but is deeply embedded in educational systems, workplaces, chronic illness trajectories, social inequalities, digital environments, and broader societal structures. Accordingly, the challenge facing contemporary mental health research is not simply to identify pathology, but to rethink how institutions, policies, and communities can actively cultivate well-being and resilience across diverse populations and contexts.

Ultimately, advancing mental health in the coming decade will likely require a broader paradigm shift: from predominantly reactive and symptom-centered models toward more preventive, ecological, and structurally informed approaches capable of fostering resilience, psychological safety, meaning, and quality of life in increasingly complex societies. From this perspective, improving mental health may depend not only on expanding access to treatment, but also on strengthening the educational, occupational, social, and institutional environments that shape everyday emotional experiences and long-term well-being.

REFERENCES

Diener, E. (1984). Subjective well-being. *Psychological Bulletin*, *95*(3), 542–575. https://doi.org/10.1037/0033-2909.95.3.542

Puthran, R., Zhang, M. W. B., Tam, W. W., & Ho, R. C. (2016). Prevalence of depression amongst medical students: A meta-analysis. *Medical Education*, *50*(4), 456–468. https://doi.org/10.1111/medu.12962

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, *57*(6), 1069–1081. https://doi.org/10.1037/0022-3514.57.6.1069

Ryff, C. D. (2014). Psychological Well-Being Revisited: Advances in the Science and Practice of Eudaimonia. *Psychotherapy and Psychosomatics*, *83*(1), 10–28. https://doi.org/10.1159/000353263

Seligman, M. E. P. (2011). *Flourish: A visionary new understanding of happiness and well-being*. Free Press.

U.S. Department of Health and Human Services. (2023). *Our epidemic of loneliness and isolation: The U.S. Surgeon General's advisory on the healing effects of social connection and community*. https://www.hhs.gov/sites/default/files/surgeon-general-social-connection-advisory.pdf

VanderWeele, T. J. (2017). On the promotion of human flourishing. *Proceedings of the National Academy of Sciences*, *114*(31), 8148–8156. https://doi.org/10.1073/pnas.1702996114

World Health Organization. (2022). *World mental health report: Transforming mental health for all*. https://www.who.int/publications/i/item/9789240049338

World Health Organization. (2024). *Mental Health Atlas 2024*.

World Health Organization. (2025a). *Mental health*. https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response

World Health Organization. (2025b). *Mental health at work*. https://www.who.int/news-room/fact-sheets/detail/mental-health-at-work

World Health Organization. (2025c). *Social isolation and loneliness*. https://www.who.int/news-room/fact-sheets/detail/social-isolation-and-loneliness

World Health Organization. (2025d). *Teens, screens and mental health*. https://www.who.int/europe/news/item/25-09-2024-teens--screens-and-mental-health

ORIGINAL ARTICLE
salud mental
Volume 49, Issue 3, May-June 2026
10.17711/SM.0185-3325.2026.15

Variables Associated with Bereaved Individuals' Quality of Life and Hopelessness

María Jesús Hernández-Jiménez,[1,2] Anabel de la Rosa-Gómez,[3] Pablo D. Valencia[3]

[1] Facultad Ciencias de la Salud, Universidad Internacional Valenciana, 46002 Valencia, España.
[2] Grupo de investigación Salud, Violencia y Trauma (GI-SAVITRA). Universidad Internacional Valenciana, Valencia, España.
[3] Facultad de Estudios Superiores Iztacala, Universidad Nacional Autónoma de México.

Correspondence:
María Jesús Hernández-Jiménez
Grupo de investigación Salud, Violencia y Trauma (GI-SAVITRA). Facultad Ciencias de la Salud, Universidad Internacional Valenciana, 46002 Valencia, España.
Email: mariajesus.hernandez@profesor.universidadviu.com

Received: 23 April 2024
Accepted: 28 March 2025

Citation:
Hernández-Jiménez, M. J., De la Rosa-Gómez, A., & Valencia, P. D. (2026). Variables Associated with Bereaved Individuals' Quality of Life and Hopelessness. *Salud Mental*, *49*(3), 103–112. https://doi.org/10.17711/SM.0185-3325.2026.15

ABSTRACT

Introduction. Losing a loved one can significantly affect quality of life and increase hopelessness, and its impact may be greater in specific demographic groups. **Objective.** The present study sought to identify sociodemographic variables associated with quality of life and hopelessness in those who had lost a loved one during the COVID-19 pandemic. **Method.** We examined baseline data from the *Duelo Covid* (COVID Bereavement) Project, assessing those seeking bereavement counseling. Bivariate and multiple regression analyses were used to identify possible variables associated with the four primary dimensions of quality of life in the WHOQOL-BREF, as well as hopelessness, as measured by the Beck Hopelessness Scale. **Results.** Being male, being aged 40 or older, having a job, having completed higher education, and not taking psychotropic medication were variables that were significantly associated with lower hopelessness and higher scores on the various dimensions of quality of life. **Discussion and conclusion.** Hopelessness and quality of life are not experienced uniformly among all bereaved persons. This suggests that certain pre-existing inequalities are also reflected in the bereavement process. Further studies should examine longitudinal changes in response to human loss.

Keywords: Grief, bereavement, quality of life, COVID-19, Mexico.

RESUMEN

Introducción. La pérdida de un ser querido puede afectar significativamente la calidad de vida e incrementar la desesperanza. Este impacto puede ser mayor en algunos grupos demográficos específicos. **Objetivo.** El presente estudio buscó identificar variables sociodemográficas asociadas con la calidad de vida y la desesperanza en personas que perdieron un ser querido durante la pandemia de COVID-19. **Método.** Se examinaron los datos de línea base del proyecto Duelo Covid, el cual evaluó a personas que buscaban acompañamiento psicológico por la pérdida de un ser querido. Se usaron análisis bivariados y de regresión múltiple para identificar posibles variables asociadas con las cuatro dimensiones de calidad de vida del WHOQOL-BREF, así como con la desesperanza, medida con la Escala de Desesperanza de Beck. **Resultados.** Ser varón, tener de 40 años a más, contar con trabajo, tener educación superior y no encontrarse bajo medicación psicotrópica fueron variables que se asociaron significativamente con una menor desesperanza y con mayor calidad de vida en sus distintas dimensiones. **Discusión y conclusión.** La desesperanza y la calidad de vida no son homogéneos entre todas las personas que pierden a un ser querido. Esto sugiere que algunas inequidades preexistentes se reflejan también al experimentar un proceso de duelo. Se sugiere que estudios posteriores examinen longitudinalmente los cambios experimentados ante una pérdida humana.

Palabras clave: Duelo, luto, calidad de vida, COVID-19, México.

INTRODUCTION

The concept of quality of life has been extensively studied in scientific literature for many years. Schalock and Verdugo (2013) characterize it as a desired state of individual well-being comprising various fundamental aspects affected by both personal and environmental factors. It is worth noting, as Costa et al. (2021) observe in their research findings, that there is considerable diversity in the way quality of life is defined and measured, posing challenges for the comparison of results across studies. Nonetheless, although the core dimensions of quality of life remain consistent across individuals, their significance and perceived value may vary from person to person. Assessing these dimensions relies on culturally and contextually sensitive indicators.

Well-being has recently been compromised by the impact of the COVID-19 pandemic, which wreaked havoc on society at large, leading to psychological, social, occupational, and economic repercussions (Mercader Rubio et al., 2022; Vancappel et al., 2023). While the pandemic itself was a significant stressor, its effects were not uniformly distributed. Individuals who lost their jobs and experienced financial decline were particularly vulnerable to adverse health outcomes, including negative impacts on their psychological well-being and overall quality of life (Brenner & Bhugra, 2020). It is also essential to consider the concept of hopelessness, as defined by Beck et al. (1974), representing a set of pessimistic expectations regarding the future. Throughout the pandemic, feelings of hopelessness triggered psychological distress, characterized by the internal turmoil of negative emotions (Ordóñez-Carrasco et al., 2022). Research findings indicate elevated levels of depression, anxiety, and stress among individuals who experienced job loss in the wake of the pandemic (McDowell et al., 2021; Valencia et al., 2022). These effects potentially endured even after the direct impact of COVID-19 declined.

Regardless of their access to treatment, individuals with a mental health diagnosis are likely to have been among the demographic groups most susceptible to a range of emotional symptoms, impairing their quality of life during the pandemic (Liu et al., 2020). Conversely, maintaining optimal emotional intelligence and having a strong social support system can mitigate stress during times of crisis, suggesting that both factors can serve as potential protective measures (Molero et al., 2020).

Exploring the connection between hopelessness and quality of life in individuals facing loss is of significant scientific and clinical interest. Hopelessness, previously linked to a higher prevalence of depression, anxiety, and suicidal tendencies (Mavrogiorgou et al., 2025), is a psychological factor characterized by the perception that current or future negative circumstances are inmutable. This belief can lead to a decline in quality of life and increase the risk of developing disorders such as depression and anxiety (Beck & Steer , 2020). Conversely, quality of life, encompassing an individual's physical, psychological, and social well-being, is severely impacted by loss and prolonged crises (World Health Organization [WHO], 2022). This study explores how variables such as age, gender, educational attainment, and medication use influence the quality of life and hopelessness of those who have lost loved ones.

Age is a crucial factor in both quality of life and mental health, directly affecting how individuals cope with loss and grief. Research indicates that older adults often experience increased hopelessness due to the loss of social support networks coupled with physical health issues (Domènech-Abella et al., 2017). Likewise, younger individuals have shown a rise in hopelessness, potentially related to disruptions in their academic and social lives (Smith & Victor, 2020). A study by Wu et al. (2021) found that advanced age was associated with higher levels of hopelessness and reduced emotional resilience in response to the loss of loved ones during the pandemic.

Gender differences also play a significant role in the experience of hopelessness and quality of life after loss. Women tend to experience a greater emotional impact due to the cultural and social factors encouraging emotional expression and help-seeking (Zhou et al., 2021). This can facilitate better trauma processing and the development of normative grief (Macia et al., 2024).

Educational attainment influences the ability to cope with adverse situations. Those with higher education often possess better coping strategies, access to mental health services, and a greater sense of control over their lives (Conceição et al., 2019; Cui, 2019). Conversely, individuals with lower educational attainment face barriers to accessing health services and emotional support, exacerbating feelings of hopelessness and negatively affecting their quality of life (Smith & Victor, 2020).

Medication use significantly increased during the pandemic, particularly among those coping with the loss of loved ones (Tiger et al., 2024; Domènech-Abella et al., 2021). Understanding how hopelessness affects quality of life in this context will help identify risk factors and develop more effective psychological interventions to support the grieving process and promote emotional well-being. Moreover, this knowledge can contribute to the design of public health policies that will provide better psychosocial support for individuals experiencing grief after the pandemic.

The present research adds to our understanding of the sociodemographic factors linked to quality of life and hopelessness during the COVID-19 pandemic. It focusses on individuals who lost a loved one, as such losses during the pandemic often occurred suddenly, depriving many of the opportunity to say goodbye and commemorate their loved ones with family and friends. This abrupt loss can result in disorganized grief, feelings of hopelessness, and a decline in quality of life (Holland et al., 2021), leading to emotional distress and hampering the grieving process (Breen et al., 2021; Eisma & Boelen, 2023; Tang et al., 2021). It is worth noting that bereavement due to COVID-19 tends to be more severe than that due to natural causes of death (Eisma et al., 2021). Despite the constraints imposed by public health measures, personalized care can still be provided through effective communication between professionals and families, potentially facilitating meaningful time spent with the loved one before their passing. These measures can enhance coping mechanisms, potentially reducing the impact on quality of life (Mayland et al., 2021).

Understanding how to address the needs of individuals post-pandemic holds immediate and lasting significance for clinical practice (Hanna et al., 2021). Given that for every COVID-19 fatality, approximately nine individuals were impacted by bereavement (Verdery et al.,2020), this translates to over 60 million people globally who experienced loss due to COVID-19, based on worldwide death tolls.

The quality of life and hopelessness of individuals who have lost loved ones are influenced by several variables, such as age, sex, educational attainment, and medication use (Eisma & Boelen, 2023). The present study therefore aims to identify individual characteristics (including sociodemographic, clinical, and bereavement-related aspects) correlating with either reduced quality of life or increased levels of hopelessness in individuals who experienced the loss of a loved one during the COVID-19 pandemic. Given the exploratory nature of the study, we did not posit specific hypotheses.

METHOD

Study design

The present cross-sectional study was part of a larger research/intervention project exploring multiple clinical factors of Mexicans who accessed a free online platform designed to provide emotional support for those experiencing grief during the COVID-19 pandemic (Dominguez-Rodriguez et al., 2021).

Participants

For this cross-sectional study, data were gathered from individuals who registered on the Duelo COVID platform, a free online resource designed to provide emotional support for those experiencing grief during the COVID-19 pandemic. Participants were primarily recruited through social media channels, enrolling on the platform between December 22, 2020, and November 17, 2021.

Individuals had to meet several criteria to be eligible for participation . Firstly, they needed to be 18 or older. Other requirements including having internet access, a valid email address, and basic digital literacy. Participants were required to be fluent in Spanish and have experienced the loss of a loved one within the previous six months.

The Duelo COVID platform, accessible through computers, smartphones, and tablets at https://www.duelocovid.com, required participants to create an account to access the intervention materials. On registration, individuals received an email confirming their account and providing access to the website, which included an informed consent form and the intervention resources. The evaluation process was integrated and automated within the platform. Information regarding external psychological services, with a focus on free options, was also available on the platform.

Using non-probability sampling, 4,869 participants, with a mean age of 33.10 years (*SD* = 9.69), were included in this study Most of them were employed females, who had completed higher education. In addition, most respondents had lost their relatives or loved ones in the three months prior to data collection. Detailed information on the sample is given in Table 1.

Table 1
Characteristics of the study sample

Variable	*N*	*%*
Age		
18-24	1072	22.02
25-29	1008	20.70
30-39	1545	31.73
40-49	886	18.20
50-60	358	7.35
Gender		
Female	4234	86.96
Male	635	13.04
Country area		
Mexico City	1851	38.02
North	583	11.97
Central	1967	40.40
South	468	9.61
Employed		
No	1940	39.84
Yes	2929	60.16
Higher education		
No	1233	25.32
Yes	3636	74.68
Currently in treatment		
No	4482	92.05
Yes	387	7.95
On medication		
No	4379	89.94
Yes	490	10.06
Time since loss		
< 1 month	1903	39.08
1 to 3 months	1708	35.08
4 to 6 months	808	16.59
> 6 months	450	9.24

Measurements

Sociodemographic variables. Participants were asked to report their sex, employment status, current treatment (psychological and pharmacological), and whether they had made a suicide attempt in the past three months. They were also asked to provide their age in years, area of the country where they lived, educational attainment, and the time that had elapsed since the loss. The area of the country was coded using four large geographical categories following an existing classification (Rivera-Rivera et al., 2020).

Beck's Hopelessness Scale. This scale comprises 20 true or false questions, with scores ranging from 0 to 20, with higher scores indicating a higher level of hopelessness (Beck et al., 1974). This scale has been widely validated and used, and for this study, the version validated in the Mexican population was administered (Córdova Osnaya, 2011).

World Health Organization Quality of Life (WHOQoL)-BREF Spanish version. This instrument is composed of 26 items, two broad questions (global quality of life and general health), and 24 questions providing a profile of the four dimensions of the respondent's quality of life: physical health, psychological health, social relationships, and environment. It focuses on their degree of satisfaction with various situations in their daily life. Each item has five Likert-type response options (1–5). The scale was validated in the Mexican population, showing partial evidence of validity in clinical settings (Acosta Quiroz et al., 2013).

Procedure

The study was conducted from December 2020 to April 2021, through a self-administered intervention platform, Duelo COVID. Detailed information on the recruitment process is available elsewhere (Dominguez-Rodriguez et al., 2021). Participants were recruited through social networks such as https://www.facebook.com/DueloCovid and articles on the news media. Potential participants were not sent emails to invite them to participate in the study.

To receive the intervention, participants were required to provide informed consent. Only adults aged 18 or older were allowed to register, and they were guaranteed that their data (such as e-mail addresses) would be protected. No confidential data such as names, addresses, or telephone numbers were requested.

Statistical analysis

First, bivariate associations between the sociodemographic variables and each of the study outcomes were examined with a set of ANOVA tests. Only statistically significant variables ($p < .05$) were selected as potential predictors for multiple regression analysis. This procedure was repeated for each of the outcome variables (hopelessness, physical QoL, psychological QoL, social QoL, and environmental QoL).

Ethical considerations

The study was approved by the Research Ethics Committee of the Universidad Autónoma de Ciudad Juárez, Mexico (Approval ID: CEI-2020-2-226), and is registered in Clinical Trials.

Before answering the questionnaires, participants were required to read and sign a consent form.

RESULTS

Bivariate analyses

As can be seen in Table 2, hopelessness was significantly associated with all study variables except for being under psychological or psychiatric treatment. This variable was also non-significant for all QoL domains except environmental QoL. The country area variable was only significantly associated with hopelessness and environmental QoL. Conversely, time since loss was significantly associated with hopelessness, psychological QoL, and social QoL, but not with physical or environmental QoL. It should be noted, however, that although the results were significant, the effect size was small in all cases (the largest being 3.2% of explained variance). Detailed results of the bivariate ANOVAs are given in Table 2.

Multiple linear regressions

Five multiple regression analyses were conducted (Table 3). First, all study variables remained associated with hopelessness even after controlling for each other. Being male, living in the northern area of Mexico, and having completed higher education were associated with less hopelessness, whereas taking psychiatric medication and having experienced the loss of a loved one four to six months prior to the evaluation were linked to greater hopelessness. Where age is concerned, the results suggest a nonlinear pattern. A slight increase in hopelessness occurs for adults aged between 25 and 39 years, after which it decreases.

Second, all study variables also showed a significant association with physical QoL. Higher scores were observed in males, those who were employed, and had completed higher education, whereas lower physical QoL was found for people who took psychiatric medication. In regard to age, an upward trend was observed from the age of 40 onwards.

Third, psychological QoL was positively related to being male, employed, and having completed higher education.Conversely, taking medication was associated with lower psychological QoL. As with physical QoL, a positive association was observed between age and psychological QoL among those aged 40 or older. Time since loss was also related to psychological QoL. Those whose loss had

Table 2
Bivariate associations between study variables and outcomes

	Hopelessness					*Physical QoL*					*Psychological QoL*					*Social QoL*					*Environmental QoL*				
Variable	*M*	*SD*	*F*	*p*	*η²*	*M*	*SD*	*F*	*p*	*η²*	*M*	*SD*	*F*	*p*	*η²*	*M*	*SD*	*F*	*p*	*η²*	*M*	*SD*	*F*	*p*	*η²*
Age			3.67	.005	.003			2.48	.042	.002			22.01	<.001	.018			3.83	.004	.003			15.59	<.001	.013
18-24	.42	.26				12.18	2.41				10.89	2.72				11.91	3.55				11.81	2.66			
25-29	.43	.27				12.35	2.64				11.06	2.77				11.98	3.58				11.89	2.73			
30-39	.43	.28				12.42	2.65				11.30	2.87				12.09	3.53				12.11	2.61			
40-49	.40	.30				12.49	2.83				11.75	2.99				12.37	3.49				12.52	2.75			
50-60	.39	.28				12.55	2.80				12.20	2.89				12.54	3.45				12.77	2.79			
Gender			9.57	.002	.002			42.92	<.001	.009			35.32	<.001	.007			0	.964	0			11.14	.001	.002
Female	.42	.28				12.28	2.63				11.21	2.82				12.11	3.53				12.07	2.69			
Male	.39	.28				13.01	2.67				11.93	3.06				12.12	3.56				12.45	2.74			
Country area			2.88	.030	.002			1.11	.346	0			1.32	.266	0			1.67	.172	.001			10.06	<.001	.006
Mexico City	.42	.28				12.38	2.70				11.37	2.87				12.22	3.48				12.05	2.72			
North	.39	.27				12.54	2.64				11.43	2.75				12.22	3.51				12.68	2.61			
Central	.43	.28				12.31	2.62				11.23	2.90				11.98	3.61				12.01	2.69			
South	.41	.27				12.42	2.52				11.22	2.83				12.06	3.45				12.17	2.73			
Employed			29.82	<.001	.006			72.53	<.001	.015			57.33	<.001	.012			14.41	<.001	.003			84.91	<.001	.017
No	.45	.28				11.98	2.64				10.93	2.84				11.87	3.64				11.69	2.69			
Yes	.40	.28				12.63	2.62				11.56	2.85				12.27	3.46				12.41	2.67			
Higher education			22.04	<.001	.005			22.69	<.001	.005			36.30	<.001	.007			7.72	.017	.001			140.22	<.001	.028
No	.45	.29				12.06	2.59				10.88	2.84				11.90	3.55				11.35	2.54			
Yes	.41	.27				12.48	2.66				11.45	2.86				12.18	3.53				12.38	2.70			
Currently in treatment			1.37	.242	0			.20	.654	0			.25	.620	0			1.70	.193	0			17.63	<.001	.004
No	.42	.28				12.38	2.62				11.30	2.86				12.09	3.54				12.07	2.69			
Yes	.40	.28				12.32	2.92				11.38	2.96				12.33	3.52				12.67	2.74			
On medication			37.23	<.001	.008								51.80	<.001	.011			28.48	<.001	.006			4.25	.039	.001
No	.41	.28				12.53	2.59	159.16	<.001	.032	11.41	2.86				12.20	3.53				12.15	2.71			
Yes	.49	.30				10.97	2.68				10.43	2.71				11.30	3.50				11.88	2.60			
Time since loss			2.78	.040	.002			.88	.451	0			3.86	.009	.002			14.77	<.001	.009			2.39	.067	.001
< 1 month	.41	.27				12.32	2.67				11.46	2.84				12.47	3.48				12.22	2.73			
1 to 3 months	.42	.28				12.45	2.61				11.29	2.85				12.06	3.50				12.13	2.67			
4 to 6 months	.44	.28				12.33	2.62				11.10	2.77				11.68	3.54				11.99	2.71			
> 6 months	.44	.30				12.39	2.71				11.11	3.14				11.53	3.75				11.91	2.67			

occurred more than a month before evaluation showed lower levels of psychological and social QoL.

Fourth, higher levels of social QoL were associated with age (beginning at 40) and having a job. Conversely, lower QoL was observed among those taking psychiatric medication. Moreover, the more time had elapsed since the loss, the lower social QoL levels tended to be.

Fifth, better environmental QoL was associated with being male, living in the Northern area of the country, having a job, having higher education, and being currently under psychological or psychiatric treatment. On the other hand, taking psychiatric medication was related to lower environmental QoL. Finally, it should be noted that all the models explained a fairly low percentage of the variances of their outcomes. Only 2% of the variance in hopelessness and QoL was explained by their respective models, as opposed to between 5 and 6% of the variance in physical, psychological, and environmental QoL.

Table 3
Bivariate associations between study variables and outcomes

	Hopelessness			*Physical QoL (Adj. R^2 = .055)*			*Psychological QoL (Adj. R^2 = .054)*			*Social QoL (Adj. R^2 = .020)*			*Environmental QoL*		
Variable	*b*	*95% CI*	*p*	*B*	*95% CI*	*p*	*b*	*95% CI*	*p*	*b*	*95% CI*	*p*	*b*	*95% CI*	*p*
Age															
18-24	Reference group			Reference group			Reference group			Reference group			Reference group		
25-29	.04	[.01, .06]	.003	-.01	[-.23, .22]	.963	-.02	[-.27, .22]	.847	-.01	[-.32, .29]	.927	-.24	[-.47, -.01]	.043
30-39	.03	[.01, .06]	.003	.06	[-.15, .26]	.595	.22	[-.01, .44]	.061	.09	[-.19, .37]	.533	0	[-.22, .21]	.974
40-49	0	[-.03, .02]	.746	.25	[.02, .49]	.034	.78	[.52, 1.03]	<.001	.44	[.12, .76]	.007	.54	[.30, .78]	<.001
50-60	-.04	[-.07, .00]	.039	.45	[.14, .76]	.004	1.39	[1.06, 1.73]	<.001	.72	[.30, 1.15]	.001	1.01	[.70, 1.33]	<.001
Gender															
Female	Reference group			Reference group			Reference group						Reference group		
Male	-.03	[-.05, -.01]	.009	.62	[.41, .84]	<.001	.62	[.39, .85]	<.001				.34	[.12, .56]	.002
Country area															
Mexico City	Reference group												Reference group		
North	-.04	[-.06, -.01]	.005										.62	[.37, .86]	<.001
Central	.00	[-.02, .02]	.788										-.01	[-.17, .16]	.949
South	-.01	[-.04, .02]	.471										.06	[-.21, .32]	.670
Employed															
No	Reference group			Reference group			Reference group			Reference group			Reference group		
Yes	-.04	[-.06, -.02]	<.001	.56	[.40, .71]	<.001	.44	[.27, .61]	<.001	.33	[.12, .54]	.002	.47	[.31, .63]	<.001
Higher education															
No	Reference group			Reference group			Reference group			Reference group			Reference group		
Yes	-.04	[-.06, -.02]	<.001	.29	[.11, .46]	.001	.54	[.35, .72]	<.001	.22	[-.01, .46]	.066	.99	[.82, 1.17]	<.001
Currently in treatment															
No													Reference group		
Yes													.54	[.27, .82]	<.001
On medication															
No	Reference group			Reference group			Reference group			Reference group			Reference group		
Yes	.08	[.06, .11]	<.001	-1.59	[-1.83, -1.34]	<.001	-1.08	[-1.35, -.82]	<.001	-.94	[-1.27, -.61]	<.001	-.44	[-.69, -.19]	.001
Time since loss															
< 1 month	Reference group						Reference group			Reference group					
1 to 3 months	.02	[0, .03]	.078				-.19	[-.37, -.01]	.042	-.43	[-.66, -.20]	<.001			
4 to 6 months	.03	[.01, .05]	.014				-.30	[-.53, -.07]	.010	-.76	[-1.05, -.47]	<.001			
> 6 months	.02	[0, .05]	.105				-.29	[-.58, -.01]	.045	-.91	[-1.27, -.55]	<.001			

DISCUSSION AND CONCLUSION

Profound societal shifts in the wake of the pandemic have significantly altered people's daily experiences, particularly in regard to grieving, confronting mortality, and coping with loss (Eisma & Tamminga, 2020). As Eisma and Tamminga (2020) note, most individuals who have experienced bereavement typically adapt and normalize their circumstances over time. However, the pandemic introduced a unique set of circumstances in which the grief experienced by those who lost loved ones to COVID-19 was intensified by risk factors such as social isolation, financial strain, health concerns, worry about family members or friends, and other related factors. This produced detrimental effects on the mental health and overall quality of life of individuals bereaved as a result of COVID-19 (Salisbury et al., 2022). At the same time, these same researchers suggest that help-seeking had the most significant impact on mitigating the effects of bereavement on individuals' quality of life.

The current study reveals correlations between all the examined variables and feelings of hopelessness. Being male, residing in northern Mexico, and higher educational attainment were linked to lower levels of hopelessness, whereas the use of psychiatric medication was associated with higher levels of hopelessness. These findings align with those of Hacimusalar et al. (2020), who assert that state anxiety levels rise during stressful situations like the pandemic, intensifying feelings of hopelessness. They argue that uncertainty catalyzes anxiety, ultimately leading to increased feelings of hopelessness among individuals. Regarding gender, our findings indicate that being male was associated with lower levels of hopelessness and higher scores in certain quality of life dimensions. This may be attributable to male gender norms requiring men to control and limit their emotions (Berke et al., 2018), potentially reducing awareness of their own emotional lives and therefore limiting descriptions of the latter in self-reports. Moreover, our results align with previous studies demonstrating lower depression rates among men than women (Valencia et al., 2022). Further research is required to explore these gender-related dynamics in bereavement. However, it is important to note that this interpretation requires further investigation for it to be confirmed within this specific context. Concerning residence in the north of the country, Mexicans in the north have been shown to report up to 0.05% higher levels of happiness than those in the rest of the country (Martínez-Sermeño et al., 2025). This could potentially explain why living in the northern area was associated with lower hopelessness in our study. Nevertheless, more specific studies are needed to explore these regional dynamics in greater detail.

Expanding on our findings, experiencing loss within the timeframe of four to six months before the assessment was associated with higher levels of hopelessness, a trend that mirrors the findings of Chen and Tang (2021). Regarding age, our results indicate a non-linear pattern. There is a slight increase in hopelessness among adults aged 25 to 39, followed by a decreasing trend thereafter. This aligns with studies focusing on younger populations, typically aged between 18 and 30, who have reported grappling with negative emotions (Brooks et al., 2020) and concerns regarding their professional future (Wang et al., 2020). These factors, in turn, contribute to psychological issues such as hopelessness, highlighting the need for a thorough examination and reflection on the current situation.

It is worth underlining the fact that all the variables examined in our study displayed significant correlations with physical quality of life. Males, employed individuals, and those with higher educational attainment exhibited better physical quality of life. In this regard, Andrei et al. (2022) suggest that the loss of employment negatively impacts quality of life, with hopelessness playing a partial mediating role in this relationship. Additional research indicates that job loss can intensify symptoms of depression, anxiety, and stress, and reduce positive mental health levels compared to individuals who remain employed (McDowell et al., 2021; Rossi et al., 2020; Valencia et al.,2022). Individuals taking psychiatric medication reported lower physical quality of life. This is consistent with the study by Wu et al., (2021) finding that the use of antidepressants and anxiolytics was associated with a temporary decrease in depressive symptoms. However, it was also linked to an increase in long-term dependence and a reduction in the perceived quality of life.

Regarding age, a progressive increase in physical quality of life was observed from the age of 40. Likewise, psychological quality of life displayed positive associations with being male, employment status, and higher educational attainment. Conversely, individuals taking medication reported lower levels of psychological quality of life. Consistent with findings on physical quality of life, there was a positive correlation between age and psychological quality of life among individuals aged 40 and over. Moreover, time since the loss was linked to psychological quality of life. Those who had experienced a loss more than one month before the assessment reported lower psychological and social quality of life. Exploring this aspect of psychological well-being, Breen et al. (2021) suggest that it may heighten the risk of impaired quality of life. Specifically, individuals bereaved due to COVID-19 may struggle to process their loss, particularly if they experience separation distress, dysfunctional grief, and/or post-traumatic stress.

Higher levels of social quality of life were linked to individuals aged 40 and over, as well as those who were employed. Conversely, individuals taking psychiatric medication reported lower social quality of life. Additionally, social quality of life tended to decrease as more time elapsed since the loss. However, contrasting findings were reported by Ham et al. (2021), who found no discrepancies in social quality of life scales, suggesting that the pandemic did not significantly impact the well-being of bereaved family members. Environmental quality of life was associated with being male, living in the northern region of the country, employment status, higher educational attainment, and receiving psychological or psychiatric treatment. However, taking psychiatric medication was linked to lower environmental quality of life.

The findings of this research suggest that individuals with robust mental health are better equipped to navigate and employ effective coping strategies in response to challenging circumstances, such as the recent pandemic. However, given that adverse effects may persist for an extended period, even beyond the pandemic itself (Forte et al., 2020), it is essential to contemplate various coping mechanisms. These measures include providing affected individuals with access to specialized psychological interventions (Eisma & Boelen, 2023). Moreover, efforts should be made to identify psychological variables such as emotional intelligence (Andrei et al., 2022), which can act as protective factors, enhancing overall quality of life and reducing the emotional toll of the pandemic on both physical and psychological well-being.

The COVID-19 pandemic presents an opportunity for organizations and services to adapt, innovate, and enhance their usual practices. It is essential to identify psychological factors that either protect against or pose risks to quality of life, as this knowledge is crucial for designing interventions aimed at alleviating the emotional impact of the pandemic and its adverse real-world effects. Nonetheless, the pandemic has also presented society with challenges in terms of coping with grief and loss, requiring diverse approaches (Mayland et al., 2020; Stroebe & Schut, 2021).

As for limitations, it is important to note that this study provides insights into how hopelessness impacts quality of life. However, future research should explore how hopelessness is affected by other factors such as depression. Additionally, all data were collected cross-sectionally, capturing a specific moment during the pandemic. To better understand the long-term effects of this unprecedented event, future studies should adopt longitudinal designs. It is also essential to underscore the significance of incorporating measures of quality of life beyond self-report, such as objective indicators related to socioeconomic factors. It is important to acknowledge that our sample consisted of individuals who actively sought online psychological support after a loss, which may create a selection bias. Those who did not seek help or lacked access to online resources may have different experiences, limiting the generalizability of our results to the bereaved population as a whole. Another limitation is the absence of a comparative group distinguishing between types of death (due to COVID-19 versus other causes). We were unable to determine whether the type of death influenced the degree of hopelessness and quality of life. Future research could benefit from including this variable to obtain a more comprehensive understanding of the impact of bereavement.

In conclusion, this study reveals significant correlations between various sociodemographic factors and both hopelessness and quality of life among those bereaved during the COVID-19 pandemic. Being male, living in northern Mexico, and having completed higher education were associated with lower hopelessness, whereas psychiatric medication use correlated with higher hopelessness. Physical, psychological, and social quality of life were positively associated with being male, employment, and higher education, and negatively associated with psychiatric medication. Age showed a non-linear relationship with hopelessness and a positive association with quality of life from the age of 40. These findings suggest that bereavement experiences are not uniform and that pre-existing inequalities influence how individuals cope with loss. Targeted interventions should address specific risk factors, such as medication use and time since loss, while leveraging protective factors such as education and employment. Future research should employ longitudinal designs to understand long-term impacts and further refine interventions to reduce the emotional toll of the pandemic on physical and psychological well-being.

Funding

None.

Conflict of interest

The authors declare they have no conflicts of interest.

Acknowledgements

Thanks are due to Dr. Alejandro Dominguez-Rodriguez and the team of collaborators of the Duelo COVID platform. The Universidad Autónoma de Ciudad Juárez funded the development of the Duelo COVID Platform to provide support for those who had lost someone to COVID-19 or in the previous six months. The Universidad Autónoma de Ciudad Juárez contributed to the cost of publishing this manuscript through the Professional Teaching Development Program, Advanced Level (PRODEP), sponsored by the Mexican Ministry of Public Education. The funding body had no role in the study design, manuscript writing, or the decision to submit the paper to a specific journal.

REFERENCES

Acosta Quiroz, C. O., Vales García, J. J., Echeverría Castro, S. B., Serrano Encinas, D. M., & García Flores, R. (2013). Psychometric properties of the Quality of Life-Old Questionnaire (WHOQOL-OLD) in Mexican older adults. *Psicología y Salud*, *23*(2), 241–250. https://doi.org/10.25009/pys.v23i2.505

Andrei, F., Mancini, G., Agostini, F., Epifanio, M. S., Piombo, M. A., Riolo, M., Spicuzza, V., Neri, E., Lo Baido, R., La Grutta, S., & Trombini, E. (2022). Quality of Life and Job Loss during the COVID-19 Pandemic: Mediation by Hopelessness and Moderation by Trait Emotional Intelligence. *International Journal of Environmental Research and Public Health*, *19*(5), 2756. https://doi.org/10.3390/ijerph19052756

Beck, A. T., Weissman, A., Lester, D., & Trexler, L. (1974). The Measurement of Pessimism: The Hopelessness Scale. *Journal of Consulting and Clinical Psychology*, *42*(6), 861–865. https://doi.org/10.1037/h0037562

Beck, A. T., & Steer, R. A. (2020). *Hopelessness Scale*. Psychological Corporation.

Berke, D. S., Reidy, D., & Zeichner, A. (2018). Masculinity, emotion regulation, and psychopathology: A critical review and integrated model. *Clinical Psychology Review*, *66*, 106–116. https://doi.org/10.1016/j.cpr.2018.01.004

Breen, L. J., Lee, S. A., & Neimeyer, R. A. (2021). Psychological Risk Factors of Functional Impairment After COVID-19 Deaths. Journal of Pain and Symptom Management, 61(4), e1–e4. https://doi.org/10.1016/j.jpainsymman.2021.01.006

Brenner, M. H., & Bhugra, D. (2020). Acceleration of Anxiety, Depression, and Suicide: Secondary Effects of Economic Disruption Related to COVID-19. *Frontiers in Psychiatry*, *11*, 592467. https://doi.org/10.3389/fpsyt.2020.592467

Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *The Lancet*, *395*(10227), 912–920. https://doi.org/10.1016/s0140-6736(20)30460-8

Chen, C., & Tang, S. (2021). Profiles of grief, post-traumatic stress, and post-traumatic growth among people bereaved due to COVID-19. *European Journal of Psychotraumatology*, *12*(1). https://doi.org/10.1080/20008198.2021.1947563

Conceição, P., & World Inequality Lab. (2019). *Human Development Report 2019: Beyond Income, Beyond Averages, Beyond the Present*. United Nations Development Programme (UNDP). https://es.wikipedia.org/wiki/Informe_sobre_Desarrollo_Humano

Córdova Osnaya, M. (2011). Consistencia interna y estructura factorial de la Escala de Desesperanza de Beck en estudiantes mexicanos. *Revista de Psicología*, *29*(2), 289–309. https://doi.org/10.18800/psico.201102.005

Costa, D. S. J., Mercieca-Bebber, R., Rutherford, C., Tait, M., & King, M. T. (2021). How is quality of life defined and assessed in published research? *Quality of Life Research*, *30*(8), 2109–2121. https://doi.org/10.1007/s11136-021-02826-0

Cui, S., Wang, R., Lu, L., Wang, H., & Zhang, Y. (2019). Influence of Education Level on Mental Health and Medical Coping Modes: A Correlation Analysis in the Elderlies. *American Journal of Nursing Science*, *8*(6), 324. https://doi.org/10.11648/j.ajns.20190806.16

Domènech-Abella, J., Lara, E., Rubio-Valera, M., Olaya, B., Moneta, M. V., Rico-Uribe, L. A., Ayuso-Mateos, J. L., Mundó, J., & Haro, J. M. (2017). Loneliness and depression in the elderly: the role of social network. *Social Psychiatry and Psychiatric Epidemiology*, 52(4), 381–390. https://doi.org/10.1007/s00127-017-1339-3

Dominguez-Rodriguez, A., Martínez-Luna, S. C., Hernández Jiménez, M. J., De La Rosa-Gómez, A., Arenas-Landgrave, P., Esquivel Santoveña, E. E., Arzola-Sánchez, C., Alvarez Silva, J., Solis Nicolas, A. M., Colmenero Guadián, A. M., Ramírez-Martínez, F. R., & Vargas, R. O. C. (2021). A Self-Applied Multi-Component Psychological Online Intervention Based on UX, for the Prevention of Complicated Grief Disorder in the Mexican Population During the COVID-19 Outbreak: Protocol of a Randomized Clinical Trial. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.644782

Eisma, M. C., & Boelen, P. A. (2023). Commentary on: A Call to Action: Facing the Shadow Pandemic of Complicated Forms of Grief. *OMEGA - Journal of Death and Dying*, *87*(1), 334–340. https://doi.org/10.1177/00302228211016227

Eisma, M. C., & Tamminga, A. (2020). Grief Before and During the COVID-19 Pandemic: Multiple Group Comparisons. *Journal of Pain and Symptom Management*, *60*(6), e1–e4. https://doi.org/10.1016/j.jpainsymman.2020.10.004

Eisma, M. C., Tamminga, A., Smid, G. E., & Boelen, P. A. (2021). Acute grief after deaths due to COVID-19, natural causes and unnatural causes: An empirical comparison. *Journal of Affective Disorders*, *278*, 54–56. https://doi.org/10.1016/j.jad.2020.09.049

Forte, G., Favieri, F., Tambelli, R., & Casagrande, M. (2020). The Enemy Which Sealed the World: Effects of COVID-19 Diffusion on the Psychological State of the Italian Population. *Journal of Clinical Medicine*, *9*(6), 1802. https://doi.org/10.3390/jcm9061802

Hacimusalar, Y., Kahve, A. C., Yasar, A. B., & Aydin, M. S. (2020). Anxiety and hopelessness levels in COVID-19 pandemic: A comparative study of healthcare professionals and other community sample in Turkey. *Journal of Psychiatric Research*, *129*, 181–188. https://doi.org/10.1016/j.jpsychires.2020.07.024

Ham, L., Fransen, H. P., van den Borne, B., Hendriks, M. P., van Laarhoven, H. W., van der Padt-Pruijsten, A., Raijmakers, N., van Roij, J., Sommeijer, D. W., Vriens, B. E., van Zuylen, L., & van de Poll – Franse, L. (2021). Bereaved relatives' quality of life before and during the COVID-19 pandemic: Results of the prospective, multicenter, observational eQuiPe study. *Palliative Medicine*, *35*(8), 1502–1507. https://doi.org/10.1177/02692163211034120

Hanna, J. R., Rapa, E., Dalton, L. J., Hughes, R., McGlinchey, T., Bennett, K. M., Donnellan, W. J., Mason, S. R., & Mayland, C. R. (2021). A qualitative study of bereaved relatives' end of life experiences during the COVID-19 pandemic. *Palliative Medicine*, *35*(5), 843–851. https://doi.org/10.1177/02692163211004210

Holland, D. E., Vanderboom, C. E., Dose, A. M., Moore, D., Robinson, K. V., Wild, E., Stiles, C., Ingram, C., Mandrekar, J., Borah, B., Taylor, E., & Griffin, J. M. (2021). Death and Grieving for Family Caregivers of Loved Ones With Life-Limiting Illnesses in the Era of COVID-19. *Professional Case Management*, *26*(2), 53–61. https://doi.org/10.1097/ncm.0000000000000485

Liu, C. H., Stevens, C., Conrad, R. C., & Hahm, H. C. (2020). Evidence for elevated psychiatric distress, poor sleep, and quality of life concerns during the COVID-19 pandemic among U.S. young adults with suspected and reported psychiatric diagnoses. *Psychiatry Research*, *292*, 113345. https://doi.org/10.1016/j.psychres.2020.113345

Macia, K. S., Carlson, E. B., Blonigen, D. M., Lindsay, J., & Cloitre, M. (2024). Change processes associated with functional improvement in a web-based version of Skills Training in Affective and Interpersonal Regulation (webSTAIR) for trauma-exposed veterans. *Journal of Consulting and Clinical Psychology*, *92*(10), 698–710. https://doi.org/10.1037/ccp0000906

Martínez-Sermeño, F., Sheagren, P., & Garduño-Rivera, R. (2025). Life is more satisfying when evaluated as a whole: A principal component analysis of Mexicans' subjective well-being. *Regional Science Policy & Practice*, *17*(2), 100164. https://doi.org/10.1016/j.rspp.2024.100164

Mayland, C. R., Harding, A. J., Preston, N., & Payne, S. (2020). Supporting Adults Bereaved Through COVID-19: A Rapid Review of the Impact of Previous Pandemics on Grief and Bereavement. *Journal of Pain and Symptom Management*, *60*(2), e33–e39. https://doi.org/10.1016/j.jpainsymman.2020.05.012

Mavrogiorgou, P., Fischer, L., Bürgy, M., & Juckel, G. (2025). The phenomenon of despair in patients with depression. *Journal of Psychiatric Research*, *181*, 648–652. https://doi.org/10.1016/j.jpsychires.2024.12.021

Mayland, C. R., Hughes, R., Lane, S., McGlinchey, T., Donnellan, W., Bennett, K., Hanna, J., Rapa, E., Dalton, L., & Mason, S. R. (2021). Are public health measures and individualised care compatible in the face of a pandemic? A national observational study of bereaved relatives' experiences during the COVID-19 pandemic. *Palliative Medicine*, *35*(8), 1480–1491. https://doi.org/10.1177/02692163211019885

McDowell, C. P., Herring, M. P., Lansing, J., Brower, C. S., & Meyer, J. D. (2021). Associations Between Employment Changes and Mental Health: US Data From During the COVID-19 Pandemic. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.631510

Mercader Rubio, I., Sánchez-López, P., Ángel, N. G., & Ruiz, N. F. O. (2022). Psychological Consequences of Fear of COVID-19: Symptom Analysis of Triggered Anxiety and Depression Disorders in Adolescents and Young Adults. *International Journal of Environmental Research and Public Health*, *19*(21), 14171. https://doi.org/10.3390/ijerph192114171

Molero, M. D. M., Pérez Fuentes, M. D. C., Soriano, J. G., Oropesa, N. F., Simón, M. D. M., Sisto, M., & Gázquez, J. J. (2020). Factores psicológicos en situaciones de cuarentena: una revisión sistemática. *European Journal of Health Research*, *6*(1), 109. https://doi.org/10.30552/ejhr.v6i1.206

Ordóñez-Carrasco, J. L., Cuadrado Guirado, I., & Rojas Tejada, A. (2022). Scale of psychological pain: Spanish adaptation of the Psychache Scale in young adults. *Revista de Psiquiatría y Salud Mental* (English Edition), *15*(3), 196–204. https://doi.org/10.1016/j.rpsmen.2022.09.006

Rivera-Rivera, L., Fonseca-Pedrero, E., Séris-Martínez, M., Vázquez-Salas, A., & Reynales-Shigematsu, L. M. (2020). Prevalencia y factores psicológicos asociados con conducta suicida en adolescentes. Ensanut 2018-19. *Salud Pública de México*, *62*(6), 672–681. https://doi.org/10.21149/11555

Rossi, R., Socci, V., Talevi, D., Mensi, S., Niolu, C., Pacitti, F., Di Marco, A., Rossi, A., Siracusano, A., & Di Lorenzo, G. (2020). COVID-19 Pandemic and Lockdown Measures Impact on Mental Health Among the General Population in Italy. *Frontiers in Psychiatry*, *11*. https://doi.org/10.3389/fpsyt.2020.00790

Salisbury, M. R., Harmsen, C. R. W., & Muller, R. T. (2022). Help-Seeking Buffers the Impact of Grief on Quality of Life: A Study of Loss During the COVID-19 Pandemic. *OMEGA - Journal of Death and Dying*, *91*(2), 977–996. https://doi.org/10.1177/00302228221146337

Schalock, R. L., & Verdugo Alonso, M. A. (2013). The impact of the quality of life concept on the field of intellectual disability. In M. L. Wehmeyer (Ed.), *The Oxford Handbook of Positive Psychology and Disability* (pp. 37–48). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780195398786.013.013.0004

Smith, K. J., & Victor, C. (2019). Typologies of loneliness, living alone and social isolation, and their associations with physical and mental health. *Ageing and Society*, 39(8), 1709–1730. https://doi.org/10.1017/S0144686X18000132

Stroebe, M., & Schut, H. (2021). Bereavement in Times of COVID-19: A Review and Theoretical Framework. *OMEGA - Journal of Death and Dying*, *82*(3), 500–522. https://doi.org/10.1177/0030222820966928

Tang, S., Yu, Y., Chen, Q., Fan, M., & Eisma, M. C. (2021). Correlates of Mental Health After COVID-19 Bereavement in Mainland China. *Journal of Pain and Symptom Management*, *61*(6), e1–e4. https://doi.org/10.1016/j.jpainsymman.2021.02.016

Tiger, M., Castelpietra, G., Wesselhoeft, R., Lundberg, J., & Reutfors, J. (2024). Utilization of antidepressants, anxiolytics, and hypnotics during the COVID-19 pandemic. *Translational Psychiatry*, *14*(1). https://doi.org/10.1038/s41398-024-02894-z

Valencia, P. D., Torres-Quispe, M. A., Sánchez-Cayo, S., Reyes-Aguilar, R. F., & Acevedo-Cahuana, A. G. (2022). Factors associated with depressive symptomatology during the COVID-19 pandemic in Mexico: A 2021 national survey. *Journal of Affective Disorders*, *317*, 212–220. https://doi.org/10.1016/j.jad.2022.08.088

Vancappel, A., Aubouin-Bonnaventure, J., El-Hage, W., Fouquereau, E., & Réveillère, C. (2023). Psychological consequences of the COVID-19 pandemic: A qualitative study. *L'Encéphale*, *49*(4), 350–356. https://doi.org/10.1016/j.encep.2022.03.002

Verdery, A. M., Smith-Greenaway, E., Margolis, R., & Daw, J. (2020). Tracking the reach of COVID-19 kin loss with a bereavement multiplier applied to the United States. *Proceedings of the National Academy of Sciences*, *117*(30), 17695–17701. https://doi.org/10.1073/pnas.2007476117

World Health Organization. (2022). *Mental health and COVID-19: Early evidence of the pandemic's impact*. https://www.who.int/publications/i/item/WHO-2019-nCoV-Sci_Brief-Mental_health-2022.1

Wang, Y., Hu, Z., Feng, Y., Wilson, A., & Chen, R. (2020). Changes in network centrality of psychopathology symptoms between the COVID-19 outbreak and after peak. *Molecular Psychiatry*, *25*(12), 3140–3149. https://doi.org/10.1038/s41380-020-00881-6

Wu, T., Jia, X., Shi, H., Niu, J., Yin, X., Xie, J., & Wang, X. (2021). Prevalence of mental health problems during the COVID-19 pandemic: A systematic review and meta-analysis. *Journal of Affective Disorders*, *281*, 91–98. https://doi.org/10.1016/j.jad.2020.11.117

Zhou, S. J., Wang, L. L., Qi, M., Yang, X. J., Gao, L., Zhang, S. Y., Zhang, L. G., Yang, R., & Chen, J. X. (2021). Depression, Anxiety, and Suicidal Ideation in Chinese University Students During the COVID-19 Pandemic. *Frontiers in Psychology*, 12, 669833. https://doi.org/10.3389/fpsyg.2021.669833

ORIGINAL ARTICLE
salud mental
Volume 49, Issue 3, May-June 2026
10.17711/SM.0185-3325.2026.16

Internet-Based Brief Intervention to Reduce Alcohol Consumption in College Students: An Exploratory Randomized Clinical Trial

Daniela Romero Reyes,[1] Juan Antonio Moriano León,[2] José Luis Ybarra Sagarduy[1]

[1] Unidad Académica de Trabajo Social y Ciencias para el Desarrollo Humano, Universidad Autónoma de Tamaulipas, Cd. Victoria, Tamaulipas, México.
[2] Universidad Nacional de Educación a Distancia, Madrid, España.

Correspondence:
Daniela Romero Reyes
Unidad Académica de Trabajo Social y Ciencias para el Desarrollo Humano, Universidad Autónoma de Tamaulipas. Universidad SN Centro Universitario UAT, 87120 Cd. Victoria, Tamaulipas, México.
Phone: +52 (83) 4301-6727
Email: dromero@docentes.uat.edu.mx

Received: 19 June 2024
Accepted: 14 May 2025

Citation:
Romero Reyes, D., Moriano León, J. A., & Ybarra Sagarduy, J. L. (2026). Internet-Based Brief Intervention to Reduce Alcohol Consumption in College Students: An Exploratory Randomized Clinical Trial. *Salud Mental*, *49*(3), 113–124. https://doi.org/10.17711/SM.0185-3325.2026.16

ABSTRACT

Introduction. Hazardous alcohol consumption among university students is a public health issue, which theoretically supported internet-based interventions have proven effective in addressing. **Objective.** To evaluate the effectiveness of an internet-based brief intervention, registered at clinicaltrials.gov as NCT05533554. The intervention was designed using the Theory of Planned Behavior (TPB), based on the hypothesis that alcohol consumption intention and drinking behavior will be lower in the experimental group compared to the control group. **Method.** An experimental design was employed, including an experimental group (*n* = 38) and a control group on a waiting list (*n* = 38), with pre- and post-intervention evaluations conducted a month apart. The control group consisted of 36 participants at the time of receiving the intervention. **Results.** The intervention reduced the number of drinks per occasion in the experimental group. Monthly consumption, number of drinks per occasion, and days of consumption decreased in the at-risk subgroup. The descriptive norm in the experimental group decreased, suggesting that addressing social norms may be related to behavioral changes. The intervention in the control group increased self-efficacy in coping with potential alcohol abuse situations. **Discussion and conclusion.** The internet-based brief intervention was effective in reducing alcohol consumption in the experimental group, particularly the at-risk subgroup. The control group's self-efficacy in dealing with alcohol abuse also increased following the intervention. Further experimental studies are recommended to confirm its effectiveness.

Keywords: University students, alcohol consumption, internet-based brief intervention, Theory of Planned Behavior.

RESUMEN

Introducción. El consumo de alcohol de riesgo entre estudiantes universitarios es un problema de salud pública. Las intervenciones basadas en internet, con respaldo teórico, han demostrado ser eficaces para abordar este problema. **Objetivo.** Evaluar la eficacia de una intervención breve basada en internet, registrada en clinicaltrials.gov como NCT05533554, diseñada según la Teoría del Comportamiento Planificado (TCP), con base en la hipótesis de que la intención de consumo de alcohol y la conducta de consumo serán menores en el grupo experimental en comparación con el grupo control. **Método.** Se empleó un diseño experimental, incluyendo un grupo experimental (*n* = 38) y un grupo control en lista de espera (*n* = 38), con evaluaciones previas y posteriores a la intervención realizadas con un mes de diferencia. El grupo control estaba compuesto por 36 participantes al momento de recibir la intervención. **Resultados.** La intervención redujo el número de bebidas por ocasión en el grupo experimental. El consumo mensual, el número de bebidas por ocasión y los días de consumo disminuyeron en el subgrupo de riesgo. La norma descriptiva en el grupo experimental disminuyó, lo que sugiere que abordar las normas sociales podría estar relacionado con cambios de comportamiento. La intervención en el grupo control aumentó la autoeficacia para afrontar posibles situaciones de abuso de alcohol. **Discusión y conclusión.** La intervención breve por internet fue eficaz para reducir el consumo de alcohol en el grupo experimental, especialmente en el subgrupo de riesgo. La autoeficacia del grupo control para afrontar el abuso de alcohol también aumentó tras la intervención. Se recomiendan estudios experimentales adicionales para confirmar su efectividad.

Palabras clave: Estudiantes universitarios, consumo de alcohol, intervención breve basada en internet, Teoría del Comportamiento Planificado.

INTRODUCTION

Hazardous alcohol consumption among university students represents a significant public health concern (Davoren et al., 2016; Gogeascoechea-Trejo et al., 2021; Hingson et al., 2017; Krieger et al., 2018; Ramírez et al., 2021; Steele et al., 2022; Yi et al., 2017). In Mexico, hazardous consumption is defined as the intake of more than four drinks per occasion for men and more than three for women (Secretaría de Salud, 2019). The potential consequences of hazardous drinking in young adults include physical harm, legal issues, failure to meet academic responsibilities, negative social interactions, and impaired cognitive processing (Almeida-Antunes et al., 2021; Gierski et al., 2020; Krieger et al., 2018; Steele et al., 2022). Preventive measures are therefore crucial, and internet-based interventions have been fundamental in this regard (Bhochhibhoya et al., 2015). In Latin America, interventions have traditionally been conducted face-to-face (Ronzani et al., 2019). However, efforts like those of German-Ponciano et al. (2023), who conducted an online mindfulness-based intervention to address stress, anxiety, depression, and alcohol consumption in university students, are beginning to emerge.

According to Diestelkamp et al. (2021), technology-based prevention includes brief interventions that promote changes in health-related behaviors through websites, applications, SMS messaging, and other technologies such as smartwatches and mobile phones. The concept of cyber interventions, as opposed to traditional face-to-face formats, encompasses internet- and computer-based interventions (Diestelkamp et al., 2021) through websites, computer interventions, and interactive web-based tools (Resko et al., 2017). Internet-based interventions can be offered in guided or automated formats and have proved effective in reducing weekly alcohol consumption and promoting low-risk drinking, with guided interventions having a stronger impact on treatment outcomes than automated ones (Riper et al., 2018). The advantages of these interventions include the perception of confidentiality (Choo et al., 2012; Resko et al., 2017) and the ability to reach students from regions with limited information on alcohol risks (Bedendo et al., 2017; White et al., 2010).

Although there are various internet-based interventions aimed at reducing alcohol consumption in college students, approximately half the interventions reviewed by Tebb et al. (2016) lacked theoretical support in their design. Interventions with theoretical support tend to be more effective (Glanz & Bishop, 2010). Incorporating theory into the design of interventions is essential as it explains the pathways leading to behavior and shows how to modify it (Tebb et al., 2016).

One robust theoretical foundation for developing interventions to modify health-related behaviors is the Theory of Planned Behavior (TPB, Ajzen, 1991; Norman et al., 2018). According to the TPB, behavior is preceded by intention, comprising attitude, subjective norm, and perceived behavioral control. Attitudes are shaped by behavioral beliefs, specifically those concerning the likely outcomes of a behavior and the evaluations of these outcomes. Subjective norms involve normative beliefs, which refer to the perceptions of other people's expectations and the motivation to comply with them. TPB is adaptable and allows for the inclusion of additional normative constructs to enhance its predictive validity. These include moral or personal norms, which reflect a sense of personal obligation or responsibility to engage or otherwise in a particular behavior. Assessing this factor is particularly useful in certain contexts (Ajzen, 1991; Rivis et al., 2009). Another construct is the descriptive norm, reflecting perceptions of what others typically do in a given situation, regardless of whether this behavior is socially approved. For instance, individuals may believe that many of their peers consume alcohol and consider this behavior both normal and acceptable (Burkhart, 2009). Finally, perceived behavioral control is determined by control beliefs, those regarding the presence of factors that may facilitate or inhibit performance of the behavior (Ajzen, 2011). Perceived behavioral control is operationalized through the subdimensions of controllability and/or self-efficacy, depending on the needs of the study (Ajzen, 2002).

Interventions aimed at reducing intentions to consume alcohol should focus on the core constructs of the TPB, as targeting these components can lead to behavioral change (Cooke et al., 2016). Modifying these factors encourages the development of new intentions that can be acted on in specific circumstances (Ajzen, 2011). TPB predictors are assessed indirectly by examining the underlying beliefs that shape them. Beliefs play a critical role in TPB, as they provide the cognitive and affective foundation for attitudes, subjective norms, and perceived behavioral control. Understanding these beliefs is essential for designing effective behavior change interventions (Ajzen, 2019).

To evaluate the effectiveness of interventions grounded in TPB, instruments developed from the same theoretical framework are used to assess the underlying beliefs of the target population. For instance, the instrument developed by Diaz Negrete et al. (2015) for Mexican students measures behavioral beliefs, subjective, personal, and descriptive norms, perceived behavioral control, and the intention to consume alcohol. Instruments assessing TPB constructs separately may also be incorporated. For example, when perceived behavioral control is operationalized as self-efficacy, it can be evaluated using tools such as the one developed by Salazar Garza et al. (2019) to measure the self-efficacy of Mexican youth in situations involving alcohol consumption.

Below is a description of studies that have applied the TPB or its individual constructs in interventions designed to reduce alcohol or drug use, or the intention to engage in these behaviors. Adapting the TPB constructs, Norman et al. (2018) used persuasive messages and implemented intention development strategies to reduce alcohol consumption among college students. After the intervention, young adults consumed fewer units of alcohol, binge drank less frequently and exhibited less harmful consumption patterns during their first six months at university. A decrease in the frequency of excessive consumption has also been reported by other studies using TPB elements in their intervention strategies (Voogt et al., 2014; Neighbors et al., 2009; Neighbors et al., 2012). In Mexico, Rodríguez-Kuri et al. (2011) evaluated the effectiveness of a face-to-face drug prevention program for adolescents, designed based on the TPB. The experimental group showed a statistically significant decrease in their intention to use drugs compared to the control group. According to Marín-Navarrete et al. (2013), conducting randomized clinical trials (RCTs) in Mexico is crucial to identifying effective, culturally appropriate treatments for addiction prevention.

Evidence indicates that rigorous study of internet-based brief interventions through clinical trials is relevant (Marín-Navarrete et al., 2013). These interventions provide a low-cost alternative for educational institutions (Champion et al., 2012; Kaner et al., 2017). They represent a feasible option for addressing hazardous alcohol consumption among young adults, a social problem in Mexico that requires urgent attention due to its adverse consequences (Barrera et al., 2024). The TPB has proven to be a parsimonious theoretical basis for designing brief interventions to reduce alcohol consumption, necessitating experimental tests of these designs (Cooke et al., 2016). The general objective of this study was therefore to test the effectiveness of an internet-based brief intervention, designed using the TPB, to reduce the intention to consume and actual alcohol consumption among young university students in their freshman year.

METHOD

Study design

An experimental methodology was employed, with an experimental group and a control group on a waiting list, with pre- and post-intervention evaluations conducted a month apart.

Participants/ sample description

The study was conducted at the Unidad Académica de Trabajo Social y Ciencias para el Desarrollo Humano (UATSCDH) of the Universidad Autónoma de Tamaulipas (UAT) in Ciudad Victoria, Tamaulipas, Mexico, from January to April 2023. The UAT is the higher education institution with the broadest coverage in the state. According to the National Association of Universities and Higher Education Institutions (2025), during the 2022–2023 academic year, the UAT Victoria campus admitted 1,853 new students, 376 of whom were enrolled at the UATSCDH.

The population consisted of first-year students, considered a vulnerable group due to their transition to a new educational context (Norman et al., 2018). G*Power statistical software was used to calculate the required sample size for each group. This program allows for a priori analyses, such as estimating the sample size (n) required to achieve a desired statistical power given a specific effect size (Cárdenas & Arancibia, 2016). In this study, a two-tailed t-test was used to determine the difference between independent means, an effect size of .80, since in brief online interventions to reduce alcohol consumption in university students, magnitudes of the effect size from moderate $d = .56$ to large $d = .85$ are usually reported (Cronce & Larime, 2011; Samson & Tanner-Smith, 2015). A significance level of .05, and a statistical power of .80 indicated that each group should include at least 26 participants. The final sample consisted of 43 participants in the control group (CG) and 44 in the experimental group (EG). During the intervention follow-up, six participants dropped out of the EG and five withdrew from the CG, resulting in final analyzed samples of EG = 38 and CG = 38.

The overall dropout rate was 12% relative to the randomized sample, an acceptable proportion, as dropout rates exceeding 20% in RCTs may pose a threat to validity (Fewtrell et al., 2008). The follow-up rate was 88%, surpassing the 80% threshold commonly used in evidence-based guidelines to classify RCTs as high quality (Oxford Centre for Evidence-Based Medicine [CEBM], 2009).

The inclusion criteria were being a first- or second-semester student, being between 18 and 29 years old, and participating voluntarily. The exclusion criteria were having a severe mental disorder, and consuming other drugs. Figure 1 shows the flow chart according to CONSORT (Moher et al., 2012). Randomization was conducted using balanced blocks based on sex (male/female) to form the groups. Six blocks of combinations between the letters A and B were initially generated (corresponding to the type of intervention, experimental or control, respectively): 1) AABB, 2) BBAA, 3) ABAB, 4) BABA, 5) ABBA, and 6) BAAB. Groups of four participants were subsequently formed, with each group being randomly assigned a computer-generated number from one to six using Excel. This number represented one of the six sequences of combination blocks. For example, if a group was assigned the number three, its members followed the combination 3) ABAB, and each participant was assigned to one of the two study arms, following the recommendations of Marín-Navarrete et al. (2013). To conceal the random sequence, participants were notified via email of their group assignment on the TEAMS platform without revealing whether they were in the EG or CG. Masking was single-blind, meaning participants were unaware of the trial group to which they had been assigned. Follow-up evaluators remained blinded.

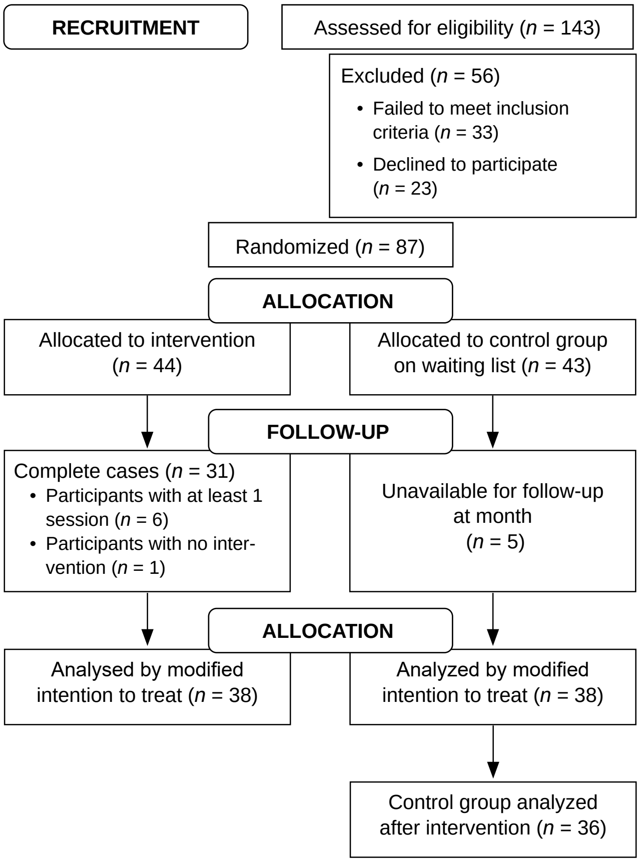


Figure 1. Flow of Participants through the Experiment.

Note: Of the participants unavailable for the 1-month follow-up, seven did not show up for the post-test and four had technical problems with TEAMS.

The intervention

The program consisted of two evaluation sessions (pre- and post-intervention) and two intervention sessions, each lasting 120 minutes, delivered via Microsoft TEAMS. Participants had access to audiovisual materials. TPB constructs, including behavioral beliefs, subjective norm, and self-efficacy, were operationalized, and the most appropriate cognitive-behavioral techniques were chosen to influence them (Michie et al., 2008; Murgraff et al., 2007; Rodríguez Kuri et al., 2011).

In the first session, the objectives were to impact social norms, modify attitudes by reducing the evaluations attributed to the expectations associated with alcohol consumption, and increase perceived behavioral control and self-efficacy to avoid alcohol consumption. The AUDIT-C results of participants were analyzed and compared to the actual consumption of university students to work on social norms. Audiovisual material and persuasive communication were used to address the expectations associated with alcohol use. The physical consequences of risky drinking were reviewed, and the advantages of low-risk drinking identified. Participants chose a low-risk consumption goal and developed an action plan to work on self-efficacy.

In the second session, the objectives were to increase perceived behavioral control and self-efficacy to avoid alcohol consumption, and engage in enjoyable activities as alternatives to risky drinking. Social skills practice was conducted through a behavioral test designed according to the guidelines of Caballo (2007) designed to help participants generate assertive communication strategies to resist the pressure to drink alcohol, thereby working on self-efficacy. Finally, participants were asked to create a list of enjoyable activities.

From August to December 2022, a pilot project was conducted to test the randomized trial procedure. Based on the results, protocol adaptations were considered, the range of participating students was expanded, and the quality of audiovisual materials was improved.

Measurements

Sociodemographic Data Questionnaire: developed ad hoc by the researchers to collect information for sample description. Data requested included sex, age, marital status, degree, semester, living arrangements, employment, diagnosed mental disorders, and drug use. Prior to randomization, affirmative responses to items regarding the presence of a mental disorder diagnosis and/or other drug use allowed us to identify participants who failed to meet the inclusion criteria.

Alcohol Use Disorders Identification Questionnaire (AUDIT; Saunders et al., 1993*):* A widely used instrument, validated in Mexico (Medina-Mora et al., 1998), showing good internal consistency (.92) among students (Moral et al., 2017). It identifies hazardous, harmful consumption and possible alcohol dependence through 10 items, each scored from 0 to 4. Scores of eight or more indicate harmful consumption. AUDIT-C, comprising the first three items of AUDIT, defines hazardous consumption as scores of five or more in men and four or more in women (García et al., 2016).

*TPB for Alcohol Consumption Questionnaire (*Diaz Negrete et al., 2015 *based on* Rodríguez-Kuri et al., 2007*):* A scale designed in Mexico based on Rodríguez-Kuri et al. (2007), showing good reliability (.96) among Mexican students (Diaz Negrete et al., 2015). It includes 25 items evaluating behavioral beliefs (expectations regarding alcohol), two items on subjective norms, one on personal norms, one on descriptive norms, five on perceived behavioral control, and three on intention to consume alcohol.

*Brief Situational Confidence Questionnaire for Young Mexican University Students (*Salazar Garza et al., 2019*):* This scale measures self-efficacy regarding students' perception of their ability to effectively cope with alcohol consumption situations. It consists of four items and has been validated among Mexican university students, with a reliability of .78.

*LIBARE Retrospective Baseline (*Sobell & Sobell, 1992*):* A calendar-based instrument where participants calculate the number of standard drinks consumed each day over a specified period ranging from seven days to one year (Almaraz & Alonso, 2018; Del Boca and Darkes, 2003). In this study, the period analyzed was three months before the intervention. Variables measured included the monthly average number of drinks, drinks per occasion, and days of consumption. LIBARE has shown test-retest reliability (≥ .87) in Canadians (Sobell et al., 1986) and .91 reliability in the version adapted for the Mexican population (Echeverría & Ayala, 1997). In Mexico, it has been used to evaluate online interventions for youth alcohol and drug use (Bravo-Alcocer et al., 2024; Stepanov & Cárdenas, 2022).

Procedure

The study protocol was approved by the university ethics committee (project approval number: 117) and registered at https://register.clinicaltrials.gov/ with the following code: NCT05533554. The academic department authorized the implementation of the study, with recruitment taking place in January and February 2023. A total of 143 students were invited to participate and received the pre-intervention evaluation. Two trained psychologists were responsible for the invitations, recruitment, and evaluations. Participants were informed by email of their assignment to the corresponding group on the Microsoft TEAMS platform and invited to attend the Computer Laboratory where the intervention was delivered. The CG received the intervention a week after the EG had completed the program.

Statistical analysis

A valid, reliable RCT requires careful sample planning, randomization of participants, and a well-defined statistical analysis strategy (Marín-Navarrete et al., 2013). The JAMOVI 2.6.44 program was used to obtain the reliability coefficients of the scales used in this study, and SPSS 25 was used for the rest of the statistical analyses. Descriptive analyses of pre- and post-intervention evaluations were conducted for the EG and CG. To test the normality of the distribution of the variables of interest, the Shapiro–Wilk goodness-of-fit test was administered, since the EG and GC comprised $n < 50$ participants. The results were statistically significant ($p < .05$), prompting the decision to use non-parametric tests for inferential analyses.

In the implementation of RCTs, losses may occur after randomization. However, the most widely recommended analytical approach remains the intention-to-treat (ITT) principle, whereby all randomized participants are included in the final analysis. Nevertheless, adherence to this approach is not always clearly reported (Gravel et al., 2007; Khan et al., 2021). Alternatively, the modified intention-to-treat (mITT) approach allows for certain justified exclusions (Sainani, 2010), such as participants who were not evaluated after the study began or were lost to follow-up. Montedori et al. (2011) found that the methodological quality of mITT studies was comparable to that of ITT trials. However, the authors emphasized the need for further research into the potential biases associated with mITT and recommended adherence to the updated Consolidated Standards of Reporting Trials (CONSORT) guidelines. These guidelines suggest replacing generic references to intention-to-treat analysis with a clear, concise explanation of which participants were included in the analysis (Schulz et al., 2010).

The modified intention-to-treat (mITT) analysis strategy was used to analyze and interpret the data. In this study, participants who did not return for the follow-up evaluation were excluded from the analysis (EG = 6, CG = 5). To compare differences between the EG and CG at the pre-intervention baseline, chi-square (χ^2) was used for the sociodemographic variables, and the Mann-Whitney U test was used for the variables of interest.

The Mann-Whitney U test was used to determine intergroup differences in low- and high-risk subgroups and the Wilcoxon T test was employed to identify intragroup differences . Pre- and post-intervention differences in the CG after administering the intervention were also evaluated using the Wilcoxon T test. Since the probability of significance by chance increases when multiple comparisons are made, a conservative alternative is to use the Bonferroni correction (Dagnino, 2014). The alpha was therefore adjusted to $p < .004$ (.05/12 measurements: AUDIT-C, LIBARE—number of drinks, drinks per occasion, days of consumption, TPB Questionnaire, Brief Situational Confidence Questionnaire pre/post) in this study to consider a statistically significant difference.

Ethical considerations

The research adhered to international standards, including the Declaration of Helsinki (World Medical Association [WMA], 2017) and the Americas Document of Good Clinical Practices (Pan American Health Organization [PAHO], 2005), The protocol was approved by the Research and Ethics Committee of the Unidad Académica Multidisciplinaria UAT at Matamoros (project approval number117) and registered at https://register.clinicaltrials.gov/ with code NCT05533554. Participants were informed of the purpose of the study, asked to provide written informed consent, and assured that participation was voluntary, that they could withdraw from the study at any time without consequences, and that their confidentiality would be maintained.

RESULTS

The psychometric quality of the scales used in this sample in the pre-intervention assessment was measured using Cronbach's alpha and McDonald's ω coefficients. The results were: AUDIT (α = .79, ω = .81), AUDIT C (α = .85, ω = .87), TPB for Alcohol Consumption Questionnaire (α = .92, ω = .94), and Brief Situational Confidence Questionnaire (α = .89, ω = .89). The correlation between AUDIT and LIBARE (average monthly drinks, drinks per drinking occasion, and number of drinking days) using Spearman's correlation was rho = .72 (*p* < .001), rho = .68 (*p* < .001), and rho = .71 (*p* < .001), respectively.

In the post-intervention evaluation, the reliability coefficients of the instruments were as follows: AUDIT (α = .87, ω = .90), AUDIT C (α = .83, ω = .84), TPB for Alcohol Consumption Questionnaire (α = .93, ω = .96), and Brief Situational Confidence Questionnaire (α = .96, ω = .96). The AUDIT-LIBARE correlation (monthly average number of drinks, drinks per drinking occasion and number of days of consumption), using the Spearman correlation were rho = .62 (*p* < .001), rho = .61 (*p* < .001) and rho = .60 (*p* < .001) respectively.

Participants had a mean age of 19.1 years (*SD* = 2.11) in the EG and of 19.05 (*SD* = 1.50) in the CG. Most participants in the EG and CG were female, 60.5% and 55.3%, respectively. The comparison of sociodemographic variables showed that the groups were homogenous in this respect (see Table 1).

Participants lost to follow-up were compared with those who completed the study within each group, with no significant differences being found in their baseline alcohol consumption as measured by AUDIT. The Mann-Whitney U test was used for these comparisons. In the experimental group, six participants were lost to follow-up (Mdn = 2.5, Range = 4) and 38 completed the study (Mdn = 1, Range = 14). The difference was not statistically significant, *z* = -1.39, *U* = 103.00, *p* = .72. In the control group, five participants were lost to follow-up (Mdn = 3, Range = 15) and 38 completed the study (Mdn = 1, Range = 17), with no significant difference either: *z* = -1.26, *U* = 64.50, *p* = .23. According to the Mann-Whitney *U* test, results for age and variables of interest, the groups were equivalent. The Bonferroni correction *p* < .004 (Dagnino, 2014) was applied to obtain a statistically significant difference (See Table 2).

Intergroup comparisons using the Mann-Whitney U test revealed no statistically significant differences in EG participants compared to the CG. Subgroup analysis was then performed: low risk (score 0 to 3) and at risk (score > 4) according to AUDIT-C. In the post-evaluation, no differences were found between the EG and CG in the low-risk subgroup. In the risk subgroup post-evaluation, the number of standard drinks per month, drinks per occasion, and days of consumption in the EG showed a statistically significant decrease compared to the CG, with a high effect size (see Table 3).

A pre-post intragroup comparison was performed to observe the effects of treatment in the EG compared to the CG . Statistically significant differences were found in the

Table 1
Characteristics of the study sample

	EG (n = 38)	*CG (n = 38)*		
Variables	*f (%)*	*f (%)*	χ^2	*p*
Sex				
Female	23(60.5)	21(55.3)	.216	.40
Male	15(39.5)	17(44.7)		
Civil status				
Single	37(97.4)	37(97.4)	2.000	.36
Married	1(2.6)	0(0)		
Living together	0(0)	1(2.6)		
Lives with				
Parents	33(86.8)	37(97.4)	6.229	.10
Spouse or partner	0(0)	1(2.6)		
Alone	2(5.3)	0(0)		
Other	3(7.9)	0(0)		
Financial support				
Parents	34(89.5)	33(86.8)	3.301	.19
Themselves	2(5.3)	5(13.2)		
Others	2(5.3)	0(0)		
Employed				
Yes	4(10.5)	8(21.1)	1.583	.17
No	34(89.5)	30(78.9)		
Monthly family income				
Less than two minimum wages	18(47.4)	13(34.2)	3.113	.53
From 2 to 3 minimum wages	13(34.2)	18(47.4)		
From 4 to 5 minimum wages	5(13.2)	3(7.9)		
From 6 to 7 minimum wages	1(2.6)	3(7.9)		
From 8 to 9 minimum wages	1(2.6)	1(2.6)		

Note: EG = Experimental group; CG = Control group; χ^2 = Chi–square; *p* = statistical significance.

Table 2
Comparison of pre-intervention variables

	EG (n = 38)	*CG (n = 38)*		
Variables	*Mdn (Range 0-25)*	*Mdn (Range 0-54)*	*U*	*p*
Age	$\bar{x}$ = 19.1 *SD* (2.11)	$\bar{x}$ = 19.05 *SD* (1.50)	690.5	.72
AUDIT	1(14)	1(17)	698	.8
AUDIT-C	1(8)	1(8)	692	.74
Number of drinks (previous month)	.17(25)	0(54)	713.5	.92
Drinks by occasion	.50(10)	0(17)	683.5	.66
Days of consumption	.17(4)	0(9)	721	.99
Expectations regarding alcohol	.06(3)	0.58(3)	564	.09
Subjective norm	.50(3)	1.25(3)	531.5	.04
Personal norm	3(4)	3(5)	717.5	.96
Descriptive norm	2(4)	1(5)	537.5	.05
PBC abstinence	4(4)	4(6)	664	.49
PBC consumption	2(3)	1.83(3)	701.5	.83
Intention to consume	.67(4)	.83(3)	714.5	.94
Situational confidence	2(2)	2(1)	603	.1

Note: EG = Experimental group; CG = Control group; $\bar{x}$ = Mean; *SD* = Standard deviation; *U* = Mann-Whitney U; PBC = Perceived Behavioral Control; *p* = statistical significance.

number of standard drinks per occasion. The post-measurement score (Mdn = 0; range = 6) was lower than the pre-measurement score (Mdn = .5; range = 10) in the EG, compared to the CG, with a moderate effect size (Rosenthal *r* = .52). A lower score was found in the descriptive norm of the EG in favor of the intervention (see Table 4).

DISCUSSION AND CONCLUSION

This study aimed to reduce the intention of and actual alcohol consumption among university students through an internet-based brief intervention. The contribution of this work lies in its design, which is supported by the TPB.

Table 3

Differences between receiving treatment and not-at-risk subgroup

	Brief Intervention						
	Without n = 5	*With n = 6*					
Variables	*Average range*	*Average range*	*Z*	*U*	*P*	*Rosenthal's r*	*CI 95%*
Number of drinks (previous month)	9	3.5	-2.986*	0	.004	-0.9	-1.18 – -.61
Drinks by occasion	9	3.5	-2.986*	0	.004	-0.9	-1.18 – -.61
Days of consumption	9	3.5	-3.019*	0	.004	-0.91	-1.18 – -.64

Note: U = Mann-Whitney U; *p* = statistical significance; * Statistically significant at the < .05 level. 95% confidence intervals. The risk subgroup consisted of five participants from the CG and six from the EG who had a score > 4 according to AUDIT-C.

Table 4

Comparison of Pre- and Post-intervention Variables with Wilcoxon T-test

	Pre	*Post*				
Variables	*Mdn (range)*	*Mdn (range)*	*Z*	*p*	*Rosenthal's r*	*CI 95%*
Experimental group (*n* = 38)						
Number of drinks (previous month)	.17(25)	0(10)	-1.271	.2	-.21	-.53 – .11
Drinks by occasion	.5(10)	0(6)	-3.231**	.001	-.52	-.80 – -.24
Days of consumption	.17(4)	0(4)	-1.071	.28	-.17	-.49 – .14
Intention to consume	.67(4)	0(4)	-2.38	.017	-.38	-.68 – .08
Expectations regarding alcohol	.06(3)	.02(4)	-.325	.74	-.05	-.37 – .27
Subjective norm	.5(3)	.25(3)	-.747	.45	-.12	-.44 – .20
Personal norm	3(4)	3(4)	-.481	.63	-.07	-.40 – .24
Descriptive norm	2(4)	1(4)	-3.046*	.002	-.49	-.77 – -.21
PBC consumption	2(3)	2.17(3)	-.642	.52	-.10	-.42 – .22
PBC abstinence	4(4)	4(4)	-1.26	.2	-.20	-.52 – .11
Situational confidence	2(2)	2(3)	-1.489	.13	-.24	-.55 – .07
Control group (*n* = 38)						
Number of drinks (previous month)	0(54)	0(36)	-1.438	.15	-.23	-.55 – .08
Drinks by occasion	0(17)	0(18)	-.741	.45	-.12	-.44 – .20
Days of consumption	0(9)	0(5)	-.852	.39	-.13	-.46 – .18
Intention to consume	.83(3)	.33(4)	-.057	.95	0	-.33 – .31
Expectations regarding alcohol	.58(3)	.18(2)	-2.515	.01	-.40	-.70 – -.11
Subjective norm	1.25(3)	.50(4)	-2.525	.01	-.41	-.70 – -.11
Personal norm	3(5)	3(4)	-.977	.32	-.15	-.48 – .16
Descriptive norm	1(5)	1(4)	-.918	.35	-.14	-.47 – .17
PBC consumption	1.83(3)	2(3)	-.043	.96	0	-.33 – .32
PBC abstinence	4(6)	4(4)	-.101	.91	-.01	-.34 – .31
Situational confidence	2(1)	2(2)	0	1	0	-.32 – .32

Note: Mdn = median; PBC = Perceived Behavioral Control; p = statistical significance; * Statistically significant at the < .05 level. ** Statistically significant at the < .001 level. 95% confidence intervals.

Tebb et al. (2016) emphasize the need to use theories in designing online interventions, as they explain the pathways leading to behavior and guide its modification. In this case, the intervention achieved behavioral changes, with significant differences being observed in the number of drinks per occasion in the EG compared to the CG in the intragroup analysis. Subgroup analysis showed decreases in monthly consumption, number of drinks per occasion, and days of consumption in the risk group.

The results of this study are consistent with other web-based interventions where beverage intake decreased, the difference being that follow-up was at six months (Norman et al., 2018; Voogt et al., 2014). The practical implications of these results are that a brief two-session group intervention is available. As recommended by other authors like Salazar et al. (2024), short formats favor student retention in clinical trials on alcohol consumption, although sessions could be increased to analyze their effect on TPB variables such as attitude. Furthermore, the study results showed a decrease in drinks per occasion in the experimental group, which may protect young adults from adverse consequences (Almeida-Antunes et al., 2021; Gierski et al., 2020; Krieger et al., 2018; Steele et al., 2022), promote stress reduction, increase self-confidence, and improve quality of life (Charlet & Heinz, 2017).

Another significant aspect of the study is that it managed to reduce monthly consumption, the number of standard drinks per occasion, and the days of consumption in the subgroup of young adults with hazardous consumption. Hazardous consumption increases the likelihood of adverse consequences for the individual, including medical, psychiatric, familial, and/or social issues (Krieger et al., 2018). Accessing groups with hazardous alcohol consumption for participation and maintenance in interventions is typically challenging (Salazar et al., 2024). However, the relevance of this proposal lies in its integration of young adults with varying levels of consumption, allowing students with hazardous consumption to benefit from the content of the intervention without exposing themselves to the stigma associated with mental health (Lee & Shin, 2022; Tembo et al., 2017). Nevertheless, the small sample size means that the effect sizes achieved should be interpreted with caution.

The descriptive norm decreased in the post-evaluation of the EG compared to the CG. Descriptive norms refer to the belief that most peers consume alcohol and that this behavior is both normal and socially acceptable. These perceptions lead young people to overestimate the prevalence of drinking among their peers and predict substance use. Consumption is therefore influenced by erroneous descriptive norms, which can be addressed (Burkhart, 2009). A strategic component of the intervention plan was for participants to distinguish between their consumption and the perception of others' consumption, using information about their peers' actual consumption to adjust their perceptions. This adjustment could be reflected in a lower descriptive norm score. This change is significant because social norms methods have substantial effects on consumption and reduce long-term alcohol problems (Burkhart, 2009).

In the control group that received the intervention, young adults showed increased perceived behavioral control towards abstinence and situational confidence after the intervention, consistent with the findings of Salazar-Garza et al. (2012) and Alonso-Castillo et al. (2013). Self-efficacy protects against excessive alcohol consumption (Chomsri et al., 2018; Foster et al., 2014), meaning that people confident in their ability to abstain from drinking are likely to drink less than those who are insecure (Foster et al., 2014). Self-efficacy inversely predicts alcohol consumption (Adamson et al., 2009), supporting the use of strategies that increase self-efficacy in interventions aimed at moderating alcohol consumption (Cooke et al., 2016; DiBello et al., 2019). Moreover, another study found that favorable attitudes and self-efficacy towards moderating alcohol consumption were prospectively associated with a reduction in alcohol consumption and alcohol-related problems (DiBello et al., 2019).

Although efforts were made to adhere to the recommendations of the CONSORT guidelines (Schulz et al., 2010), this study has significant limitations that should be considered when critically interpreting findings. First, due to the nature of this type of design, the initial participant sample, prior to randomization, was obtained through non-probabilistic sampling. However, participants were recruited from one of the academic units of the Universidad Autónoma de Tamaulipas (UAT) with the highest student enrollment, making it a typical purposive sample for studies of this kind Bravo-Alcocer et al., 2024; Hernández et al., 2014; Voogt et al., 2014). Although the sampling procedure was not random, the assignment of participants to experimental and control groups was randomized. Additionally, sample size was calculated using a statistical procedure that considered the expected effect size to determine the appropriate number of participants per group. Although the results cannot be generalized to all university students, they can be compared with those from populations with similar demographic and contextual characteristics.

Another limitation concerns participant attrition during follow-up, a common issue in randomized trials (Akl et al., 2021; Fewtrell et al., 2008). In response to this, the data were analyzed using a modified intention-to-treat (mITT) approach, which excluded participants who did not complete follow-up assessments. Although this method may introduce bias, efforts were made to comply with CONSORT guidelines (Schulz et al., 2010) by providing a clear description of participant flow, reasons for attrition, and the number of cases excluded from the analysis.

Moreover, participants lost to follow-up were compared with those who completed the study within each group, and no significant differences were found in their baseline alcohol consumption characteristics. This provides some assurance that the participants retained in the analysis did not substantially differ from those who dropped out. As Akl et al. (2012) note, when individuals lost to follow-up present a less favorable baseline profile, they may have worse outcomes, potentially introducing bias. In this study, although some attrition occurred, the number of randomized participants exceeded the target sample size, and the final sample maintained sufficient statistical power for the planned analyses.

Self-reported data present both advantages and limitations. Contextual and environmental factors, such as cultural norms, the assessment setting, and immediate interpersonal dynamics, can influence participants' responses and increase the risk of social desirability bias (del Boca & Darkes, 2003). This is particularly relevant in studies addressing sensitive topics such as substance use, violence, and abuse (del Valle & Zamora, 2021). To minimize this potential bias, all the instruments in this study were self-administered online by participants, thereby promoting confidentiality. Moreover, online evaluations conducted with proper planning and execution can provide data equal to or better than traditional paper evaluations (Chang & Vowles, 2013).

Anonymity and confidentiality have been shown to enhance the validity of self-reports on alcohol consumption by reducing the perceived risk of negative consequences (Langenbucher & Merrill, 2001). Participants were therefore encouraged to respond sincerely through the informed consent process and instrument instructions, which underlined the fact that their anonymity would be fully protected. Evidence suggests that anonymous self-reports increase the likelihood of honest responses, particularly in relation to stigmatized behaviors (del Valle & Zamora, 2021).

Assessing alcohol consumption over extended periods can lead to measurement errors due to memory deficits (Gmel & Daeppen, 2007). The LIBARE instrument was used, which has shown adequate test-retest reliability in the Mexican population (Echeverría & Ayala, 1997). Limited monitoring time points may not accurately capture the changing nature of consumption on specific calendar dates (Voogt et al., 2014), which is why future studies should monitor over longer periods ranging from six to 12 months.

While no single measure of alcohol consumption is ideal for all contexts or populations, this study employed validated instruments with solid psychometric properties. In particular, the LIBARE calendar has demonstrated validity in helping participants accurately recall drinking episodes and report consumption across specific time intervals (del Boca & Darkes, 2003). Despite their inherent limitations, self-report tools have shown acceptable levels of reliability and validity, and remain non-invasive, cost-effective methods for assessing alcohol use (del Boca & Darkes, 2003; del Valle & Zamora, 2021). All the limitations outlined above should be considered when interpreting the results of this study, and caution should be exercised when generalizing the findings to adolescents, students from private institutions, or out-of-school youth.

In conclusion, the intervention effectively reduced the number of drinks per occasion, monthly alcohol consumption, and frequency of drinking among participants in the at-risk group. This suggests that individuals with higher initial risk levels benefitted from the intervention content without being exposed to the stigma often associated with mental health treatment (Lee & Shin, 2022; Tembo et al., 2017), as they participated alongside individuals with varying levels of consumption. Moreover, a decrease in perceived descriptive norms was observed in the experimental group, indicating that targeting social norms may contribute to behavioral change. This adjustment in self-perception is noteworthy, as interventions addressing normative beliefs have shown long-term effectiveness in reducing alcohol-related problems (Burkhart, 2009). Nevertheless, the results observed in the experimental and at-risk subgroups should be interpreted with caution, considering the constraints related to participant attrition, potential measurement biases, and the limited generalizability to populations similar to the one studied.

The intervention applied to the control group was also associated with increased self-efficacy in managing situations involving potential alcohol misuse. This supports the integration of self-efficacy-enhancing strategies in the design of alcohol reduction programs, given the well-established association between higher self-efficacy and decreased alcohol use and related problems (DiBello et al., 2019). As a future research direction, confirmatory trials of this intervention are recommended, ideally incorporating an increased number of sessions and follow-up assessments at three, six, and 12 months, to better evaluate its long-term effects and risk–benefit profile.

Financing

None.

Conflict of interests

The authors declare that they have no conflicts of interest.

Acknowledgments

Thanks are due to the students who participated in the intervention, to Marissa Sánchez Ávalos, Mayrán Anahí López Mendoza, and Nallely Berenice Camacho Olvera for their valuable collaboration in the application of the intervention, and to Jesús Antonio Martínez Salazar for his support with the linguistic review.

REFERENCES

Adamson, S. J., Sellman, J. D., & Frampton, C. M. (2009). Patient predictors of alcohol treatment outcome: A systematic review. *Journal of Substance Abuse Treatment, 36*(1), 75–86. https://doi.org/10.1016/j.jsat.2008.05.007

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-t

Ajzen, I. (2002). Perceived Behavioral Control, Self-Efficacy, Locus of Control, and the Theory of Planned Behavior1. *Journal of Applied Social Psychology*, *32*(4), 665–683. https://doi.org/10.1111/j.1559-1816.2002.tb00236.x

Ajzen, I. (2011). Design and evaluation guided by the theory of planned behavior in M.M., Mark, S.I., Donaldson, & B., Campbel (Ed.), *Social Psychology and Evaluation* (pp. 74–100). Guilford Publications.

Ajzen, I. (2019). *Constructing a TPB questionnaire: conceptual and methodological considerations*. Universidad de Massachusetts Amherst. http://www.people.umass.edu/aizen/

Akl, E. A., Briel, M., You, J. J., Sun, X., Johnston, B. C., Busse, J. W., Mulla, S., Lamontagne, F., Bassler, D., Vera, C., Alshurafa, M., Katsios, C. M., Zhou, Q., Cukierman-Yaffe, T., Gangji, A., Mills, E. J., Walter, S. D., Cook, D. J., Schunemann, H. J., Altman, D. G., & Guyatt, G. H. (2012). Potential impact on estimated treatment effects of information lost to follow-up in randomised controlled trials (LOST-IT): systematic review. *BMJ*, *344*(may18 1), e2809–e2809. https://doi.org/10.1136/bmj.e2809

Almaraz, C. D. A., & Alonso, C. M. M. (2018). Consejo Breve y Atención Plena para dejar de fumar: un estudio de caso. *Health and Addictions/Salud y Drogas*, *18*(2), 91–100. https://doi.org/10.21134/haaj.v18i2.376

Almeida-Antunes, N., Crego, A., Carbia, C., Sousa, S. S., Rodrigues, R., Sampaio, A., & López-Caneda, E. (2021). Electroencephalographic signatures of the binge drinking pattern during adolescence and young adulthood: A PRISMA-driven systematic review. *NeuroImage: Clinical*, *29*, 102537. https://doi.org/10.1016/j.nicl.2020.102537

Alonso Castillo, M. M., Esparza Almanza, S. E., López García, K. S., Rodríguez Aguilar, L., Guzmán Facundo, F. R., & Alonso Castillo, M. T. D. J. (2013). Prevención de consumo de drogas y fortalecimiento de conductas saludables en jóvenes de preparatoria. *Ciencia UANL*, *16*(62), 56-67. http://eprints.uanl.mx/3212/1/8ArticulodelasDrogas.pdf

Barrera, Y. B., Briones, N. G. P., Ortiz, P. M. T., Reyes, B. J. L., Sánchez, E. R., & Argüello, E. J. (2024). Predictive Factors for Suicidal Behaviors among University Students in the North-Central Region of Mexico. *Salud Mental*, *47*(2), 81–87. https://doi.org/10.17711/sm.0185-3325.2024.011

Bedendo, A., Andrade, A. L. M., Opaleye, E. S., & Noto, A. R. (2017). Binge drinking: a pattern associated with a risk of problems of alcohol use among university students. *Revista Latino-Americana de Enfermagem*, *25*. https://doi.org/10.1590/1518-8345.1891.2925

Bhochhibhoya, A., Hayes, L., Branscum, P., & Taylor, L. (2015). The Use of the Internet for Prevention of Binge Drinking Among the College Population: A Systematic Review of Evidence. *Alcohol and Alcoholism*, *50*(5), 526–535. https://doi.org/10.1093/alcalc/agv047

Bravo-Alcocer, O., Martínez-Martínez, K. I., Oropeza-Tena, R., & Colunga-Rodríguez, C. (2024). Tratamiento cognitivo-conductual grupal en línea para jóvenes con abuso de drogas. *Psicología y Salud*, *34*(2), 225–234. https://doi.org/10.25009/pys.v34i2.2904

Burkhart, G. (2009). Creencias normativas en estrategias preventivas: una espada de doble filo. Efectos de la percepción de normas y normalidad en campañas informativas, programas escolares y medidas ambientales. *Revista Española de Drogodependencias*, *34*(4), 376-400. http://hdl.handle.net/10550/22436

Caballo, V. E. (2007). *Manual de evaluación y entrenamiento de habilidades sociales* (7th ed.). Siglo XXI.

Cárdenas, M., & Arancibia, H. (2016). Statistical power and effect size calculating in G* Power: Complementary analysis of statistical significance testing and its application in psychology. *Salud & Sociedad*, *5*(2), 210–244. https://doi.org/10.22199/S07187475.2014.0002.00006

Centre for Evidence-Based Medicine (2009). *Oxford Centre for Evidence-Based Medicine: Levels of Evidence (March 2009).* https://www.cebm.ox.ac.uk/resources/levels-of-evidence/oxford-centre-for-evidence-based-medicine-levels-of-evidence-march-2009

Champion, K. E., Newton, N. C., Barrett, E. L., & Teesson, M. (2012). A systematic review of school-based alcohol and other drug prevention programs facilitated by computers or the Internet. *Drug and Alcohol Review*, *32*(2), 115–123. https://doi.org/10.1111/j.1465-3362.2012.00517.x

Chang, T. Z. D., & Vowles, N. (2013). Strategies for improving data reliability for online surveys: A case study. *International Journal of Electronic Commerce Studies*, *4*(1), 121-130. https://doi.org/10.7903/ijecs.1121

Charlet, K., & Heinz, A. (2017). Harm reduction-a systematic review on effects of alcohol reduction on physical and mental symptoms. *Addiction Biology*, *22*(5), 1119–1159. https://doi.org/10.1111/adb.12414

Chomsri, P., Likhitsathian, S., Aramrattana, A., & Siviroj, P. (2018). Self-efficacy, sensation seeking, right attitude, and readiness to change among alcohol drinkers in a Thai vocational school. *Addictive Behaviors Reports*, *8*, 107–112. https://doi.org/10.1016/j.abrep.2018.08.006

Choo, E. K., Ranney, M. L., Aggarwal, N., & Boudreaux, E. D. (2012). A Systematic Review of Emergency Department Technology-based Behavioral Health Interventions. *Academic Emergency Medicine*, *19*(3), 318–328. https://doi.org/10.1111/j.1553-2712.2012.01299.x

Cooke, R., Dahdah, M., Norman, P., & French, D. P. (2016). How well does the theory of planned behaviour predict alcohol consumption? A systematic review and meta-analysis. *Health Psychology Review*, *10*(2), 148–167. https://doi.org/10.1080/17437199.2014.947547

Cronce, J. M., & Larimer, M. E. (2011). Individual-focused approaches to the prevention of college student drinking. *Alcohol research & health: the journal of the National Institute on Alcohol Abuse and Alcoholism*, *34*(2), 210–221. https://pmc.ncbi.nlm.nih.gov/articles/mid/NIHMS353685/

Dagnino, J. (2014). Comparaciones múltiples. *Revista Chilena de Anestesia*, *43*(1), 311–312. https://revistachilenadeanestesia.cl/PII/revchilanestv43n04.08.pdf

Davoren, M. P., Demant, J., Shiely, F., & Perry, I. J. (2016). Alcohol consumption among university students in Ireland and the United Kingdom from 2002 to 2014: a systematic review. *BMC Public Health*, *16*(1). https://doi.org/10.1186/s12889-016-2843-1

Del Boca, F. K., & Darkes, J. (2003). The validity of self-reports of alcohol consumption: state of the science and challenges for research. *Addiction*, *98*(s2), 1–12. https://doi.org/10.1046/j.1359-6357.2003.00586.x

Del Valle, M., & Zamora, E. (2021). El uso de las medidas de autoinforme: ventajas y limitaciones en la investigación en Psicología. *Alternativas en Psicología*, *47*(8), 22–35. https://ri.conicet.gov.ar/handle/11336/173600

Diaz Negrete, D. B., Arellanez Hernández, J. L., Rodríguez Kuri, S. E., & Fernández Cáceres, C. (2015). Comparación de Tres Modelos de Riesgo de Uso Nocivo de Alcohol en Estudiantes Mexicanos. *Acta de Investigación Psicológica*, *5*(2), 2047–2061. https://doi.org/10.1016/s2007-4719(15)30022-3

DiBello, A. M., Miller, M. B., & Carey, K. B. (2019). Self-Efficacy to Limit Drinking Mediates the Association between Attitudes and Alcohol-Related Outcomes. *Substance Use & Misuse*, *54*(14), 2400–2408. https://doi.org/10.1080/10826084.2019.1653322

Diestelkamp, S., Schulz, A., & Thomasius, R. (2021). Technologiebasierte Interventionen zur Alkoholprävention bei Kindern und Jugendlichen. *Bundesgesundheitsblatt - Gesundheitsforschung - Gesundheitsschutz*, *64*(6), 714–721. https://doi.org/10.1007/s00103-021-03338-5

Echeverría, L., & Ayala, H. E. (1997). *Auto registro del consumo de alcohol y otras drogas: traducción y adaptación*. Universidad Nacional Autónoma de México.

Fewtrell, M. S., Kennedy, K., Singhal, A., Martin, R. M., Ness, A., Hadders-Algra, M., Koletzko, B., & Lucas, A. (2008). How much loss to follow-up is acceptable in long-term randomised trials and prospective studies? *Archives of Disease in Childhood*, *93*(6), 458–461. https://doi.org/10.1136/adc.2007.127316

Foster, D. W., Neighbors, C., & Young, C. M. (2014). Drink refusal self-efficacy and implicit drinking identity: An evaluation of moderators of the relationship between self-awareness and drinking behavior. *Addictive Behaviors*, *39*(1), 196–204. https://doi.org/10.1016/j.addbeh.2013.09.024

García, C. M. A., Novalbos, R. J. P., Martínez, D. J. M., & O'Ferral, G. C. (2016). Validación del test para la identificación de trastornos por uso de alcohol en población universitaria: AUDIT y AUDIT-C. *Adicciones*, *28*(4), 194–204. https://doi.org/10.20882/adicciones.775

German-Ponciano, L. J., Zapata-de la Rosa, M. F., Molina-Cadena, B. I., Velasco-Gómez, Y. S., & Puig-Lagunes, Á. A. (2023). Effectiveness evaluation of online Mindfulness in mental health and alcohol consumption in medical students during the COVID-19 pandemic. *Salud Mental*, *46*(2), 45–54. https://doi.

org/10.17711/sm.0185-3325.2023.007

Gierski, F., Stefaniak, N., Benzerouk, F., Gobin, P., Schmid, F., Henry, A., Kaladjian, A., & Naassila, M. (2020). Component process analysis of verbal memory in a sample of students with a binge drinking pattern. *Addictive Behaviors Reports*, *12*, 100323. https://doi.org/10.1016/j.abrep.2020.100323

Glanz, K., & Bishop, D. B. (2010). The Role of Behavioral Science Theory in Development and Implementation of Public Health Interventions. *Annual Review of Public Health*, *31*(1), 399–418. https://doi.org/10.1146/annurev.publhealth.012809.103604

Gmel, G., & Daeppen, J. (2007). Recall Bias for Seven-Day Recall Measurement of Alcohol Consumption Among Emergency Department Patients: Implications for Case-Crossover Designs. *Journal of Studies on Alcohol and Drugs*, *68*(2), 303–310. https://doi.org/10.15288/jsad.2007.68.303

Gogeascoechea-Trejo, M. D. C., L. Blázquez-Morales, M. S., Pavón-León, P., & Ortiz León, M. C. (2021). Consumo de alcohol en estudiantes universitarios como predictor para el consumo de otras drogas. *Health & Addictions/Salud y Drogas*, *21*(1). https://doi.org/10.21134/haaj.v21i1.569

Gravel, J., Opatrny, L., & Shapiro, S. (2007). The intention-to-treat approach in randomized controlled trials: Are authors saying what they do and doing what they say? *Clinical Trials*, *4*(4), 350–356. https://doi.org/10.1177/1740774507081223

Hernández, S. R., Fernández, C. C., & Baptista, L. P. (2014). *Metodología de la investigación* (6th ed.). McGraw Hill Interamericana Editores.

Hingson, R., Zha, W., & Smyth, D. (2017). Magnitude and Trends in Heavy Episodic Drinking, Alcohol-Impaired Driving, and Alcohol-Related Mortality and Overdose Hospitalizations Among Emerging Adults of College Ages 18–24 in the United States, 1998–2014. *Journal of Studies on Alcohol and Drugs*, *78*(4), 540–548. https://doi.org/10.15288/jsad.2017.78.540

Kaner, E. F., Beyer, F. R., Garnett, C., Crane, D., Brown, J., Muirhead, C., Redmore, J., O'Donnell, A., Newham, J. J., de Vocht, F., Hickman, M., Brown, H., Maniatopoulos, G., & Michie, S. (2017). Personalized digital interventions for reducing hazardous and harmful alcohol consumption in community-dwelling populations. *Cochrane Database of Systematic Reviews*, (9). https://doi.org/10.1002/14651858.cd011479.pub2

Khan, N. A., Torralba, K. D., & Aslam, F. (2021). Missing data in randomised controlled trials of rheumatoid arthritis drug therapy are substantial and handled inappropriately. *RMD Open*, *7*(2), e001708. https://doi.org/10.1136/rmdopen-2021-001708

Krieger, H., Young, C. M., Anthenien, A. M., & Neighbors, C. (2018). The Epidemiology of Binge Drinking Among College-Age Individuals in the United States. *Alcohol Research: Current Reviews*, *39*(1), 23. https://doi.org/10.35946/arcr.v39.1.05

Langenbucher, J., & Merrill, J. (2001). The Validity of Self-Reported Cost Events by Substance Abusers: Limits, Liabilities, and Future Directions. *Evaluation Review*, *25*(2), 184–210. https://doi.org/10.1177/0193841x0102500204

Lee, J., & Shin, Y. (2022). Using the Theory of Planned Behavior to Predict Korean College Students' Help-Seeking Intention. *The Journal of Behavioral Health Services & Research*, *49*(1), 76–90. https://doi.org/10.1007/s11414-020-09735-z

Marín-Navarrete, R., Fernández-Mondragón, J., Eliosa-Hernández, A., Templos, N. L., Graue-Moreno, J., Galván-Sosa, D., Fernández-De la Fuente, C., Gómez, V.G., & Berlanga, C. (2013). Consideraciones metodológicas y éticas para la conducción de ensayos clínicos controlados aleatorizados (ECCA) sobre brotes para las adicciones. *Salud Mental*, *36*(3), 253–265.

Medina-Mora, E., Carreño, S., & De la Fuente, J. R. (1998). Experience with the Alcohol Use Disorders Identification Test (AUDIT) in México. In *Recent Developments in Alcoholism. Recent Developments in Alcoholism* (vol. 14, pp. 383-396). Springer. https://doi.org/10.1007/0-306-47148-5_19

Michie, S., Johnston, M., Francis, J., Hardeman, W., & Eccles, M. (2008). From Theory to Intervention: Mapping Theoretically Derived Behavioural Determinants to Behaviour Change Techniques. *Applied Psychology*, *57*(4), 660–680. https://doi.org/10.1111/j.1464-0597.2008.00341.x

Moher, D., Hopewell, S., Schulz, K. F., Montori, V., Gøtzsche, P. C., Devereaux, P., Elbourne, D., Egger, M., & Altman, D. G. (2012). CONSORT 2010 explanation and elaboration: Updated guidelines for reporting parallel group randomised trials. *International Journal of Surgery*, *10*(1), 28–55. https://doi.org/10.1016/j.ijsu.2011.10.001

Montedori, A., Bonacini, M. I., Casazza, G., Luchetta, M. L., Duca, P., Cozzolino, F., & Abraha, I. (2011). Modified versus standard intention-to-treat reporting: Are there differences in methodological quality, sponsorship, and findings in randomized trials? A cross-sectional study. *Trials*, *12*(1). https://doi.org/10.1186/1745-6215-12-58

Moral, J. M. de la V., Bringas, M. C., Ovejero, B. A., Morales, Q. L. A., & Rodríguez, D. F. J. (2017). Emergencia sociosanitaria en consumo de riesgo de alcohol y síntomas de dependencia en jóvenes. *Health and Addictions/Salud y Drogas*, *17*(2), 91–99. https://doi.org/10.21134/haaj.v17i2.307

Murgraff, V., Abraham, C., & McDermott, M. (2007). Reducing Friday alcohol consumption among moderate women drinkers: Evaluation of a brief evidence-based intervention. *Alcohol and Alcoholism*, *42*(1), 37–41. https://doi.org/10.1093/alcalc/agl083

National Association of Universities and Higher Education Institutions. (2025). *Anuarios Estadísticos de Educación Superior*. https://www.anuies.mx/informacion-y-servicios/informacion-estadistica-de-educacion-superior/anuario-estadistico-de-educacion-superior

Neighbors, C., Lee, C. M., Atkins, D. C., Lewis, M. A., Kaysen, D., Mittmann, A., Fossos, N., Geisner, I. M., Zheng, C., & Larimer, M. E. (2012). A randomized controlled trial of event-specific prevention strategies for reducing problematic drinking associated with 21st birthday celebrations. *Journal of Consulting and Clinical Psychology*, *80*(5), 850–862. https://doi.org/10.1037/a0029480

Neighbors, C., Lee, C. M., Lewis, M. A., Fossos, N., & Walter, T. (2009). Internet-based personalized feedback to reduce 21st-birthday drinking: A randomized controlled trial of an event-specific prevention intervention. *Journal of Consulting and Clinical Psychology*, *77*(1), 51–63. https://doi.org/10.1037/a0014386

Norman, P., Cameron, D., Epton, T., Webb, T. L., Harris, P. R., Millings, A., & Sheeran, P. (2018). A randomized controlled trial of a brief online intervention to reduce alcohol consumption in new university students: Combining self-affirmation, theory of planned behaviour messages, and implementation intentions. *British Journal of Health Psychology*, *23*(1), 108–127. https://doi.org/10.1111/bjhp.12277

Pan American Health Organization. (2005). *Good Clinical Practices Document of the Americas*. https://www.ms.gba.gov.ar/ssps/investigacion/DocTecnicos/Buenas-Practicas-DocAmericas.pdf

Ramírez, P. L., Cruz, Z. G., Núñez-Hernández, A., Lerena, M. S. M., & Plascencia, C. J. (2021). Consumo de sustancias adictivas en estudiantes de primer ingreso a un Centro Universitario en Jalisco, México. *RESPYN Revista Salud Pública y Nutrición*, *20*(2), 1–12. https://doi.org/10.29105/respyn20.2-1

Resko, S. M., Brown, S., Lister, J. J., Ondersma, S. J., Cunningham, R. M., & Walton, M. A. (2017). Technology-Based Interventions and Trainings to Reduce the Escalation and Impact of Alcohol Problems. *Journal of Social Work Practice in the Addictions*, *17*(1-2), 114–134. https://doi.org/10.1080/1533256x.2017.1304948

Riper, H., Hoogendoorn, A., Cuijpers, P., Karyotaki, E., Boumparis, N., Mira, A., Andersson, G., Berman, A. H., Bertholet, N., Bischof, G., Blankers, M., Boon, B., Boß, L., Brendryen, H., Cunningham, J., Ebert, D., Hansen, A., Hester, R., Khadjesari, Z., Kramer, J., Murray, E., Postel, M., Schulz, D., Sinadinovic, K., Suffoletto, B., Sundström, C., de Vries, H., Wallace, P., Wiers, R. W., & Smit, J. H. (2018). Effectiveness and treatment moderators of internet interventions for adult problem drinking: An individual patient data meta-analysis of 19 randomised controlled trials. *PLOS Medicine*, *15*(12), e1002714. https://doi.org/10.1371/journal.pmed.1002714

Rivis, A., Sheeran, P., & Armitage, C. J. (2009). Expanding the Affective and Normative Components of the Theory of Planned Behavior: A Meta-Analysis of Anticipated Affect and Moral Norms. *Journal of Applied Social Psychology*, *39*(12), 2985–3019. https://doi.org/10.1111/j.1559-1816.2009.00558.x

Rodríguez-Kuri, S. E., Díaz-Negrete, D. B., Gracia-Gutiérrez de Velasco, S. E., Guerrero-Huesca, J. A., & Gómez-Maqueo, E. L. (2007). Capacidad predictiva de la teoría de la conducta planificada en la intención y uso de drogas ilícitas entre estudiantes mexicanos. *Salud Mental*, *30*(1), 68–81. https://www.scielo.org.mx/scielo.php?pid=S0185-33252007000100068&script=sci_arttext

Rodríguez Kuri, S. E., Díaz Negrete, D. B., Gracia Gutiérrez de Velasco, S. E., Guerrero Huesca, J. A., & Gómez-Maqueo, E. L. (2011). Evaluación de un programa de prevención del consumo de drogas para adolescentes. *Salud Mental*, *34*(1), 27–35. http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0185-33252011000100004&lng=es&tlng=es

Ronzani, T. M., Fuentes-Mejía, C., Mota, D. C. B., Gomide, H. P., Ferreira, M. L., & Cruvinel, E. (2019). Intervenciones breves para el abuso de sustancias en

América Latina: una revisión sistemática. *Psicologia Em Estudo*, *24*. https://doi.org/10.4025/psicolestud.v24i0.44393

Sainani, K. L. (2010). Making Sense of Intention-to-Treat. *PM&R*, *2*(3), 209–213. https://doi.org/10.1016/j.pmrj.2010.01.004

Salazar, M. L., Vacio, M. D. L. A., & González, A. (2024). Ensayo clínico aleatorizado con dos intervenciones breves para disminuir el consumo de alcohol en estudiantes universitarios. *Health and Addictions/Salud y Drogas*, *24*(1), 93–110. https://doi.org/10.21134/haaj.v24i1.783

Salazar-Garza, M. L., Castro, J. L. P., Hernández, O. P. A., & Muro, M. D. L. Á. V. (2012). Consejo breve a universitarios que consumen alcohol en exceso: resultados iniciales. *Psicología y Salud*, *22*(2), 247–256.

Salazar Garza, M. L., Vacio Muro, M. D. L. Á., & Macías Rodríguez, J. J. (2019). Adaptación y validación del Cuestionario Breve de Confianza Situacional en universitarios mexicanos que consumen alcohol. *Revista Internacional de Investigación en Adicciones*, *5*(2), 30–37. https://doi.org/10.28931/riiad.2019.2.04

Samson, J. E., & Tanner-Smith, E. E. (2015). Single-Session Alcohol Interventions for Heavy Drinking College Students: A Systematic Review and Meta-Analysis. *Journal of Studies on Alcohol and Drugs*, *76*(4), 530–543. https://doi.org/10.15288/jsad.2015.76.530

Saunders, J. B., Aasland, O. G., Babor, T. F., De la Fuente, J. R., & Grant, M. (1993). Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption-II. *Addiction*, *88*(6), 791–804. https://doi.org/10.1111/j.1360-0443.1993.tb02093.x

Schulz, K. F., Altman, D. G., & Moher, D. (2010). CONSORT 2010 Statement: Updated Guidelines for Reporting Parallel Group Randomized Trials. *Annals of Internal Medicine*, *152*(11), 726–732. https://doi.org/10.7326/0003-4819-152-11-201006010-00232

Secretaría de Salud (2019). Prevención del consumo de alcohol en el trabajo. Gobierno de México. https://www.gob.mx/cms/uploads/attachment/file/566347/Guia_Prevension_de_Consumo_Alcohol_Trabajo_2019.pdf

Sobell, L. C., & Sobell, M. B. (1992). Seguimiento de la línea de tiempo. In *Medición del consumo de alcohol*. Humana Press.

Sobell, M. B., Sobell, L. C., Klajner, F., Pavan, D., & Basian, E. (1986). The reliability of a timeline method for assessing normal drinker college students' recent drinking history: Utility for alcohol research. *Addictive Behaviors*, *11*(2), 149–161. https://doi.org/10.1016/0306-4603(86)90040-7

Steele, B., Martin, M., Yakubovich, A., Humphreys, D. K., & Nye, E. (2022). Risk and Protective Factors for Men’s Sexual Violence Against Women at Higher Education Institutions: A Systematic and Meta-Analytic Review of the Longitudinal Evidence. *Trauma, Violence, & Abuse*, *23*(3), 716–732. https://doi.org/10.1177/1524838020970900

Stepanov, N., & Cárdenas-López, G. (2022). Estudio de caso único de efectividad de intervención en línea para bebedores problema. *Acta Comportamentalia: Revista Latina de Análisis de Comportamiento*, *30*(4), 725–750.

Tebb, K. P., Erenrich, R. K., Jasik, C. B., Berna, M. S., Lester, J. C., & Ozer, E. M. (2016). Use of theory in computer-based interventions to reduce alcohol use among adolescents and young adults: a systematic review. *BMC Public Health*, *16*(1). https://doi.org/10.1186/s12889-016-3183-x

Tembo, C., Burns, S., & Kalembo, F. (2017). The association between levels of alcohol consumption and mental health problems and academic performance among young university students. *PLOS ONE*, *12*(6), e0178142. https://doi.org/10.1371/journal.pone.0178142

Voogt, C., Kuntsche, E., Kleinjan, M., Poelen, E., & Engels, R. (2014). Using Ecological Momentary Assessment to Test the Effectiveness of a Web-Based Brief Alcohol Intervention Over Time Among Heavy-Drinking Students: Randomized Controlled Trial. *Journal of Medical Internet Research*, *16*(1), e5. https://doi.org/10.2196/jmir.2817

White, A., Kavanagh, D., Stallman, H., Klein, B., Kay-Lambkin, F., Proudfoot, J., Drennan, J., Connor, J., Baker, A., Hines, E., & Young, R. (2010). Online Alcohol Interventions: A Systematic Review. *Journal of Medical Internet Research*, *12*(5), e62. https://doi.org/10.2196/jmir.1479

World Medical Association. (2017). *WMA Declaration of Helsinki - Ethical Principles for Medical Research Involving Human Subjects*. https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/

Yi, S., Ngin, C., Peltzer, K., & Pengpid, S. (2017). Health and behavioral factors associated with binge drinking among university students in nine ASEAN countries. *Substance Abuse Treatment, Prevention, and Policy*, *12*(1). https://doi.org/10.1186/s13011-017-0117-2

salud mental

ORIGINAL ARTICLE
Volume 49, Issue 3, May-June 2026
10.17711/SM.0185-3325.2026.17

Validation of a Scale to Measure the Psychological Well-being of Physiotherapists in Training at a Public University in Mexico

Fernando Flores Hernández,[1] Xochiquetzalli Tejeda-Castellanos,[2] Tania Vives Varela,[3] Manuel Millán Hernández,[3] Luis Alberto Luja Ramírez,[4] Claudia Gutiérrez Camacho[5]

[1] Departamento de Investigación en Educación Médica, Secretaría de Educación Médica, Facultad de Medicina, UNAM, Ciudad de México, México.
[2] Unidad de Investigación en Fisioterapia. Licenciatura en Fisioterapia. Facultad de Medicina, UNAM, Ciudad de México, México.
[3] Departamento de Investigación en Educación Médica, Secretaría de Educación Médica, Facultad de Medicina, UNAM, Ciudad de México, México.
[4] Coordinación de la Licenciatura en Fisioterapia, Facultad de Medicina, UNAM, Ciudad de México, México.
[5] Dirección de Enseñanza y Desarrollo Académico. Hospital Infantil de México Federico Gómez, Ciudad de México, México.

Correspondence:
Claudia Gutiérrez Camacho
Dirección de Enseñanza y Desarrollo Académico, Hospital Infantil de México Federico Gómez, Ciudad de México, México, México.
Phone: +52 (55) 3199-8137
Email: claudia.g.cam@facmed.unam.mx

Received: 29 October 2024
Accepted: 27 March 2025

Citation:
Flores Hernández, F., Tejeda-Castellanos, X., Vives Varela, T., Millán Hernández, M., Luja Ramírez, L. A., & Gutiérrez Camacho, C. (2026). Validation of a Scale to Measure the Psychological Well-being of Physiotherapists in Training at a Public University in Mexico. *Salud Mental*, *49*(3), 125–130. https://doi.org/10.17711/SM.0185-3325.2026.17

ABSTRACT

Introduction. According to the eudaimonic theory proposed by Carol Ryff, psychological wellbeing involves achieving fulfillment through the search for perfection and realizing one's potential. However, some scales do not clearly differentiate levels of wellbeing and must be adapted for specific populations, such as Mexicans. **Objective.** To validate the Ryff wellbeing scale in physiotherapy students and obtain its psychometric properties. **Method.** The scale was administered to 196 students in the bachelor's degree program in physiotherapy at the National Autonomous University of Mexico (UNAM). Adjustment values and explained variance were determined through exploratory and confirmatory factor analysis, and internal consistency was obtained through Cronbach's Alpha. ANOVA was used to determine the discrimination of the items and dimensions of the scale. **Results.** An instrument with a solid structure, variance, internal consistency, and adequate discrimination was obtained. **Discussion and conclusion.** This study enabled us to establish six aspects of wellbeing in physiotherapy students: personal growth, self-acceptance, self-control, maintaining positive relationships with others, personal interaction, professional relationships and future, and purpose in life.

Keywords: Psychological wellbeing, physiotherapy, university students, public university, wellbeing scale.

RESUMEN

Introducción. El bienestar psicológico desde la conceptualización eudamónica propuesta por Carol Riff supone el logro del potencial a través de la búsqueda de la perfección y la realización del propio potencial. Las escalas propuestas no siempre discriminan los niveles de bienestar y requieren de su adaptación a diferentes poblaciones como la mexicana. **Objetivo.** Validar la escala de bienestar de Riff, en estudiantes de la licenciatura en fisioterapia y obtener sus propiedades psicométricas. **Método.** La escala se aplicó a 196 estudiantes de la Licenciatura en Fisioterapia de la Universidad Nacional Autónoma de México (UNAM). Se determinaron los valores de ajuste, varianza explicada a través de análisis factorial exploratorio y confirmatorioy la consistencia interna a través de la determinación de Alfa de Cronbach y con ANOVA se determinó la discriminación de reactivos y dimensiones de la escala. **Resultados.** Se obtuvo un instrumento con estructura sólida, con varianza, consistencia interna y discriminación adecuada. **Discusión y conclusión.** Este estudio permitió establecer seis dimensiones en los estudiantes de fisioterapia; crecimiento personal, auto aceptación, auto control, mantener relaciones positivas con otros, interacción personal, relación profesional y planes a futuro, y propósito en la vida.

Palabras clave: Bienestar psicológico, fisioterapia, estudiantes universitarios, universidad pública, escala de bienestar.

INTRODUCTION

Psychological wellbeing is a construct studied in psychology, conceptualized as an optimal state of mental health in medical terms (Pethtel & Chen, 2010). Psychological wellbeing allows a subject to be aware of their abilities, cope with stress, be more productive and efficient in society, reduce their levels of anxiety and depression and achieve better academic results (Vences Camacho et al., 2023).

It has been documented that psychological distress negatively affects students' learning, in addition to making it difficult for them to concentrate and participate in university life. Education authorities must therefore understand students' experience, and the stressors to which they are exposed, to improve their wellbeing (Baik et al., 2019; Fichardt et al., 2023).

Although psychological wellbeing has been extensively studied in the university context, especially in health sciences students, particularly medicine, there is a dearth of studies on undergraduate students of physiotherapy and their wellbeing. At UNAM, physiotherapy students are affected by factors such as stress and constant anguish.

Like doctors, at the start of their training, they have a high academic load and begin their practices at hospitals in the early stages, and continuously during the fourth year of training. In addition, they are required to decide on an area of in-depth physiotherapeutic study as part of the final stage of their professional training.

Psychological wellbeing is a complex, multifaceted construct that has spawned various conceptualizations, from hedonic to eudaimonic (Lee & Carey, 2013).

According to the eudaimonic conceptualization, the model of wellbeing proposed by Ryff & Keyes (1995) and based on what is described by Waterman (1993) involves the realization of the unique nature of each human being, through the search for perfection, and involves the fulfillment of one's potential.

The multifactorial conceptualization proposed by Ryff & Keyes (1995) comprises six inter-related dimensions, including the following:

Personal growth: characterized by interest in the acquisition of knowledge and continuous training with an innovative, professional vision, designed to consolidate life skills in the context of the discipline.

Self-acceptance: acceptance of one's physique, personality and interaction with others, and identification of one's positive and negative traits.

Self-control: managing one's impulses, way of being and behaviors in situations requiring interaction in an unfavorable or complex context.

Personal interaction: the ability to establish interpersonal relationships and the identification of associated personal traits.

Professional relationship and future plans: defined by positive interactions and the establishment of relationships with one's colleagues and directing efforts towards the fulfillment of one's goals.

Purpose in life: focused on the definition of a future life plan to guide one's goals and the actions required to achieve them in an organized, planned way.

Developing scales to evaluate psychological wellbeing is essential for empirical research because there are reports in the literature of scales with diverse psychometric properties with varying reliability and validity (Springer et al., 2011; Topp et al., 2015). Furthermore, studies conducted in different cultures and contexts suggest that the six dimensions proposed by Ryff & Keyes (1995) do not always identify high levels of psychological wellbeing. Others have suggested inconsistency in the latent structure of the scales due to the excessive reduction of items, compromising the internal consistency coefficients (García et al., 2023).

One of four representative studies of the development of scales to determine psychological wellbeing in the Latin American context is the study by Díaz et al. (2006). These authors adapted van Dierendonck's (2004) version and reported good internal consistency with Cronbach's alpha values of .83 in self-acceptance and .68 in personal growth (Díaz et al., 2006). However, they also reported not having found a satisfactory level of adjustment after confirmatory factor analysis in the six-dimensional model (self-acceptance, positive relationships, autonomy, mastery of the environment, purpose of life, and personal growth) (Díaz et al., 2006). These same authors eventually proposed an abridged version to improve the psychometric properties with Cronbach's alpha values from .84 to .70 (Díaz et al., 2006).

For their part, Aranguren & Irrazabal (2015) analyzed the psychometric properties of Ryff's psychological wellbeing scales in Argentinean students, finding, through several exploratory factor analyses, a scale with good reliability and fit indices, limited to three main factors: autonomy, positive relationships with others, and competence.

A study of Mexican students examined an instrument with a brief, unidimensional structure of 19 items, through exploratory and confirmatory factor analysis and modeling using structural equations, with acceptable indicators of its internal structure and reliability. These same authors used the structure of the version proposed by van Dierendonck (2004) already adapted to Spanish (Díaz et al., 2006; Dominguez-Lara et al., 2019).

In health sciences, in the bachelor's degree program in medicine in Mexico, the psychometric properties of Ryff's Psychological Wellbeing scale were adapted after administering the scale to students at two universities (Flores Hernández et al., 2023). Exploratory and confirmatory analysis yielded a four-dimensional instrument (purpose of life, personal rejection and self-acceptance, personal control, and personal growth), with robust structure, satisfactorily explained variance, internal consistency (with a Cronbach's alpha of .89) and appropriate discrimination.

In light of what has been reported in the literature, it is useful to recall that the measurement of wellbeing varies according to the cultural context. The factor structure of certain scales is affected by aspects such as gender, urban and rural differences in specific populations and age of respondents (Sasaki et al., 2020).

In this regard, it has been reported, for example, that age is a key factor in groups of young people such as university students, whose psychological wellbeing has been shown to be affected by high levels of mental fatigue (Browne, 2017).

Other studies, conducted at universities in various parts of the world, have reported high levels of generalized psychological distress and severe depression symptoms in students compared to the general population. This has primarily been attributed to the transition from secondary to higher education (Larcombe et al., 2016; Stallman, 2010).

Although the factors affecting the psychological wellbeing of university students, particularly physiotherapists in training, have been identified, there are no studies evaluating them in this population in Mexico. Moreover, existing wellbeing scales have varying reliability and validity in medical students, in addition to jeopardizing their internal consistency by reducing the number of items they contain. The main objective of the present study was therefore to validate the Ryff Wellbeing Scale (Flores Hernández et al., 2023) in physiotherapy students.

METHOD

Study design

This is a cross-sectional analytical study, designed to validate the proposed psychological wellbeing scale (Flores Hernández et al., 2023).

Participants

We included a sample of 196 students in the bachelor's degree in physiotherapy at the Faculty of Medicine of the National Autonomous University of Mexico (UNAM), obtained through convenience sampling of consecutive cases from June to November 2023.

Measurements

We requested permission from the coordination office of the bachelor's degree in physiotherapy to send a link to the scale in Google Forms through the WhatsApp groups of students enrolled in the degree course. We also asked for permission to send the link by email, the usual communication channel between students and the bachelor's degree coordination office. The questionnaire included 29 items in Likert-type format with four response options: 1= Little or never, 2 = Sometimes, 3 = Frequently, 4 = Almost always or always.

Procedures

To encourage participant response, infographics were created and placed at the degree headquarters so that students could access the questionnaire through a QR code. Students were invited to participate and those who accepted were asked to authorize a privacy notice for their data, which were kept confidential since we worked with global data to adapt the scale. Information was extracted from the Excel format file generated by the system and exported to SPSS and AMOS 21 for analysis.

Statistical analysis

The psychometric structure of the scale was determined through exploratory and confirmatory factor analysis, enabling us to obtain the adjustment values, explained variance, structure, and discrimination of the instrument. To determine the internal consistency of the instrument, we used Cronbach's Alpha and one-way ANOVA to discriminate between the items and dimensions as regards their diagnostic criteria and the scale as a whole.

Ethical considerations

The study is part of the protocol approved by the ethics and research committees of the Research Division of the National Autonomous University of Mexico (UNAM) Medicine Faculty, registration number FM/DI/114/2020. Students were asked to authorize their participation through a data management privacy notice according to the regulations established by UNAM.

RESULTS

One hundred and ninety-six students from the four years of the bachelor's degree program in physiotherapy were evaluated, 155 of which were women (79.0%), and 41 (20.91%) men, with a mean age of 20.79 ± 2.42 years. The sample was mainly concentrated in the first two years of the degree, with first year students accounting for 38.2% and second year students accounting for 27.0% of participants.

The reliability of the instrument was determined by the Cronbach's alpha coefficient, which obtained a value of .76 for the instrument as a whole. The structure of the instrument was developed through an exploratory factor analysis of principal components with Oblimin rotation, with KMO adjustment values of .86 significant at .000.

Table 1
Structure of physiotherapy instrument compared with medicine instrument

Dimensions of the Physiotherapy instrument	*Items*	*Post*							*Explained variance*	*Alpha*	*Medicine (previous structure)*
		1	*2*	*3*	*4*	*5*	*6*	*7*			
1 Personal growth	1. I am interested in acquiring new skills	.846							32.05	.88	4
	4. I have an open attitude to knowledge and innovation.	.807									4
	3. I am interested in perfecting my skills	.779									4
	5. Study to know more and cope with life's challenges	.762									4
	2. I am open to new experiences that will contribute to my training.	.749									4
2 Self-acceptance	17. I accept my flaws		-.833						10.06	.70	2
	16. I love myself with all my flaws		-.819								2
	19. I hate my flaws		.813								2
	25. I hate the way I am		.720								2
	18. I would like to have a different body		.715								2
	26. I would like to have another character		.613								
3 Self-control	28. I can control my impulses			.886					7.08	.84	3
	27. I control my behavior, even if I am upset			.880							3
	29. I easily control my character			.844							3
4 Personal interaction	9. I have a hard time relating to people				.857				6.36	.68	no grouping
	8. I find it difficult to make new friends				.840						no grouping
	7. I relate easily to people my age				-.717						no grouping
	24. I hate my character				.654						no grouping
5 Professional relationship and future plans	11. I get along well with my colleagues					-.895			5.50	.78	no grouping
	10. I have good relationships with my colleagues					-.877					no grouping
	23. If I strive to achieve my goals I will achieve them					-.651					no grouping
	6. If I try hard, I achieve what I want					-.578					1
6 Purpose in life	13. I have a plan for what I want to do with my life in the next few years						-.918		4.92	.86	1
	14. I have a life plan that gives direction and guidance to my actions						-.906				1
	12. I have clear goals about what I want to do with my life						-.898				1
	15. I have set out to achieve several goals						-.783				1
	22. To achieve what I want it is important to make plans						-.435				1
Items without loading on a factor	20. Making plans for the future is a waste of time								worthless	worthless	no grouping
	21. Designing a life project is a waste of time								worthless	worthless	no grouping

Note: * Items 20 and 21 were not integrated into any dimension; 20_ Making plans for the future is a waste of time and 21_ Designing a life project is a waste of time

The variance explained by item identified in the communities was located within a range of .43 to .86, except for statement 22, "to achieve what I want, it is important to make plans." This item obtained a value of .36, and was therefore eliminated from the adapted version of the instrument. The Global Explained Variance of the instrument was 66% for the six dimensions obtained.

Table 1 presents the structure obtained by dimension with the factor loading for each item, the explained variance and factor consistency, as well as a comparison with the original structure of the instrument for medical students.

Items 20 and 21 were eliminated since they were not grouped into any factor.

The discrimination of the instrument was determined by establishing cut-off points at the .33 and .67 percentiles; discrimination for the global scores and by factor were shown in Table 2. Significant discrimination was identified through a one-way ANOVA with significant differences at all the intervals of the scale (low, lower middle, upper middle, and high) with a significance of $p < .001$, determined using Tukey's post hoc test.

Table 2
Global discrimination of instrument and factors

	F	*Sig.*
Global discrimination	522.70	.000
Factor 1	418.25	.000
Factor 2	392.08	.000
Factor 3	401.05	.000
Factor 4	471.73	.000
Factor 5	433.07	.000
Factor 6	439.29	.000

Confirmatory factor analysis was obtained through a structural equation model, with a Chi2 value of 4.14 ($p < .01$). The items associated with each factor reported significant standardized regression weights, ranging from .563 to .914 with a root mean square error of approximation (RMSEA) value of .036 and a normal fit index (NFI) of .921.

DISCUSSION AND CONCLUSION

The objective of this study was to validate the Ryff Wellbeing Scale in physiotherapy students. The main finding obtained was the six dimensions in its structure scale: personal growth, self-acceptance, self-control, maintaining positive relationships with others, personal interaction, professional relationships and future plans, and purpose in life.

The instrument developed in this study is consistent with the scale adapted by Díaz et al. (2006), where the author reported good internal consistency with self-acceptance and personal growth. The present adaptation to the degree in physiotherapy undertaken as a result of the analysis produced an instrument with an adjustment level consistent with the proposed theoretical model of six dimensions. It included adjustments in the grouping of the items of each dimension, unlike what was reported by Díaz et al. (2006).

In Spain, a study evaluated dimensions such as self-acceptance, positive relationships, autonomy, environmental mastery, personal growth, and purpose in 149 university students (Morales-Rodríguez et al., 2020). This is congruent with the structure of the instrument obtained in the physiotherapists evaluated in this study. We established six dimensions of psychological wellbeing in the same way as in the study by Díaz et al. (2006), with slight variations in their grouping.

In Mexico, this same scale was adapted for medical students, 1,974 of whom were evaluated. However, the reported structure only identified four dimensions: purpose in life, personal rejection and self-acceptance, personal control, and personal growth, with solid psychometric values (Flores Hernández et al., 2023).

The structure of the aforementioned instrument was the main reference for the proposed adaptation to the physiotherapy degree. The grouping of factors was largely maintained by varying their order and two additional dimensions were consolidated in the present instrument by items with no loading as regards the medical structure.

Despite the similarities between medical and physiotherapy students, it is necessary to have specific instruments for each population. The use of a generic instrument for both groups could cause bias or even lead to inaccurate interpretation due to the lack of specificity.

Unlike what was reported by Flores et al. in 2023 (Flores Hernández et al., 2023), physiotherapy students showed that they had a more defined life plan, as well as knowledge of the goals they wished to achieve, as a good correlation was found between the subscales.

The relevance of the present study is borne out by previous studies in countries such as Pakistan (Afridi & Fahim, 2019), Sweden and the Netherlands (Hodselmans et al., 2018), Australia and the United Kingdom (Tucker et al., 2006), and Israel (Jacob et al., 2013). These studies report that physiotherapy students present moderate to high stress levels related to academic and interpersonal aspects with a direct bearing on their wellbeing. However, reports of the use of psychometrically robust instruments to evaluate psychological wellbeing in this group of students remain scarce (Walsh et al., 2010).

Among the strengths of this study are the psychometric characteristics of the scale with its high levels of validity and reliability. One of its weaknesses is that we surveyed fewer than half the students enrolled in the degree course. Morever, the cross-sectional nature of the study only enabled us to determine the emotional state of the students at the time they were being evaluated, which may differ at other times.

The present instrument adapted for physiotherapy students has adequate psychometric properties, coupled with high statistical evidence of validity and reliability to evaluate psychological wellbeing. However, it would be advisable to conduct further studies to evaluate the temporal consistency of the results obtained.

Financing

None.

Conflict of interests

The authors declare they have no conflicts of interest.

Acknowledgments

Special thanks are due to Tania Escriba for the creative infographics and posters she designed to disseminate this study. We are also grateful to the students in the UNAM bachelor's degree program in physiotherapy for their valuable participation.

REFERENCES

Afridi, A., & Fahim, M. F. (2019). Identification of stressors and Perceptional difference of stress in first and final year Doctor of Physical Therapy students; a comparative study. *JPMA. The Journal of the Pakistan Medical Association*, *69*(4), 572–575.

Aranguren, M., & Irrazabal, N. (2015). Estudio de las propiedades psicométricas de las escalas de bienestar psicológico de Ryff en una muestra de estudiantes argentinos. *CienciasPsicológicas*, *9*(1), 73–83.

Baik, C., Larcombe, W., & Brooker, A. (2019). How universities can enhance student mental wellbeing: the student perspective. *Higher Education Research & Development*, *38*(4), 674–687. https://doi.org/10.1080/07294360.2019.1576596

Browne, V. (2017). Under the Radar: The Mental Health of Australian University Students. *The Australian and New Zealand Student Services Association*, *25*(2), 51–62. https://doi.org/10.30688/janzssa.2017.16

Díaz, D., Rodríguez-Carvajal, R., Blanco, A., Moreno-Jiménez, B., Gallardo, I., Valle, C., & van Dierendonck, D. (2006). Adaptación española de las escalas de bienestar psicológico de Ryff. *Piscothema*, *18*(3), 572–577.

Dominguez-Lara, S., Romo-González, T., Palmeros-Exsome, C., Barranca-Enríquez, A., del Moral-Trinidad, E., & Campos-Uscanga, Y. (2019). Análisis estructural de la Escala de Bienestar Psicológico de Ryff en universitarios mexicanos. *Liberabit: Revista Peruana de Psicología*, *25*(2), 267–285. https://doi.org/10.24265/liberabit.2019.v25n2.09

Fichardt, A. E., Janse Van Vuuren, C., & van der Merwe, L. (2023). Psychological well-being, stressors, coping strategies and support of undergraduate healthcare students amid COVID-19. *Health SA Gesondheid*, *28*. https://doi.org/10.4102/hsag.v28i0.2340

Flores Hernández, F., Morales López, S., Ramos Castillo, Y. O., Vives Varela, T., & Millán-Hernández, M. (2023). Adaptation of the Psychological Wellbeing Scale in Mexican medical students. *Salud Mental*, *46*(2), 89–95. https://doi.org/10.17711/sm.0185-3325.2023.012

Garcia, D., Kazemitabar, M., & Asgarabad, M. H. (2023). The 18-item Swedish version of Ryff's psychological wellbeing scale: psychometric properties based on classical test theory and item response theory. *Frontiers in Psychology*, *14*. https://doi.org/10.3389/fpsyg.2023.1208300

Hodselmans, A., Hemdal, E., Lundberg, S., Bjarnegård, A., Hobbelen, H., & Svantesson, U. (2018). Physiotherapy students' perceived stress, stressors, and reactions to stressors: A comparative study between Sweden and The Netherlands. *Physiotherapy Theory and Practice*, *34*(4), 293–300. https://doi.org/10.1080/09593985.2017.1390805

Jacob, T., Itzchak, E. B., & Raz, O. (2013). Stress among healthcare students – A cross disciplinary perspective. *Physiotherapy Theory and Practice*, *29*(5), 401–412. https://doi.org/10.3109/09593985.2012.734011

Larcombe, W., Finch, S., Sore, R., Murray, C. M., Kentish, S., Mulder, R. A., Lee-Stecum, P., Baik, C., Tokatlidis, O., & Williams, D. A. (2016). Prevalence and socio-demographic correlates of psychological distress among students at an Australian university. *Studies in Higher Education*, *41*(6), 1074–1091. https://doi.org/10.1080/03075079.2014.966072

Lee, E., & Carey, T. (2013). Eudaimonic Wellbeing as a Core Concept of Positive Functioning. *MindPad Notes d'idées*, 17–20.

Morales-Rodríguez, F. M., Espigares-López, I., Brown, T., & Pérez-Mármol, J. M. (2020). The Relationship between Psychological Well-Being and Psychosocial Factors in University Students. *International Journal of Environmental Research and Public Health*, *17*(13), 4778. https://doi.org/10.3390/ijerph17134778

Pethtel, O., & Chen, Y. (2010). Cross-cultural aging in cognitive and affective components of subjective well-being. *Psychology and Aging*, *25*(3), 725–729. https://doi.org/10.1037/a0018511

Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological wellbeing revisited. *Journal of Personality and Social Psychology*, *69*(4), 719–727. https://doi.org/10.1037/0022-3514.69.4.719

Sasaki, N., Watanabe, K., Imamura, K., Nishi, D., Karasawa, M., Kan, C., Ryff, C. D., & Kawakami, N. (2020). Japanese version of the 42-item psychological wellbeing scale (PWBS-42): a validation study. *BMC Psychology*, *8*(1), 75. https://doi.org/10.1186/s40359-020-00441-1

Springer, K. W., Pudrovska, T., & Hauser, R. M. (2011). Does psychological well-being change with age? Longitudinal tests of age variations and further exploration of the multidimensionality of Ryff's model of psychological well-being. *Social Science Research*, *40*(1), 392–398. https://doi.org/10.1016/j.ssresearch.2010.05.008

Stallman, H. M. (2010). Psychological distress in university students: A comparison with general population data. *Australian Psychologist*, *45*(4), 249–257. https://doi.org/10.1080/00050067.2010.482109

Topp, C. W., Østergaard, S. D., Søndergaard, S., & Bech, P. (2015). The WHO-5 Well-Being Index: A Systematic Review of the Literature. *Psychotherapy and Psychosomatics*, *84*(3), 167–176. https://doi.org/10.1159/000376585

Tucker, B., Jones, S., Mandy, A., & Gupta, R. (2006). Physiotherapy students' sources of stress, perceived course difficulty, and paid employment: Comparison between Western Australia and United Kingdom. *Physiotherapy Theory and Practice*, *22*(6), 317–328. https://doi.org/10.1080/09593980601059550

Van Dierendonck, D. (2004). The construct validity of Ryff's Scales of Psychological Well-being and its extension with spiritual well-being. *Personality and Individual Differences*, *36*(3), 629–643. https://doi.org/10.1016/s0191-8869(03)00122-3

Vences Camacho, K. A., Márquez Gómez, J. O., & Cardoso Jiménez, D. (2023). Bienestar psicológico en estudiantes universitarios de nuevo ingreso. *RIDE Revista Iberoamericana para la Investigación y el Desarrollo Educativo*, *13*(26). https://doi.org/10.23913/ride.v13i26.1385

Walsh, J., Feeney, C., Hussey, J., & Donnellan, C. (2010). Sources of stress and psychological morbidity among undergraduate physiotherapy students. *Physiotherapy*, *96*(3), 206–212. https://doi.org/10.1016/j.physio.2010.01.005

Waterman, A. S. (1993). Two conceptions of happiness: Contrasts of personal expressiveness (eudaimonia) and hedonic enjoyment. *Journal of Personality and Social Psychology*, *64*(4), 678–691. https://doi.org/10.1037/0022-3514.64.4.678

salud mental

ORIGINAL ARTICLE
Volume 49, Issue 3, May-June 2026
10.17711/SM.0185-3325.2026.18

Sleep Quality, Anxiety, and Depression in Medical Students: A Mediation Model

Adrián Josué Lizcano Baños,[1] Beatriz Martínez Ramírez,[1] Edgar Fernando Peña Torres,[2] María de Lourdes Rojas Armadillo,[1] Daniela León Rojas,[3] Gabriel Antonio Santos Montalvo,[1] Nissa Yaing Torres Soto[1]

[1] Universidad Autónoma del Estado de Quintana Roo, División de Ciencias de la Salud, Chetumal, Quintana Roo, México.

[2] Universidad del Caribe, Ciencias de la Salud, Cancún, Quintana Roo, México.

[3] Instituto Tecnológico de Monterrey, Escuela de Medicina y Ciencias de la Salud, Monterrey, Nuevo León, México.

Correspondence:
Nissa Yaing Torres Soto
Universidad Autónoma del Estado de Quintana Roo, División de Ciencias de la Salud, Av. Erick Paolo Martínez S/N. esquina Av. 4 de marzo; Colonia Magisterial. C.P. 77039; Chetumal, Quintana Roo, México.
Phone: +52 (66) 2123-8381
Email: nissa.torres@uqroo.edu.mx

Received: 8 November 2024
Accepted: 4 June 2025

Citation:
Lizcano Baños, A. J., Martínez Ramírez, B., Peña Torres, E. F., Rojas Armadillo, M. de L., León Rojas, D., Santos Montalvo, G. A., & Torres Soto, N. Y. (2026). Sleep Quality, Anxiety, and Depression in Medical Students: A Mediation Model. *Salud Mental*, *49*(3), 131–138. https://doi.org/10.17711/SM.0185-3325.2026.18

ABSTRACT

Introduction. The association between sleep and mental health has been observed in the clinical context since individuals with a sleep disorder are more likely to suffer from a mental disorder. Medical students are at high risk in this respect due to the lack of sleep time because of their high workload. **Objective.** To evaluate a structural equation model predicting the presence of depression through the mediation of anxiety, based on sleep quality in medical students. **Method.** A quantitative, descriptive, cross-sectional study was conducted with the medical students of the Autonomous University of the State of Quintana Roo from Chetumal, Quintana Roo, Mexico from February to November 2023. Participants completed a questionnaire assessing sociodemographic factors, sleep quality, anxiety, and depression symptoms. **Results.** Two hundred medical students with an average age of 19.9 years were surveyed to propose a Structural Equation Model, showing that poor sleep quality positively and significantly influences depression, with anxiety serving as a mediator. No direct association was found between poor sleep quality and depression. **Discussion and conclusion.** A high prevalence of poor sleep quality was observed (75%), surpassing the rates reported in Brazil (68.8%), China (19%), and Lithuania (40%). Moreover, the study showed that women students exhibited higher rates of anxiety and depression. This study underscores the association between sleep quality and mental health, demonstrating that poor sleep quality contributes to increased anxiety and depression among medical students.

Keywords: Sleep quality, anxiety, depression, structural equation model, medical students.

RESUMEN

Introducción. La asociación entre el sueño y la salud mental se ha visto en el contexto clínico ya que las personas que presentan algún trastorno del sueño son más propensas a sufrir de algún trastorno mental. Los estudiantes de Medicina son una población en riesgo por el poco tiempo con el que cuentan para dormir. **Objetivo.** Evaluar un Modelo de Ecuaciones Estructurales que prediga la presencia de depresión mediado por la ansiedad de acuerdo con la calidad del sueño de los estudiantes. **Método.** Se realizó un estudio cuantitativo, descriptivo y transversal con estudiantes de medicina de la Universidad Autónoma del Estado de Quintana Roo en Chetumal, Quintana Roo, México de febrero a noviembre del 2023. Los estudiantes fueron encuestados sobre factores sociodemográficos, calidad del sueño, así como síntomas de ansiedad y depresión. **Resultados.** Se encuestaron a 200 estudiantes con un promedio de edad de 19.9 años para proponer un Modelo de Ecuaciones Estructurales el cual demostró que una pobre calidad del sueño afecta positiva y significativamente en la depresión, siendo mediado por la ansiedad. No se encontró una asociación directa entre calidad del sueño y depresión. **Discusión y conclusión.** Se observó una gran prevalencia de pobre calidad del sueño (75%), superando lo reportado en Brasil (68.8%), China (19%) y Lituania (40%), demostrando a su vez que las mujeres presentan ansiedad y depresión más frecuentemente. Este estudio demuestra que una pobre calidad del sueño contribuye a un incremento en los niveles de ansiedad y depresión de los estudiantes de Medicina.

Palabras clave: Calidad del sueño, ansiedad, depresión, Modelo de Ecuaciones Estructurales, estudiantes de medicina.

INTRODUCTION

Sleep is an essential component of life, required for learning, undertaking physical activity, and maintaining both physical and mental health (Jalali et al., 2020). It is a crucial physiological function, the quality of which depends on a variety of environmental and intrinsic factors interacting with each other (Toscano-Hermoso et al., 2020).

The functions of sleep have been summarized in theoretical models from various areas of study, underlining its importance for neurodevelopment, neuronal synaptic plasticity, memory consolidation, metabolic functions, immune system regulation, general well-being, and survival (Miletínová & Bušková, 2021). These theories work together to explain the ultimate purpose of sleep and suggest that insufficient or interrupted sleep can affect health. Poor sleep quality is associated with physical and psychological consequences such as mood disorders, anxiety, aggression, cognitive impairment, attention deficit disorder, autism, Prader-Willi syndrome, and Smith-Magenis syndrome (Clement-Carbonell et al., 2021; Garbarino, 2020).

The term “sleep quality” in sleep medicine refers to various metrics, including total sleep time, sleep latency, efficiency, maintenance, disturbances, and total wakefulness. It can be assessed objectively through polysomnography and actigraphy, or subjectively through sleep journals and retrospective questionnaires (Fabbri et al., 2021).

Prevalence of poor sleep quality varies by sociodemographic characteristics, with reports indicating that 22% to 65% of the general population experiences some form of sleep disorder (Yassin et al., 2020). In Mexico, the 2016 National Health and Nutrition Survey (ENSANUT) was the first to reveal a high prevalence of various sleep disorders among the adult population. It found that 28.4% of adults had short sleep duration, 18.8% suffered from insomnia, and 27.3% were at risk for obstructive sleep apnea (Gaona-Pineda et al., 2021). The 2018 National Survey on Health and Aging in Mexico (ENASEM) reported that 46.6% of women and 32.4% of men surveyed experienced frequent sleep difficulties, with a 2.2% increase for women in 2021. However, these studies focused primarily on adults aged 53 and older (Instituto Nacional de Estadística Geografía e Informática [INEGI], 2018, 2021).

Anxiety and depression are a significant health problem among university students in general (Mirza et al., 2021). However, several studies have evaluated differences in the prevalence of anxiety and depression between medical and non-medical students, finding that anxiety is significantly more prevalent in medical students (Moreira de Sousa et al., 2018). Findings are mixed for depression, with studies observing either higher or lower prevalence among medical undergraduates (Mirza et al.,2021). Regarding sleep quality, several studies have demonstrated that medical students display more impairments in sleep quality (Corrêa et al., 2017) due to their demanding workloads, experiencing significant stress. This leads to less sleeping time, substance abuse to stay awake, poor sleep maintenance and disturbances, and poor overall sleep quality, which can cause long-term mental health issues (McKinley et al., 2022; Paniagua et al., 2023;Yassin et al., 2020).

Research has shown that poor sleep quality stemming from sleep deprivation negatively affects somatic, cognitive, emotional, and behavioral functions (Suardiaz Muro et al., 2020). A cross-sectional study by Oh et al., (2019) found a link between sleep disorders and psychiatric comorbidities, with individuals at higher risk for insomnia more likely to experience anxiety and depression. Nearly half the participants with insomnia suffered from either anxiety, depression, or both.

These associations between sleep quality and depression have been widely observed, with depression being known to cause poor sleep quality. Recently, however, more emphasis has been placed on sleep quality (Joo et al., 2022). The theoretical model of depression is based on cognitive vulnerability, whereby a self-concept of helplessness and low self-esteem are activated by catastrophic or negative events that interact with stressors to produce the condition (Nima et al., 2013). The same is true of anxiety, which is strongly associated with negative affectivity or the experience of stressors and other negative emotional states (Eysenck &Fajkowska, 2018). Poor sleep quality affects the regulatory mechanisms mentioned previously that enable a person to weather stressors and negative events.

Research has shown that anxiety precedes depression in the elderly, and it has also been demonstrated that poor sleep quality can lead to either depression or anxiety (Chen et al., 2022). However, the association among these three variables remains unclear, especially since poor sleep quality appears to precede both affective disorders, while anxiety predicts the onset of depression. Anxiety is therefore hypothesized to have a mediating effect.

The overall objective of the present research was to analyze the effect of sleep quality as a predictor of depression mediated by anxiety among medical students at the Autonomous University of Quintana Roo (UAEQROO). The specific objectives were to evaluate the prevalence of anxiety and depression in medical undergraduates from the first to fourth semesters, assess their sleep quality of students, and determine whether poor sleep quality can predict the presence of depression or whether it needs to be mediated by anxiety.

METHOD

Study design

A quantitative, descriptive, cross-sectional study was conducted in a Health Sciences Division in the municipality of

Othón P. Blanco, Chetumal, in the southern region of Quintana Roo, Mexico from February to November 2023.

Subjects

The study population included medical students from the first to fourth semesters at the Autonomous University of Quintana Roo. Sample size calculation for a finite population was performed with a 95% confidence interval and a 5% margin of error, yielding a total sample of 200 participants selected by non-probabilistic convenience sampling.

Inclusion and exclusion criteria

Inclusion criteria for the study were being medical students of either sex enrolled in the first to fourth semesters, who were willing to participate, and provided their informed consent. Exclusion criteria included being under medical treatment for a mental disorder or having had a prior diagnosis of anxiety or depression.

Measurements

Sociodemographic data

Students were asked about their sex, age, family income, and the semester in which they were enrolled, and whether they had had a prior diagnosis or treatment for mental health conditions. The last two questions were included for exclusion purposes and were not essential for the analysis of this study.

Instruments

Pittsburgh sleep quality index

The Pittsburgh Sleep Quality Index (PSQI) was used to assess sleep quality. This 24-item questionnaire provides information on various aspects of sleep, including sleep duration, latency, and the frequency and severity of sleep problems. It provides seven component scores, each ranging from 0 to 3, which are added to produce an overall score from 0 to 21. Higher scores indicate worse sleep quality. The PSQI evaluates sleep quality in the past month, distinguishing between transient and persistent sleep disorders (Buysse et al., 1989). The instrument has demonstrated adequate reliability, with a Cronbach's alpha of .83, and has been validated for use in populations with anxiety and Spanish-speakers (de la Vega et al., 2015).

Hamilton anxiety scale

The Hamilton Anxiety Scale comprises 14 items assessing the severity of anxiety symptoms. Each item is rated from 0 (absent) to 4 (severe). A total score ranging from 6 to 14 out of a maximum of 56 points indicates mild anxiety, while scores greater than 15 denote moderate to severe anxiety (Instituo Mexicano de Seguridad Social [IMSS], 2010). The scale has a reliability index ranging from .79 to .86 (IMSS, 2010).

Beck depression inventory

The Beck Depression Inventory (BDI) includes 21 items scored from 0 to 3 based on symptom severity. It evaluates affective, cognitive, somatic, and vegetative symptoms. The total score ranges from 0 to 63 points, with scores over 20 indicating depression. For those with depression, scores are categorized as follows: 0 to 13 (minimal depression), 14 to 19 (mild depression), 20 to 28 (moderate depression), and 29 to 63 (severe depression) (Richter et al., 1998). The BDI has shown an average coefficient alpha of .75, with differences between psychiatric (.88) and non-psychiatric (.82) populations (Jackson-Koku, 2016).

Procedure

Prior to the administration of the surveys, permission was requested from the university authorities. Once the intervention had been approved, students were invited to participate in the survey by asking the professor responsible for the primary health care program to give up an hour of his time during the classes associated with the program.

Data collection took place from April to June 2023 using Google Forms. During that time, a member of the research team spoke to students in their classrooms to request their collaboration. The researcher explained the objective of the research, the potential benefits, the minimal risks associated with the project, and the inclusion, exclusion and elimination criteria. Students were also provided with an informed consent form containing more detailed information and, if they agreed to participate, were asked check the box with the option "Yes, I agree". If they met the inclusion criteria, they continued filling out the survey under the supervision of a research team member. The survey included the instruments previously mentioned (Pittsburgh Sleep Quality Index, Hamilton Anxiety Scale, and Beck Depression Inventory) and a sociodemographic data form asking about their family income, the semester in which they were enrolled, and their sex. Students were not allowed to participate if they had a prior diagnosis of anxiety or depression made by a medical practitioner, and/or were taking antidepressants.

Once the sample quota had been reached, the survey was discontinued and data management proceeded. The fact that the survey was conducted on Google Forms, made it possible to download the data onto a spreadsheet. The data were downloaded onto a laptop and processed in Excel. The answers were assigned a numerical value so that missing values could subsequently be filled in with the mean scores of a given question. Once the process had been completed, the data were uploaded onto the Statistical Package for Social Sciences where they were analyzed.

Statistical analysis

Descriptive statistics, including minimum and maximum values, arithmetic means, and standard deviation, were calculated using IBM SPSS Statistics 26. Normality of data was assessed using the Skewness and Kurtosis test. Pearson's correlation coefficient was used to analyze the linear associations between study variables, indicating how changes in one variable relate to changes in another, with values ranging from -1 to +1 (Kirch, 2008).

Structural Equation Modeling (SEM) was performed using EQS 6 to examine the effect of sleep quality on depression, mediated by anxiety.

Practical, statistical, and population goodness-of-fit indicators were used to assess the relevance of the model. For statistical goodness-of-fit, the Chi-Square (χ^2) statistic was employed to determine the relationship between nominal variables. The hypothetical model was deemed not relevant due to a significant p-value ($p > .05$) (Bentler, 2007). However, the efficiency of the theoretical model was compared to a saturated model that includes all possible relationships between variables, as indicated by the Degrees of Freedom (*df*). Since the χ^2 statistic can be influenced by sample size, relative χ^2, calculated by dividing adjusted χ^2 by the degrees of freedom, was used (Field, 2024).

Practical indicators yielded values close to 1.0, suggesting adequate goodness-of-fit for the model. Examples of these indicators include the Bentler-Bonett Normalized Goodness of Fit Index (BBNFI), the Bentler-Bonett Non-Normalized Goodness of Fit Index (BBNNFI), and the Root Mean Square Error of Approximation (RMSEA), which measures the mean population fit with a value $\leq .09$.

To further evaluate the impact of sex, a dependent variable on each measured value, a t-test was conducted to analyze statistically significant differences between the groups (Field, 2024).

Ethical considerations

This study was submitted for approval to an institutional ethics committee with registration number CONBIOETICA-23-CEI-001-20231115 and was accepted. It complies with the Mexican General Health Law regarding health research, in accordance with Article 3, Section III, for the prevention and control of health issues. It is also based on Article 13, as it sought to uphold the principle of respect for the dignity and protection of the rights and well-being of every individual participating in this study. Moreover, it aimed to prioritize the benefits for participants over the foreseeable risks of the study, in line with Section IV of Article 14. Additionally, informed consent was obtained, and the purpose of the study was explained to each participant, as required by Section V of Article 14, as well as Articles 20, 21 and 22.

RESULTS

Participants

A total of 200 students were surveyed, with a mean age of 19.9 years. Of these, 42% were male (*n* = 84) and 58% female (*n* = 116). Distribution by semester was as follows: 37.5% were in the first, 18.5% in the second, 19.5% in the third, and 24.5% in the fourth semester. Regarding family income, 44% of participants had an income ranging from $5,000 to $10,000 pesos, 30.5% had an income of $10,001 to $20,000 pesos, 18% had an income from $20,001 to $30,000 pesos, and 4% had an income of over $40,001 pesos (see Table 1).

Table 1
Sociodemographic characteristics

	F	%
Sex		
Male	84	42%
Female	116	58%
Monthly family income in Mexican pesos		
$5,000–$10,000	88	44%
$10,001–$20,000	61	30.5%
$20,001–$30,000	36	18%
$30,001–$40,000	7	3.5%
>$40,001	8	4%
Semester		
First semester	75	37.5%
Second semester	37	18.5%
Third semester	39	19.5%
Fourth semester	49	24.5%

Note: f = Frequency.

Univariate statistics

In Table 2, the univariate statistics regarding the minimum and maximum scores obtained are shown as well as the intern consistency acquired on each scale. Every one of them acquired an acceptable reliability according to Kaiser (Kaiser, 1974).

Table 2
Univariate statistics of scales

Items	*Min.*	*Max.*	*Mean*	*SD*	*Cronbach's alpha*
Sleep quality	.0	2.53	.867	.426	.77
Anxiety	.0	2.69	1.05	.621	.90
Depression	.0	2.33	.699	.513	.93

Note: Min = Minimum, *Max* = Maximum, *SD* = Standard deviation.

Frequency of students with poor sleep quality

Table 3 presents an assessment of the sleep quality questionnaire, with a threshold value of 5 points established to categorize poor sleep quality. Students scoring above this threshold (> 5) were classified as having poor sleep quality. It was found that 71.5% of medical students in the basic cycles fell into this category, representing 143 of the 200 students surveyed. Conversely, students scoring 5 or less were classified as having acceptable sleep quality, accounting for 28.5% of the sample, or 57 students.

Frequency of students presenting with anxiety

The anxiety questionnaire was analyzed to determine symptom severity. It was found that 14% of students had scores between 0 and 5, indicating no anxiety (*n* = 28). A score between 6 and 14 was observed in 39% of the sample, classifying these students as having mild anxiety (*n* = 78). The remaining 47% of students scored 15 or higher, indicating moderate to severe anxiety (*n* = 94) (see Table 3).

Frequency of students presenting with depression

The depression scores revealed that 50% of students had minimal levels of depression, with scores of 13 or less. The remaining 50% exhibited some degree of depression, with 16% classified as having mild depression, 22% as having moderate depression, and 12% as having severe depression (see Table 3).

Table 3
Frequencies and percentages of sleep quality, anxiety and depression

	Assessment criteria, frequency and percentages				
Factors	*Criteria*	*f*	*%*	*Sk*	*K*
Sleep quality				.557	.758
Poor sleep quality	> 5	143	71.5%		
Good sleep quality	< 5	57	28.5%		
Anxiety				.469	-.554
No anxiety	0–5	28	14%		
Mild anxiety	6–14	78	39%		
Moderate to severe anxiety	≥ 15	94	47%		
Depression				.617	-.094
Minimum	0–13	100	50%		
Mild	14–19	32	16%		
Moderate	20–28	44	22%		
Severe	29–63	24	12%		

Note: f = Frequency, *Sk* = Skewness, *K* = Kurtosis.

Sex differences

Differences in latent variables, both dependent and non-dependent, were examined by sex. The analysis revealed that there were no statistically significant differences between the sexes as regards sleep quality. However, variables such as anxiety (t = -2.108, p < .05, df = 198) and depression (t = -2.298, p < .05, df = 198) showed statistically significant differences by sex, with higher mean scores being observed for women in both cases (see Table 4).

Table 4
Sex differences in poor sleep quality, anxiety, and depression

	Sex								
	Male		*Female*		*Levene test*			*T test*	
Variables	*Mean*	*SD*	*Mean*	*SD*	*F*	*P*	*t*	*df*	*P*
Poor sleep quality	.83	.45	.89	.40	.119	.731	-.915	198	.361
Anxiety	.94	.62	1.12	.60	.039	.844	-2.108	198	.036
Depression	.60	.54	.76	.48	1.149	.285	-2.298	198	.023

Note: SD = standard deviation, *F* = levene statistic, *P* = *p* value, *df* = degrees of freedom, *t* = *t* statistics.

Pearson's correlation analysis

A correlation analysis was performed of the scores obtained for sleep quality, depression, and anxiety. Pearson's correlation coefficients were as follows: for sleep quality and anxiety, r = .75 (p < .01); for sleep quality and depression, r = .64 (p < .01); and for anxiety and depression, r = .76 (p < .01). Results indicate a strong association between variables.

Structural model

The results of the structural model (Figure 1) indicate that the manifest variables, based on item set plots, exhibit acceptable factorial weights for each of the first-order factors studied (poor sleep quality, anxiety, and depression). The analysis revealed that poor sleep quality has a positive, significant influence on the presence of depression, mediated by anxiety. However, no direct association was found between poor sleep quality and depression in medical students. This suggests that poorer sleep quality leads to increased anxiety, which, in turn, is associated with a higher incidence of depression.

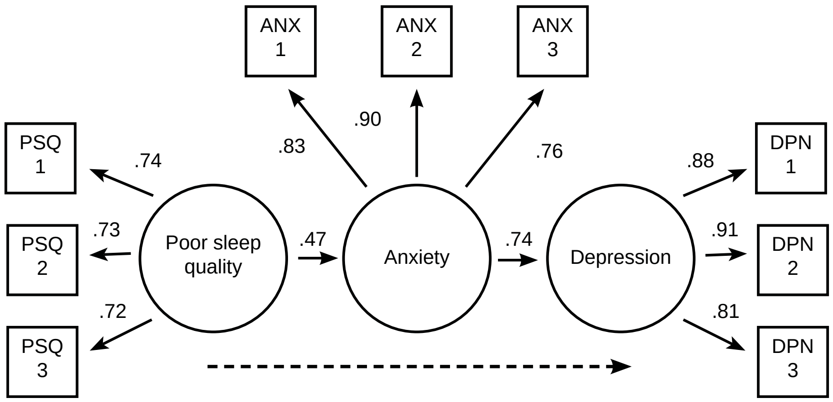


Figure 1. Structural equation model of the effect of sleep quality on depression mediated by anxiety $\chi^2 = 46.969_{(dof22)}$, p <.001, $_{relative}\chi^2 = 1.86$, BBNFI = .96, BBNNFI = .97, CFI = .98, RMSEA = .07, α Cronbach = .92, RHO coefficient = .95.

Note: PSQ = Poor sleep quality, ANX = Anxiety, DPN = Depression, χ^2 = Chi squared, χ^2 relative = Chi squared relative, BBNFI = Bentler-bonnet normed fit index, BBNNFI = Bentler-bonnet non normed fit index, CFI = Comparative fit index, RMSEA = Root mean square error of approximation.

DISCUSSION AND CONCLUSION

Our study enabled us to establish an association between sleep quality, anxiety and depression, not merely as a general interaction but also as a predictor that poor sleep quality leads to depression with anxiety as a mediator. It also made it possible to analyze the prevalence of these disorders in the medical student population in southeastern Mexico, underlining concerns about their high frequency.

This study found that 75% of students reported poor sleep quality, higher than the prevalence reported by Perotta et al.(2021) in Brazil (68.8%), Feng et al.(2005) in China (19%), and Preišegolavičiūtė et al. (2010) in Lithuania (40%). Moreover, 86% of students experienced some degree of anxiety, while 50% had some degree of depression. These findings contrast with those of Elguera et al. (2021) in Peru, where only 56.7% of medical students reported some degree of anxiety and 37.2% reported insomnia.

The high frequencies observed have significant implications, suggesting that many students have sleep and mental health issues that could become more severe over time. Findings by Landeros et al. (2019) from a longitudinal study in Mexico suggest that the prevalence of sleepiness, poor sleep quality, anxiety, and depression increases significantly over time.

Consistent with studies by Moalla et al., (2020) in Turkey, Zhang et al., (2023) in China, and Gregory et al., (2011) in the United Kingdom, poor sleep quality was found to be significantly related to higher anxiety and depression scores among medical students in this study. These associations are well established in psychiatry, where sleep disturbances are recognized as symptoms of anxiety and depression. However, sleep disturbances may also precede these conditions by impairing emotional regulation (Gregory et al., 2011; O'Leary et al., 2017).

The t-test conducted revealed statistically significant differences for anxiety and depression, with higher mean scores being observed for women. This finding is consistent with Chen et al. (2022), who also reported higher mean scores in women for anxiety and depression, although their study identified differences in sleep quality with higher means for women, not found in the present study. Anxiety and depression are known to affect women at higher rates than men, potentially due to biological factors or traditional gender roles (Gaus et al., 2015; McLean et al., 2011). For example, Arcand et al. (2020) found that higher masculinity was associated with lower symptoms of anxiety and depression.

The results of the structural model (Figure 1) indicate that the factor loadings for each of the first-order factors—poor sleep quality, anxiety, and depression—are high and significant (p < .05), demonstrating convergent construct validity. Additionally, the structural coefficients between latent factors were lower than the factor loadings, confirming discriminant construct validity (Corral & Figueredo, 1999). The goodness-of-fit indicators for the statistical (χ^2; relative χ^2, p < .001), practical (BBNFI, BBNNFI, CFI), and population (RMSEA) measures suggest that the theoretical model fits the empirical data well.

Our study demonstrated that poor sleep quality positively and significantly affects anxiety-mediated depression among medical students at the Health Sciences Division of the UAEQROO. These findings align with those of Zhu et al. (2023), who reported significant paths between sleep quality and anxiety and depression symptoms (a = .704), as well as between anxiety, depression, and students' self-perceived health status (b = .448). They found that the indirect effect of sleep quality on self-perceived health status through anxiety and depression was greater than the direct effect (.227 and .315 respectively). This means that people with poor sleep quality who tend to experience anxiety and depression often perceive themselves as having lower health status, which affects their quality of life.

This mediation effect is supported by Chen et al., (2022), who used the Sobel-Goodman mediation test, finding that PSQI scores were positively associated with Self-Rating Depression Scale (SDS) scores among medical students. This association was partially mediated by State-Trait Anxiety Inventory (STAI) scores, accounting for 83.79% of the association after adjusting for potential confounders. This suggests that sleep quality impacts trait anxiety ($\beta = 2.480$, $p < .001$), which in turn affects depression ($\beta = .470$, $p < .001$). However, unlike our study, a direct association between sleep quality and depression was also observed ($\beta = .225$, $p < .001$).

The increase in depression and anxiety symptoms appears to be associated with academic years with heavy theoretical loads, which negatively impact sleep quality and contribute to anxiety and depression. Given the high demand for medical degree courses, characterized by rigorous schedules and multiple tasks, it is essential to design and implement interventions aimed at improving sleep hygiene. Effective strategies could include recommendations from the Academy of Cognitive Behavioral Therapy for Insomnia, which focus on modifying pre-sleep habits and optimizing the sleep environment. Other suggestions include engaging in activities that promote better sleep quality such as exercise and following a consistent sleep schedule, mainly in the clinical setting (Altena et al., 2020; Huang & Sullivan, 2021).

The results of this study highlight the prevalence of mental disorders among medical students. They underline the need for the timely referral of students experiencing significant distress to university psychology clinics for counseling and, if necessary, further medical evaluation and treatment.

However, it is important to acknowledge the limitations of this study. Firstly, the small sample size restricts the generalizability of the findings on poor sleep quality, anxiety, and depression to the broader population of medical students. Nonetheless, the study highlights a significant increase in the prevalence of these mental health disorders over time, particularly in comparison with studies conducted in other countries.

Additionally, the study excluded students previously diagnosed with and treated for mental health disorders. The presence or absence of mental health symptoms at the time of the survey was not assessed, which may have influenced the high prevalence observed.

Another important consideration is that the cross-sectional design of the study limits the ability to draw causal inferences about the relationship between poor sleep quality, anxiety, and depression. The structural equation model used in the study, while effective for modeling direct dependencies among these variables, does not allow for causal conclusions. A longitudinal study would be beneficial for determining whether students with poor sleep quality are more likely to develop anxiety and depression over time, particularly in clinical settings.

Financing

No funding was received for producing this article.

Conflict of interests

The authors declare that they have no conflicts of interest.

Acknowledgments

We would like to thank the Health Sciences Division of the Autonomous University of Quintana Roo for the support received during the collection of data on students' mental health.

REFERENCES

Altena, E., Baglioni, C., Espie, C. A., Ellis, J., Gavriloff, D., Holzinger, B., Schlarb, A., Frase, L., Jernelöv, S., & Riemann, D. (2020). Dealing with sleep problems during home confinement due to the COVID-19 outbreak: Practical recommendations from a task force of the European CBT-I Academy. *Journal of Sleep Research*, *29*(4). https://doi.org/10.1111/jsr.13052

Arcand, M., Juster, R., Lupien, S. J., & Marin, M. (2020). Gender roles in relation to symptoms of anxiety and depression among students and workers. *Anxiety, Stress, & Coping*, *33*(6), 661–674. https://doi.org/10.1080/10615806.2020.1774560

Bentler, P. M. (2007). On tests and indices for evaluating structural models. *Personality and Individual Differences*, *42*(5), 825–829. https://doi.org/10.1016/j.paid.2006.09.024

Buysse, D. J., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: A New Instrument for Psychiatric Practice and Research. *Psychiatry Research*, *28*(2), 193–213. https://doi.org/10.1016/0165-1781(89)90047-4

Chen, J., Tuersun, Y., Yang, J., Xiong, M., Wang, Y., Rao, X., & Jiang, S. (2022). Association of depression symptoms and sleep quality with state-trait anxiety in medical university students in Anhui Province, China: a mediation analysis. *BMC Medical Education*, *22*(1). https://doi.org/10.1186/s12909-022-03683-2

Clement-Carbonell, V., Portilla-Tamarit, I., Rubio-Aparicio, M., & Madrid-Valero, J. J. (2021). Sleep Quality, Mental and Physical Health: A Differential Relationship. *International Journal of Environmental Research and Public Health*, *18*(2), 1–8. https://doi.org/10.3390/ijerph18020460

Corral, V., & Figueredo, A. (1999). Convergent and Divergent Validity of Three Measures of Conservation Behavior. *Environment and Behavior*, *31*(6), 805–820. https://doi.org/10.1177/00139169921972353

Corrêa, C. D. C., Oliveira, F. K. D., Pizzamiglio, D. S., Ortolan, E. V. P., & Weber, S. A. T. (2017). Sleep quality in medical students: a comparison across the various phases of the medical course. *Jornal Brasileiro de Pneumologia*, *43*(4), 285–289. https://doi.org/10.1590/s1806-37562016000000178

De la Vega, R., Tomé-Pires, C., Solé, E., Racine, M., Castarlenas, E., Jensen, M. P., & Miró, J. (2015). The Pittsburgh Sleep Quality Index: Validity and factor structure in young people. *Psychological Assessment*, *27*(4), e22–e27. https://doi.org/10.1037/pas0000128

Elguera, A., Talavera, J., Cárdenas, M., & Vargas, J. (2021). Trastornos del sueño y ansiedad de estudiantes de Medicina del primer y último año en Lima, Perú. *Revista de la Fundación Educación Médica*, *24*(3), 133–138. https://doi.org/10.33588/fem.243.1125

Eysenck, M. W., & Fajkowska, M. (2018). Anxiety and depression: toward overlapping and distinctive features. *Cognition and Emotion*, *32*(7), 1391–1400. https://doi.org/10.1080/02699931.2017.1330255

Fabbri, M., Beracci, A., Martoni, M., Meneo, D., Tonetti, L., & Natale, V. (2021). Measuring Subjective Sleep Quality: A Review. *International Journal of Environmental Research and Public Health*, *18*(3), 1082. https://doi.org/10.3390/ijerph18031082

Feng, G., Chen, J., & Yang, X.-Z. (2005). Study on the status and quality of sleep-related influencing factors in medical college students. *Zhongua Liu Xing Bing Xue Za Zhi*, *26*(5), 328–331. https://pubmed.ncbi.nlm.nih.gov/16053754/

Field, A. (2024). *Discovering statistics using IBM SPSS statistics* (6th ed.). Sage.

Gaona-Pineda, E. B., Martinez-Tapia, B., Rodríguez-Ramírez, S., Guerrero-Zúñiga, S., Perez-Padilla, R., & Shamah-Levy, T. (2021). Dietary patterns and sleep disorders in Mexican adults from a National Health and Nutrition Survey. *Journal of Nutritional Science*. https://doi.org/10.1017/jns.2021.24

Garbarino, S. (2020). Sleep Disorders across the Lifespan: A Different Perspective. *International Journal of Environmental Research and Public Health*, *17*(23), 9025. https://doi.org/10.3390/ijerph17239025

Gaus, V., Kiep, H., Holtkamp, M., Burkert, S., & Kendel, F. (2015). Gender differences in depression, but not in anxiety in people with epilepsy. *Seizure*, *32*, 37–42. https://doi.org/10.1016/j.seizure.2015.07.012

Gregory, A. M., Buysse, D. J., Willis, T. A., Rijsdijk, F. V., Maughan, B., Rowe, R., Cartwright, S., Barclay, N. L., & Eley, T. C. (2011). Associations between sleep quality and anxiety and depression symptoms in a sample of young adult twins and siblings. *Journal of Psychosomatic Research*, *71*(4), 250–255. https://doi.org/10.1016/j.jpsychores.2011.03.011

Huang, L. T., & Sullivan, K. L. (2021). Sleep, anxiety, and depression. In C. Martin, L. Hunter (Eds.), In *The Neuroscience of Depression: Genetics, Cell Biology, Neurology, Behavior, and Diet* (pp. 405–414). Elsevier. https://doi.org/10.1016/b978-0-12-817935-2.00014-3

Instituto Nacional de Estadística Geografía e Informática. (2018). *Encuesta nacional sobre salud y envejecimiento en México (ENASEM) 2018*. https://www.inegi.org.mx/contenidos/programas/enasem/2018/doc/enasem_2018_nota_tecnica.pdf

Instituto Nacional de Estadística Geografía e Informática. (2021). *Encuesta nacional sobre salud y envejecimiento en México (ENASEM) y encuesta de evaluación cognitiva 2021*. https://www.inegi.org.mx/contenidos/programas/enasem/2021/doc/enasem_2021_nota_tecnica.pdf

Instituto Mexicano del Seguro Social. (2010). *Guía de Referencia Rápida. Diagnóstico y Tratamiento de los Trastornos de Ansiedad en el Adulto*. https://imss.gob.mx/sites/all/statics/guiasclinicas/392GRR.pdf

Jackson-Koku, G. (2016). Beck Depression Inventory. *Occupational Medicine*, *66*(2), 174–175. https://doi.org/10.1093/occmed/kqv087

Jalali, R., Khazaie, H., Khaledi Paveh, B., Hayrani, Z., & Menati, L. (2020). The Effect of Sleep Quality on Students' Academic Achievement. *Advances in Medical Education and Practice*, *11*, 497–502. https://doi.org/10.2147/amep.s261525

Joo, H. J., Kwon, K. A., Shin, J., Park, S., & Jang, S. (2022). Association between sleep quality and depressive symptoms. *Journal of Affective Disorders*, *310*, 258–265. https://doi.org/10.1016/j.jad.2022.05.004

Kaiser, H. F. (1974). An Index of Factorial Simplicity. *Psychometrika*, *39*(1), 31–36. https://doi.org/10.1007/bf02291575

Kirch, W. (2008). Pearson's Correlation Coefficient. In *Encyclopedia of Public Health, 1090–1091*. Springer Netherlands. https://doi.org/10.1007/978-1-4020-5614-7_2569

Landeros, O., Valadés, A., Cosme, J. A., & Arenas, F. E. (2019). Cambios en la calidad de sueño, somnolencia diurna, ansiedad y depresión durante el internado médico de pregrado. *Investigación en Educación Médica*, *8*(31), 48–54. https://doi.org/10.22201/facmed.20075057e.2019.31.18118

McKinley, B., Daines, B., Allen, M., Pulsipher, K., Zapata, I., & Wilde, B. (2022). Mental health and sleep habits during preclinical years of medical school. *Sleep Medicine*, *100*, 291–297. https://doi.org/10.1016/j.sleep.2022.09.001

McLean, C. P., Asnaani, A., Litz, B. T., & Hofmann, S. G. (2011). Gender differences in anxiety disorders: Prevalence, course of illness, comorbidity and burden of illness. *Journal of Psychiatric Research*, *45*(8), 1027–1035. https://doi.org/10.1016/j.jpsychires.2011.03.006

Miletínová, E., & Bušková, J. (2021). Functions of Sleep. *Physiological Research*, *70*(2), 177-182. https://doi.org/10.33549/physiolres.934470

Mirza, A. A., Baig, M., Beyari, G. M., Halawani, M. A., & Mirza, A. A. (2021). Depression and Anxiety Among Medical Students: A Brief Overview. *Advances in Medical Education and Practice*, *12*, 393–398. https://doi.org/10.2147/amep.s302897

Moalla, M., Maalej, M., Nada, C., Sellami, R., Ben Thabet, J., Zouari, L., & Maalej, M. (2020). Sleep disorders, depression and anxiety among medicine university students in Sfax. *European Psychiatry*, *33*(S1), s268–s269. https://doi.org/10.1016/j.eurpsy.2016.01.704

Moreira de Sousa, J., Moreira, C. A., & Telles-Correia, D. (2018). Anxiety, Depression and Academic Performance: A Study Amongst Portuguese Medical Students Versus Non-Medical Students. *Acta Médica Portuguesa*, *31*(9), 454–462. https://doi.org/10.20344/amp.9996

Nima, A. A., Rosenberg, P., Archer, T., & Garcia, D. (2013). Anxiety, Affect, Self-Esteem, and Stress: Mediation and Moderation Effects on Depression. *PLoS ONE*, *8*(9), e73265. https://doi.org/10.1371/journal.pone.0073265

Oh, C., Kim, H. Y., Na, H. K., Cho, K. H., & Chu, M. K. (2019). The Effect of Anxiety and Depression on Sleep Quality of Individuals With High Risk for Insomnia: A Population-Based Study. *Frontiers in Neurology*, *10*. https://doi.org/10.3389/fneur.2019.00849

O'Leary, K., Bylsma, L. M., & Rottenberg, J. (2017). Why might poor sleep quality lead to depression? A role for emotion regulation. *Cognition and Emotion*, *31*(8), 1698–1706. https://doi.org/10.1080/02699931.2016.1247035

Paniagua, D., Salvador, J., Ayala, K., Rodríguez, L., Elizarraraz, L., García, P., Moya, M., & Morales, O. (2023). Impacto en la calidad del sueño y trastornos psicológicos en estudiantes universitarios. *Jóvenes En La Ciencia*, *21*, 1–15. https://www.jovenesenlaciencia.ugto.mx/index.php/jovenesenlaciencia/article/view/4107

Perotta, B., Arantes-Costa, F. M., Enns, S. C., Figueiro-Filho, E. A., Paro, H., Santos, I. S., Lorenzi-Filho, G., Martins, M. A., & Tempski, P. Z. (2021). Sleepiness, sleep deprivation, quality of life, mental symptoms and perception of academic environment in medical students. *BMC Medical Education*, *21*(1). https://doi.org/10.1186/s12909-021-02544-8

Preišegolavičiūtė, E., Leskauskas, D., & Adomaitienė, V. (2010). Associations of quality of sleep with lifestyle factors and profile of studies among Lithuanian students. *Medicina (Kaunas)*, *46*(7), 482–489. https://pubmed.ncbi.nlm.nih.gov/20966622/

Richter, P., Werner, J., Heerlein, A., Kraus, A., & Sauer, H. (1998). On the Validity of the Beck Depression Inventory. *Psychopathology*, *31*(3), 160–168. https://doi.org/10.1159/000066239

Suardiaz Muro, M., Morante Ruiz, M., Ortega Moreno, M., Ruiz, M. A., Martín Plasencia, P., & Vela Bueno, A. (2020). Sueño y rendimiento académico en estudiantes universitarios: revisión sistemática. *Revista de Neurología*, *71*(2), 43. https://doi.org/10.33588/rn.7102.2020015

Toscano-Hermoso, M. D., Arbinaga, F., Fernández-Ozcorta, E. J., Gómez-Salgado, J., & Ruiz-Frutos, C. (2020). Influence of Sleeping Patterns in Health and Academic Performance Among University Students. *International Journal of Environmental Research and Public Health*, *17*(8), 2760. https://doi.org/10.3390/ijerph17082760

Yassin, A., Al-Mistarehi, A., Beni Yonis, O., Aleshawi, A. J., Momany, S. M., & Khassawneh, B. Y. (2020). Prevalence of sleep disorders among medical students and their association with poor academic performance: A cross-sectional study. *Annals of Medicine and Surgery*, *58*, 124–129. https://doi.org/10.1016/j.amsu.2020.08.046

Zhang, M., Qin, L., Zhang, D., Tao, M., Han, K., Chi, C., Zhang, Z., Tao, X., & Liu, H. (2023). Prevalence and factors associated with insomnia among medical students in China during the COVID-19 pandemic: characterization and associated factors. *BMC Psychiatry*, *23*(1). https://doi.org/10.1186/s12888-023-04556-8

Zhu, Y., Jiang, C., Yang, Y., Dzierzewski, J. M., Spruyt, K., Zhang, B., Huang, M., Ge, H., Rong, Y., Ola, B. A., Liu, T., Ma, H., & Meng, R. (2023). Depression and Anxiety Mediate the Association between Sleep Quality and Self-Rated Health in Healthcare Students. *Behavioral Sciences*, *13*(2), 82. https://doi.org/10.3390/bs13020082

salud mental

ORIGINAL ARTICLE
Volume 49, Issue 3, May-June 2026
10.17711/SM.0185-3325.2026.19

Self-esteem of Women with Breast Cancer Undergoing Oncological Treatment: A Cross-sectional Study

João Vitor Andrade,[1] Juliana Cristina Martins de Souza,[1] Vânia Regina Bressan,[1] Zélia Marilda Rodrigues Resck,[1] Denismar Alves Nogueira,[2] Fábio de Souza Terra[1]

[1] School of Nursing, Federal University of Alfenas, Alfenas, Minas Gerais, Brazil.
[2] Department of Statistics, Federal University of Alfenas, Alfenas, Minas Gerais, Brazil.

Correspondence:
João Vitor Andrade
School of Nursing - Federal University of Alfenas. Rua Gabriel Monteiro da Silva, 700. Centro - Alfenas/MG CEP: 37130-001.
Phone: +55 (35) 3701-9471
Email: jvma100@gmail.com

Received: 28 December 2024
Accepted: 6 June 2025

Citation:
Andrade, J. V., Souza, J. C. M. de, Bressan, V. R., Resck, Z. M. R., Nogueira, D. A., & Terra, F. de S. (2026). Self-esteem of Women with Breast Cancer Undergoing Oncological Treatment: A Cross-sectional Study. *Salud Mental*, *49*(3), 139–147. https://doi.org/10.17711/SM.0185-3325.2026.19

ABSTRACT

Introduction. Breast cancer is the most common type of cancer and the leading cause of cancer-related mortality among women, with biopsychosocial impacts that can significantly affect self-esteem. **Objective.** To analyze the self-esteem of women with breast cancer undergoing oncological treatment and its association with sociodemographic, clinical, behavioral, and treatment-related variables. **Method.** This is a cross-sectional, quantitative, and descriptive-analytical study conducted with 210 women at a High-Complexity Oncology Center. Data were collected through interviews using the Rosenberg Self-Esteem Scale and analyzed with statistical tests and logistic regression. **Results.** Most participants reported high self-esteem (86.2%), while 11.4% presented average self-esteem and 2.4% exhibited low self-esteem. Religious beliefs, religious habits, symptoms/side effects, and significant life events were associated with self-esteem. In some cases, religious habits, the presence of side effects, and the occurrence of significant events contributed to reducing self-esteem. **Discussion and conclusion.** Despite the predominance of high self-esteem, factors such as religiosity, physical symptoms, and significant life events negatively influence self-esteem. The healthcare team plays an essential role in providing comprehensive care, and future studies should explore interventions designed to promote emotional well-being and self-esteem in women with breast cancer undergoing oncological treatment.

Keywords: Breast neoplasms, self-concept, mental health, quality of life.

RESUMEN

Introducción. El cáncer de mama es el tipo de cáncer más común y la principal causa de mortalidad por cáncer entre las mujeres, con impactos biopsicosociales que pueden afectar significativamente la autoestima. **Objetivo.** Analizar la autoestima de mujeres con cáncer de mama sometidas a tratamiento oncológico y su asociación con variables sociodemográficas, clínicas, conductuales y relacionadas con el tratamiento. **Método.** Se trata de un estudio transversal, cuantitativo y descriptivo-analítico realizado con 210 mujeres en un Centro Oncológico de Alta Complejidad. Los datos fueron recolectados mediante entrevistas utilizando la Escala de Autoestima de Rosenberg y analizados con pruebas estadísticas y regresión logística. **Resultados.** La mayoría de las participantes reportó una autoestima alta (86.2%), mientras que el 11.4% tenía autoestima moderada y el 2.4% autoestima baja. Las creencias religiosas, los hábitos religiosos, los síntomas/efectos secundarios y los eventos significativos de la vida se asociaron con la autoestima. Específicamente, los hábitos religiosos, la presencia de efectos secundarios y la ocurrencia de eventos significativos contribuyeron a la reducción de la autoestima en ciertos casos. **Discusión y conclusión.** A pesar del predominio de una autoestima alta, factores como la religiosidad, los síntomas físicos y los acontecimientos vitales significativos influyen negativamente en la autoestima. El equipo sanitario desempeña un papel esencial en la prestación de una atención integral, y futuros estudios deberían explorar intervenciones dirigidas a promover el bienestar emocional y la autoestima en mujeres con cáncer de mama sometidas a tratamiento oncológico.

Palabras clave: Neoplasias de la mama, autoimagen, salud mental, calidad de vida.

INTRODUCTION

Breast cancer is the most common type of cancer worldwide, with an estimated 2.3 million new cases annually. It is also the leading cause of cancer-related mortality among women, with approximately 666,103 deaths reported globally in 2024 (Ferlay et al., 2024; International Agency for Research on Cancer, 2024). In Brazil, breast cancer remains the most prevalent malignancy among women, with 73,610 new cases expected by 2025, a rate of 66.54 cases per 100,000 women, and approximately 18,000 annual deaths (National Cancer Institute, 2022).

Women diagnosed with breast cancer or undergoing treatment (such as surgery, chemotherapy, radiotherapy, or hormone therapy) face multiple challenges that go beyond the physical illness, including functional limitations, altered body image, and emotional stress. These factors can compromise self-esteem and negatively affect quality of life (Pierrisnard et al., 2018). The type of surgery (mastectomy or conservative) directly influences self-esteem, with lower scores being observed in women who undergo mastectomy (Joaquín-Mingorance et al., 2019). Moreover, side effects such as chemotherapy-induced alopecia and severe fatigue can affect emotional well-being and body image (Dunnill et al., 2018; Versluis et al., 2022).

Self-esteem, defined by Rosenberg (1965) as an individual's overall evaluation of their own worth, plays a central role in coping with chronic illnesses such as breast cancer. In his work on self-esteem, Rosenberg emphasizes the importance of this construct in psychological adjustment, noting that individuals with higher self-esteem tend to display greater emotional resilience and adaptability when coping with stressors. The Transactional Model of Stress and Coping developed by Lazarus and Folkman (1984) reinforces this perspective by positing that self-esteem acts as a psychological resource that mediates emotional and behavioral responses to stressful situations, including chronic illness. Low self-esteem has been consistently associated with greater susceptibility to anxiety, depression, and diminished quality of life (Cortés & Justicia, 2008; Joaquín-Mingorance et al., 2019; Valverde et al., 2014).

Although the importance of self-esteem in the oncological context has been widely recognized, studies have reported conflicting findings. For example, an Iranian study with 261 women reported a high likelihood of low self-esteem (Yektatalab & Ghanbari, 2020), whereas an Indonesian study with 56 participants undergoing neoadjuvant chemotherapy found self-esteem levels within the normal range (Aprilianto et al., 2021). These inconsistencies suggest that sociodemographic, clinical, behavioral, and cultural factors may influence self-esteem outcomes. Few studies have comprehensively examined these dynamics in Brazil, a developing country with continental dimensions and significant regional disparities in income and healthcare access, where religiosity plays a key role (Ipsos Institute, 2023; Martins et al., 2021).

Understanding these associations is essential for developing comprehensive care strategies designed to mitigate damage to self-esteem and enhance well-being. This study therefore aimed to analyze the self-esteem of women with breast cancer undergoing oncological treatment and its association with sociodemographic, clinical, behavioral, and treatment-related variables.

METHOD

Study design

This is a quantitative, cross-sectional study with both descriptive and inferential analytical approaches. Descriptive statistics were employed to characterize the sample, while inferential techniques, specifically regression analysis, were used to examine associations between the variables of interest.

Participants

The study population consisted of women diagnosed with breast cancer at a High-Complexity Oncology Center in Brazil. The population included all women diagnosed with breast cancer at any stage of treatment at the institution in 2022, totaling 270 patients. The inclusion criteria were as follows: being aged 18 or older, having a confirmed breast cancer diagnosis, currently undergoing any form of oncological treatment (such as chemotherapy, radiotherapy, surgery, or hormonal therapy) at the Center, and the ability to understand and complete the data collection instruments. Women with a hearing, vision, speech, or cognitive impairment limiting their ability to answer or complete the data collection instruments were excluded. Participants were selected through direct contact by the researcher at the institution. At least two contact attempts and the implementation of inclusion and exclusion criteria yielded a final population of 210 women.

Measurements

Two instruments were used during data collection. Sociodemographic, behavioral, clinical, and treatment-related variables were assessed using a structured questionnaire developed by the research team based on a literature review. Content was validated by a panel of seven experts, researchers with PhDs with expertise in oncology and/or the development and validation of measurement instruments, who evaluated the items for clarity, coherence, presentation, and relevance. For analytical purposes, the following variables were dichotomized: age (≤ 49 vs. ≥ 50 years), race/ethnicity (White vs. non-White), municipality of residence (Muriaé vs. other), marital status (partnered vs. unpartnered), children (yes vs. no), type of employment (paid vs. unpaid), monthly household income (≤ 4000 vs. ≥ 4001 BRL), housing (owned vs. other), educational attainment (up to elementary school vs. high school and beyond), religious belief (yes vs. no), religious attendance (yes vs. no), engagement in religious practices (yes vs. no), alcohol use (yes vs. no), smoking (yes vs. no), illicit drug use (yes vs. no), physical activity (yes vs. no), presence of chronic illness (yes vs. no), daily use of continuous medications (yes vs. no), type of healthcare coverage (supplementary/private vs. public/Sistema Unica de Saúde (SUS)), time since cancer diagnosis (≤ 6 vs. ≥ 7 months), current cancer treatment (with vs. without chemotherapy), presence of symptoms or side effects (yes vs. no), number of treatment sessions (≤ 15 vs. ≥16), previous cancer treatment (yes vs. no), duration of current treatment (≤ 6 vs. ≥ 7 months), history of previous or concurrent cancers (yes vs. no), and presence of significant life events (yes vs. no).

The Rosenberg Self-Esteem Scale (RSES), originally developed by Rosenberg in 1965 and adapted to Portuguese by Dini et al. (2004), was used to assess self-esteem. The instrument consists of 10 items rated on a 4-point Likert scale (ranging from 1 = "strongly disagree" to 4 = "strongly agree"), with five items assessing positive self-image and five assessing negative self-image. Total scores range from 10 to 40, with higher scores indicating greater self-esteem. Scores were classified as low (< 20), average (20–30), or high (> 30). For analytical purposes, self-esteem was dichotomized into high (> 30) and average/low (≤ 30). The RSES has shown acceptable internal consistency, with Cronbach's alpha values ranging from .71 to .87 in previous studies (Bano et al., 2022; Tsai et al., 2021).

Procedure

Data collection was conducted between November 2022 and February 2023 at the hospital. Participants were approached individually in each area of treatment (chemotherapy, radiotherapy, hormone therapy, and surgery) at the oncology service. To avoid interruptions, interviews were conducted before or after the scheduled treatment sessions. This approach ensured that data collection did not interfere with the treatment routine or cause disruptions for either the patients or healthcare professionals. Data were collected through individual interviews lasting approximately 20 minutes, during which two instruments were administered (the Sociodemographic and Clinical Questionnaire and the Rosenberg Self-Esteem Scale). The researchers completed the instruments based on participants' responses, ensuring uniformity. In cases where participants had difficulty understanding the questions, the researchers repeated them slowly, as often as necessary, without altering the content or providing synonyms. This ensured that the reading was consistent and no interpretation was made of the questions, preventing any bias in responses. Due to the COVID-19 pandemic, all health measures were observed, including mask usage, social distancing, and surface disinfection with 70% alcohol.

Statistical analysis

The data were double-entered for quality control and analyzed using IBM SPSS Statistics 24.0. Descriptive statistics (frequencies, percentages, means, and standard deviations) were calculated. Pearson's Chi-square and Fisher's Exact tests were used to assess associations between self-esteem levels and independent variables. The internal consistency of the RSES was assessed using Cronbach's alpha coefficient, with values ≥ .70 being considered acceptable. The dependent variable for the logistic regression was self-esteem, dichotomized as high self-esteem (scores > 30) and average/low self-esteem (scores ≤ 30), based on the cut-off points established in the Rosenberg Self-Esteem Scale. All 27 independent variables were included in the model. The final model was constructed using the Forward Stepwise selection method, and variables that failed to meet the significance criteria ($p < .05$) were not retained in the final model. Model adequacy was assessed using the -2 Log Likelihood, Cox & Snell R^2, Nagelkerke R^2, and the Hosmer-Lemeshow goodness-of-fit test to confirm the model fit with the observed data, ensuring the reliability and validity of the regression results.

Ethical considerations

The study was approved by the Research Ethics Committee of a Brazilian public university with protocol No. 5,688,277.

RESULTS

The sociodemographic profile of the 210 participants revealed that 51.4% were aged between 50 and 69. Regarding race/ethnicity, 42.4% identified as white and 41.4% as mixed race. Most participants resided in municipalities outside the study location (88.1%), including regions in the states of Minas Gerais, Rio de Janeiro, Espírito Santo, and the Federal District. In terms of marital status, 59.5% were partnered, while 33.8% had two and 31.9% had three or more children.

Regarding employment, participants displayed similar proportions of unemployment (29.0%), sick leave (29.0%), and retirement (28.2%). The majority reported a household income of up to one and a half minimum wages (57.6%) and lived in their own homes (70.0%). In terms of educational attainment, most participants had incomplete elementary education (44.3%). Religiosity was significant, with 96.1% professing a religion and 90.0% attending religious institutions.

As for the breast cancer diagnosis, 49.5% had been diagnosed between seven and 24 months earlier, and 51.0% were undergoing chemotherapy. Most participants had already undergone more than 15 treatment sessions (67.6%), and 44.3% had been in follow-up care for seven to 24 months. A total of 18.1% reported metastasis, with the bones (28.3%) and lungs (18.9%) being the most frequent sites.

In regard to significant life events, 66.6% of participants reported having experienced at least one. Seventy per cent cited a single event, the most common one being the cancer diagnosis (49.3%), followed by the loss of a loved one (40.0%). Positive events, such as the birth of children or grandchildren and new friendships, were mentioned by 13.6%.

Table 1 shows the distribution of the women by their responses to the items in the Rosenberg Self-Esteem Scale.

The distribution of women undergoing oncological treatment for breast cancer was analyzed separately based on their responses to the statements in the Rosenberg Self-Esteem Scale, as shown in Table 1. They were classified according to their responses to statements evaluating positive (1, 3, 4, 7, and 10) and negative feelings (2, 5, 6, 8, and 9).

Table 1
Distribution of Women with Breast Cancer Undergoing Oncological Treatment by Responses to the Self-esteem Statements (n = 210). Alfenas, MG, Brazil, 2023

Statement	*Answers*	*F*	*%*
1 On the whole, I am satisfied with myself	(4) Strongly agree	157	74.8
	(3) Agree	39	18.6
	(2) Disagree	5	2.4
	(1) Strongly disagree	9	4.3
2 Sometimes I think I am not good at anything	(1) Strongly agree	27	12.9
	(2) Agree	21	10.0
	(3) Disagree	4	1.9
	(4) Strongly disagree	158	75.2
3 I feel I have a number of good qualities	(4) Strongly agree	187	89
	(3) Agree	14	6.7
	(2) Disagree	6	2.9
	(1) Strongly disagree	3	1.4
4 I am able to do things as well as most other people	(4) Strongly agree	154	73.3
	(3) Agree	38	18.1
	(2) Disagree	13	6.2
	(1) Strongly disagree	5	2.4
5 I feel I don't have much to be proud of	(1) Strongly agree	12	5.7
	(2) Agree	16	7.6
	(3) Disagree	6	2.9
	(4) Strongly disagree	176	83.8
6 At times, I feel useless	(1) Strongly agree	24	11.4
	(2) Agree	48	22.9
	(3) Disagree	9	4.3
	(4) Strongly disagree	129	61.4
7 I feel I am a person of worth, at least on a par with others	(4) Strongly agree	188	89.6
	(3) Agree	12	5.7
	(2) Disagree	7	3.3
	(1) Strongly disagree	3	1.4
8 I wish I could have more respect for myself	(1) Strongly agree	41	19.5
	(2) Agree	28	13.3
	(3) Disagree	9	4.3
	(4) Strongly disagree	132	62.9
9 Overall, I am inclined to feel that I am a failure	(1) Strongly agree	10	4.8
	(2) Agree	12	5.7
	(3) Disagree	4	1.9
	(4) Strongly disagree	184	87.6
10 I have a positive attitude toward myself	(4) Strongly agree	162	77.1
	(3) Agree	31	14.8
	(2) Disagree	9	4.3
	(1) Strongly disagree	8	3.8

Source: Compiled by the author.

Regarding the positive feelings statements (1, 3, 4, 7, and 10), the majority of respondents strongly agreed (score 4), with percentages ranging from 73.3% (154) to 89.6% (188). These statements displayed scores ranging from three to four, the highest on the scale for these items, reflecting participants' high self-esteem.

For the negative feelings statements (2, 5, 6, 8, and 9), most participants strongly disagreed (score 4), with percentages ranging from 61.4% (129) to 87.6% (184). It was also observed that scores were high for these statements. Statements 6 ("At times, I feel useless") and 8 ("I wish I could have more respect for myself") showed significant percentages of women with breast cancer reporting a score of 1 (strongly agree), 11.4% (24) and 19.5% (41), and a score of 2 (agree), 22.9% (48) and 13.3% (28), respectively. These are the lowest scores on the scale (Table 1).

Table 2 presents the distribution of women with breast cancer undergoing oncological treatment by self-esteem classification.

An analysis of the distribution of women with breast cancer by self-esteem classification based on the cutoff points showed that 86.2% (181) of respondents were classified as having high self-esteem. Additionally, 11.4% (35) were classified as having average self-esteem, while 2.4% (five) were classified as having low self-esteem (Table 2).

Table 2
Distribution of women with breast cancer undergoing oncological treatment by self-esteem classification based on cut-off points (n = 210). Alfenas, MG, Brazil, 2023

Self-Esteem Classification	*f*	*%*
High self-esteem	181	86.2
Average self-esteem	24	11.4
Low self-esteem	5	2.4
Total	210	100.0

Source: Compiled by the author.

The internal consistency of the Rosenberg Self-Esteem Scale was assessed using Cronbach's alpha coefficient, yielding a value of .835. The analysis indicated that the items evaluated demonstrated homogeneity and adequate correlation, making the internal consistency of the instrument acceptable for this study. This finding supports the reliability of the scale in assessing participants' self-esteem.

In the univariate analysis, no significant associations were found between self-esteem and sociodemographic variables such as age group, race/ethnicity, municipality of residence, marital status, number of children, and employment status. Likewise, no significant associations were found between lifestyle habits, including alcohol consumption, smoking, illicit drug use, physical activity, and the presence of chronic diseases. No association was found between participants' self-esteem and clinical factors, such as continuous medication use, type of care, time since cancer diagnosis, and type of current treatment, as well as treatment-related variables, such as the number of sessions, previous treatments, treatment duration, and the presence of prior or concomitant cancers (*p* > .05).

However, associations with self-esteem were identified for the following variables: religious beliefs, habits related to religiosity, symptom(s)/side effect(s), and significant life events, as shown in Table 3.

The analyses revealed a significant association with the "religious belief" (*p* = .014) and "habits related to religiosity" (*p* = .014) variables, showing that women with religious beliefs and religious habits are approximately seven times more likely to have low or average self-esteem. Similarly, the "symptom(s)/side effect(s)" (*p* = .004) variable showed that participants reporting these symptoms are about four times more likely to have low or average self-esteem. Finally, the "significant life events" (*p* = .048) variable indicated that women who had experienced significant life events were twice as likely to have low or average self-esteem.

Table 4 presents the evaluation of the logistic regression model parameters for the independent variables with self-esteem. After analyzing the parameters of all the independent variables influencing self-esteem using the logistic regression model, it was found that the "religious belief"

Table 4
Evaluation of the logistic regression model parameters for independent variables for self-esteem (n = 210). Alfenas, MG, Brazil, 2023

Variables	*Parameter*	*Standard error*	*p-value*	*OR (lower/upper)*
Religious belief	2.204	.926	.017	9.605 (1.477/55.644)
Habits related to religiosity	3.156	.959	.001	23.467 (3.582/153.746)
Presence of symptom(s)/side effect(s)	1.665	.595	.005	5.287 (1.648/16.957)
Significant life event	1.330	.614	.030	3.780 (1.135/12.593)
Constant	- 4.336	.780	.000	.013

Source: Compiled by the author.
Note: OR = Odds ratio (cross-product ratio).

Table 3
Variables demonstrating an association with self-esteem (n = 210). Alfenas, MG, Brazil, 2023

Variables	*High self-esteem*	*Average/low self-esteem*	*P-value*	*OR*	*CI 95%*
Religious belief					
Has religious beliefs	177 (97.8%	25 (86.2%)	.014**	7.080	1.664-30.117
Does not have religious beliefs	4 (2.2%)	4 (13.8%)		1.000	
Habits related to religiosity					
No	4 (2.2%)	4 (13.8%)	.014**	1.000	1.664-30.117
Yes	177 (97.8%)	25 (86.2%)		7.080	
Symptom(s)/side effect(s)					
No	83 (45.8%)	5 (17.3%)	.004**	1.000	1.485-11.127
Yes	98 (54.2%)	24 (82.7%)		4.065	
Significant life events					
No	65 (36%)	5 (17.2%)	.048*	1.000	0.979-7.386
Yes	116 (64%)	24 (82.8%)		2.690	

Source: Compiled by the author.
Notes: * Administration of Pearson's chi-square test; ** Administration of Fisher's exact test; *CI* = Confidence interval (lower/upper); *OR* = Odds ratio (cross-product ratio).

(p = .017), "habits related to religiosity" (p = .001), "presence of symptom(s)/side effect(s)" (p = .005), and "significant life event" (p =.030) variables showed significant associations, resulting in a final adjusted model (Table 4).

The model revealed that women with breast cancer undergoing oncological treatment who hold religious beliefs are approximately nine times more likely to have low or average self-esteem. Moreover, participants with habits related to religiosity were approximately 23 times more likely to develop low or average self-esteem. Regarding the presence of symptom(s)/side effect(s), the model indicates that the likelihood of having low or average self-esteem is approximately five times higher than in women without symptoms/side effects. Finally, it was observed that women who had experienced a significant life event were about three times more likely to have low or average self-esteem (Table 4).

In addition to the interpretation of model coefficients, the adequacy of the logistic regression model was assessed using statistical fit indices. The -2 Log Likelihood progressively decreased during the selection process, achieving a final value of 137.131 in Step 4, indicating improvements in model fit with each step. Cox & Snell R^2 and Nagelkerke R^2 values showed that the final model explained 13.9% and 25.2% of the variance in self-esteem classification respectively. Furthermore, the Hosmer-Lemeshow goodness-of-fit test did not indicate a significant lack of fit (χ^2 = 1.448; p = .919), suggesting a good model fit for observed data.

DISCUSSION AND CONCLUSION

The analysis of the sociodemographic profile highlighted relevant characteristics aligned with the literature, such as the predominance of women aged between 50 and 69, the age group when breast cancer is most frequent (Andrade et al., 2023). Most participants were white or mixed race, reflecting Brazil's demographics (Brazilian Institute of Geography and Statistics, 2022), and resided in municipalities outside the treatment location, underscoring the need for oncological care decentralization (Andrade et al., 2023).

The presence of a partner, observed in 59.5% of participants, may contribute to emotional stability and well-being during treatment, as suggested by previous literature (Bastianello & Hutz, 2016). However, the low family income and limited educational attainment observed in a large proportion of participants highlight economic and educational vulnerabilities requiring specific health intervention strategies (Gratão et al., 2023).

The analysis of the distribution of women with breast cancer undergoing oncological treatment using the Rosenberg Self-Esteem Scale showed that most displayed high percentages (above 73.3%) of agreement with statements reflecting positive feelings, such as self-acceptance, self-appreciation, and self-confidence. These feelings reflect a positive self-view and belief in their abilities (Branden, 2000; Kernis, 1995).

However, the impact of these feelings on women with breast cancer is modest, given the emotional, physical, and social challenges of the disease affecting their psychological well-being (Almeida et al., 2012; Kim et al., 2021). Medical procedures and physical changes can undermine self-acceptance and self-confidence (Almeida et al., 2012; Hagen et al., 2021). Additionally, these women face stigma, isolation, and pressure to maintain a positive image, which may negatively impact their self-esteem (Yektatalab & Ghanbari, 2020).

Recognizing these complex experiences and providing support from the multidisciplinary team with interventions designed to strengthen emotional and social well-being is essential for helping women cope with the challenges of breast cancer diagnosis and treatment (Iddrisu et al., 2020; Adib-Hajbaghery et al., 2021).

Religiosity was widely reported, with 96.1% of participants professing a belief. Faith can act as emotional support but also revealed unexpected associations with average or low self-esteem, suggesting that factors such as religious guilt and social pressures may play a role (Gall & Bilodeau, 2020; Esperandio et al., 2022). This ambivalence has been widely documented in the literature (Koenig, 2012; Leal et al., 2022; Pargament, 2007).

While religiosity is often seen as a coping resource that offers emotional comfort and a sense of purpose (Koenig, 2012; Pargament, 2007), Pargament's theory of religious coping shows that in certain contexts, it can also contribute to spiritual struggles. When individuals interpret illness as divine punishment or experience feelings of religious inadequacy, religiosity can increase rather than alleviate emotional distress (Pargamentet al., 1998).

This dynamic may explain why variables such as "religious belief" and "habits related to religiosity" showed significant associations with lower self-esteem in this study. While religiosity is often seen as a source of emotional support, some women reported feelings of guilt or frustration when their religious practices failed to provide the expected healing or relief, which may have negatively impacted their self-esteem (Mkuu et al., 2021). These findings underscore the importance of not only recognizing the presence of religiosity but also of understanding how patients internalize and relate to their faith during illness.

Furthermore, religious environments can serve as spaces for social comparison, where women with breast cancer feel unworthy or less spiritually favored. This sense of spiritual abandonment can intensify frustration and insecurity, resulting in lower self-esteem (Ferreira et al., 2020; Esperandio et al., 2022).

The "symptom(s)/side effect(s)" variable also demonstrated a significant association with self-esteem. Physical changes resulting from treatment, such as alopecia, radiodermatitis, and lymphedema, can negatively affect self-image and contribute to low self-esteem due to the perception of loss of attractiveness (Almeida et al., 2012; Kim et al., 2021). According to the Transactional Model of Stress and Coping (Lazarus & Folkman, 1984), these physical symptoms are primary stressors patients appraise in terms of their impact on personal identity and daily functioning.

When symptoms challenge bodily integrity, an essential component of self-concept, especially for women, this can result in heightened psychological vulnerability. Side effects such as fatigue, musculoskeletal pain, and gastrointestinal disorders hinder daily activities and impose dietary restrictions, perceived as limitations affecting self-image and self-esteem. The persistence of these side effects reinforces feelings of inadequacy, worthlessness, and social withdrawal, further exacerbating psychological distress (Keaver et al., 2021; Kruif et al., 2021).

“Significant life events” showed a significant association with self-esteem, particularly the cancer diagnosis, which can be perceived as a traumatic event. The uncertainty and emotional impact associated with the diagnosis can undermine self-esteem and increase emotional vulnerability (Almeida et al., 2012). This observation is consistent with the stress proliferation theory (Pearlin et al., 1981) positing that major life events often trigger secondary stressors that accumulate and amplify emotional distress.

For example, women undergoing cancer treatment may simultaneously have to deal with personal loss, financial strain, and family disruptions, compounding the psychological burden. Conversely, positive life events, such as the birth of a grandchild, may act as protective factors that buffer the negative impact of illness and positively influence self-esteem, highlighting the importance of support networks in coping with the disease (Iddrisu et al., 2020; Hagen et al., 2021).

The internal consistency of the Rosenberg Self-Esteem Scale was satisfactory in the present study ($\alpha = .835$), indicating its reliability for assessing self-esteem. Comparative international studies revealed similar coefficients, reinforcing the robustness of the scale across cultural contexts (Yektatalab & Ghanbari, 2020; Bano et al., 2022).

The findings related to religiosity should be interpreted in light of the Brazilian sociocultural context, where religious beliefs and practices are deeply rooted in daily life and often serve as key coping mechanisms in situations of illness and suffering. A global survey conducted by the Ipsos Institute (2023) in 26 countries found that Brazil, together with South Africa, has the highest proportion of people believing in God or a higher power (89%). Among Brazilians, 76% reported praying outside a place of worship (for example, at home), while 49% reported regularly attending religious services. Paradoxically, the results of this study revealed that both holding religious beliefs and engaging in habits linked to religiosity were associated with lower self-esteem in women undergoing oncological treatment.

This may reflect internal spiritual conflict, guilt, or the perception of illness as divine punishment, patterns that have been observed in other Brazilian populations coping with chronic illness (Borges et al., 2022; Leal et al., 2022). Moreover, the association between lower self-esteem and the presence of symptoms or side effects, as well as recent significant life events, highlights the multidimensional burden these women face. In a country marked by social inequality, limited access to specialized psychosocial support, and strong family and religious structures, these findings underscore the need for culturally sensitive care approaches that not only consider clinical but also emotional and spiritual dimensions of the experience of illness. It is therefore essential for healthcare teams to be trained in recognizing and addressing spiritual struggles as part of holistic oncological care, to ensure that religious beliefs serve as a source of comfort rather than an additional source of distress (Branco & Silva, 2017; Dias & Pais-Ribeiro, 2019).

This study has significant limitations that must be considered. Its observational nature prevents the inference of causality between the variables analyzed and self-esteem, while the sample size (210 women) and refusals to participate may limit the generalizability of findings and introduce potential selection bias. Additionally, the subjectivity inherent to the construct evaluated may have resulted in different interpretations by participants, influencing their responses.

To overcome these limitations, future studies should adopt prospective designs with nationally representative samples, enabling the evaluation of causal relationships and the identification of modifiable associated factors. It is also necessary to explore interventions such as educational practices and psychological support to promote and sustain self-esteem in women with breast cancer.

This study found that most women with breast cancer undergoing oncological treatment display high levels of self-esteem, despite the challenges posed by the disease. However, variables such as religious beliefs, habits related to religiosity, symptoms/side effects, and significant life events showed significant associations with self-esteem. These factors often negatively affect patients’ self-perception, emphasizing the need for special attention to emotional, social, and spiritual aspects during oncological care.

Caring for the self-esteem of women with breast cancer requires an integrated approach by healthcare professionals. Beyond clinical care, it is essential to provide emotional support, establish empathetic connections, clarify doubts about treatment, and address patient concerns. Individualized, comprehensive care aids in adapting to physical and emotional changes, contributing to building self-esteem. Based on the findings of this study, it is crucial for the multidisciplinary team to be aware of the importance of delivering holistic care, improving patient/family/professional/institution interaction, and fostering more effective coping with the disease.

Financing

We would like to thank the Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG), Minas Gerais, Brazil, for providing a master's degree grant to conduct the research. This study was undertaken with the support of the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brazil (CAPES) - Funding Code 001.

Conflict of interests

The authors declare they have no conflicts of interest.

REFERENCES

Adib-Hajbaghery, M., Maghsoud, F., & Batooli, Z. (2021). Evaluating Effect of Social Support Programs Based on the Roy's Adaptation Model on Patients with Breast Cancer: A Systematic Review. *Journal of Research Development in Nursing and Midwifery*, *18*(2), 14–17. https://doi.org/10.52547/jgbfnm.18.2.14

Almeida, T. R. D., Guerra, M. R., & Filgueiras, M. S. T. (2012). Repercussões do câncer de mama na imagem corporal da mulher: uma revisão sistemática. *Physis: Revista de Saúde Coletiva*, *22*(3), 1003–1029. https://doi.org/10.1590/s0103-73312012000300009

Andrade, J. V., De Souza, J. C. M., Bonifácio, R. G., Bressan, V. R., Resck, Z. M. R., Nogueira, D. A., & Terra, F. D. S. (2023). Características sociodemográficas, hábitos de vida, doenças crônicas e aspectos do tratamento do Câncer de Mama em mulheres: estudo transversal. *Contribuciones a Las Ciencias Sociales*, *16*(11), 25688–256711. https://doi.org/10.55905/revconv.16n.11-055

Aprilianto, E., Lumadi, S. A., & Handian, F. I. (2021). Family Social Support and the Self-Esteem of Breast Cancer Patients Undergoing Neoadjuvant Chemotherapy. *Journal of Public Health Research*, *10*(2). https://doi.org/10.4081/jphr.2021.2234

Bano, N., Shahzad, S., & Ahmad, S. (2022). A closer look at self esteem and perceived social support: Their role in depression among women with chronic illnesses. Journal of Pakistan Psychiatric Society, 20(2). https://doi.org/10.63050/jpps.20.02.255

Bastianello, M. R., & Hutz, C. S. (2016). Optimism and social support in women with breast cancer: A systematic review. *Psicologia: Teoria e Prática*, *18*(2), 19-33. https://doi.org/10.15348/1980-6906/psicologia.v18n2p19-33

Borges, L. M., Malagris, L. E. N., & de Freitas, M. H. (2022). Chronic Illness, Religiosity, and Spirituality in Brazil: Health Professionals' Perceptions and Guidelines. *International Journal of Latin American Religions*, *6*(2), 148–170. https://doi.org/10.1007/s41603-022-00177-3

Branco, P. C. C., & Silva, L. X. B. (2017). Psicologia humanista de Abraham Maslow: recepção e circulação no Brasil. *Revista da Abordagem Gestáltica: Phenomenological Studies*, *23*(2), 189–199. http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid=S1809-68672017000200007&lng=pt&nrm=iso

Branden, N. (2000). *Autoestima: Como aprender a gostar de si mesmo*. Saraiva.

Brazilian Institute of Geography and Statistics. (2022). *Continuous National Household Sample Survey 2012/2022*. https://educa.ibge.gov.br/jovens/conheca-o-brasil/populacao/18319-cor-ou-raca.html

Cortés, D. C., & Justicia, F. J. (2008). Afrontamiento del abuso sexual infantil y ajuste psicológico a largo plazo. *Psicothema*, *20*(4), 509–515. https://reunido.uniovi.es/index.php/PST/article/view/8689

Dias, E. N., & Pais-Ribeiro, J. L. (2019). O Modelo de Coping de Folkman e Lazarus: Aspectos Históricos e Conceituais. *Revista Psicologia e Saúde*, 55–66. https://doi.org/10.20435/pssa.v11i2.642

Dini, G. M., Quaresma, M. R., & Ferreira, L. M. (2004). Adaptação cultural e validação da versão brasileira da Escala de autoestima de Rosenberg. *Sociedade Brasileira de Cirurgia Plástica*, *19*(1), 41–52. http://www.rbcp.org.br/details/322/pt-BR/adaptacao-cultural-e-validacao-da-versao-brasileira-da-escala-de-auto-estima-de-rosenberg

Dunnill, C. J., Al-Tameemi, W., Collett, A., Haslam, I. S., & Georgopoulos, N. T. (2018). A Clinical and Biological Guide for Understanding Chemotherapy-Induced Alopecia and Its Prevention. *The Oncologist*, *23*(1), 84–96. https://doi.org/10.1634/theoncologist.2017-0263

Esperandio, M. R. G., Viacava, J. J. C., Franco, R. S., Pargament, K. I., & Exline, J. J. (2022). Brazilian Adaptation and Validation of the Religious and Spiritual Struggles (RSS) Scale—Extended and Short Version. *Religions*, *13*(4), 282. https://doi.org/10.3390/rel13040282

Ferlay, J., Ervik, M., Lam, F., Laversanne, M., Colombet, M., Mery, L., Piñeros, M., Znaor, A., Soerjomataram, I., & Bray, F. (2024). *Global Cancer Observatory: Cancer Today*. International Agency for Research on Cancer. https://gco.iarc.who.int/today

Ferreira, L. F., Freire, A. P., Silveira, A. L. C., Silva, A. P. M., Sá, H. C., Souza, I. S., Garcia, L. S. A., Peralta, R. S., & Araujo, L. M. B. (2020). A Influência da Espiritualidade e da ReligiosidadenaAceitação da Doença e no Tratamento de Pacientes Oncológicos: Revisão Integrativa da Literatura. *Revista Brasileira de Cancerologia*, *66*(2), e-07422. https://doi.org/10.32635/2176-9745.rbc.2020v66n2.422

Gall, T. L., & Bilodeau, C. (2020). Attachment to God and coping with the diagnosis and treatment of breast cancer: a longitudinal study. *Supportive Care in Cancer*, *28*(6), 2779–2788. https://doi.org/10.1007/s00520-019-05149-6

Gratão, A. C. M., Cardoso, A. M., Ottaviani, A. C., Campos, C. R. F., Oliveira, D. C. D., Monteiro, D. Q., Barham, E. J., Orlandi, F. D. S., Barbosa, G. C., Cruz, K. C. T. D., Corrêa, L., Rocha, L. A. D., Alves, L. C. D. S., Maciel, L. B., Nico, L. S., Hoffmann, M. C. C. L., & Pavarini, S. C. I. (2023). Efficacy of iSupport-Brasil for unpaid caregivers of people living with dementia: protocol for a randomized and controlled clinical trial. *Dementia & Neuropsychologia*, *17*, e20230040. https://doi.org/10.1590/1980-5764-dn-2023-0040

Hagen, B. M., Santos, A. A. P., Comassetto, I., Holanda, J. B. L., Freire, M. M., & da Lima, N. F. C. (2021). Câncer de mama:(re) significando a imagem corporal feminina. *Revista Recien - Revista Científica de Enfermagem*, *11*(34), 266–276. https://doi.org/10.24276/rrecien2021.11.34.266-276

Iddrisu, M., Aziato, L., & Dedey, F. (2020). Psychological and physical effects of breast cancer diagnosis and treatment on young Ghanaian women: a qualitative study. *BMC Psychiatry*, *20*(1). https://doi.org/10.1186/s12888-020-02760-4

Instituto Ipsos. (2023). *Global religion 2023: Religious beliefs across the world – A 26-country Global Advisor survey*. https://www.ipsos.com/pt-br/89-dos-brasileiros-acreditam-em-deus-ou-em-um-poder-maior-aponta-pesquisa-ipsos#:~:text=O%20dado%20foi%20apurado%20por,m%C3%A9dia%20global%20%C3%A9%20de%2061%25

International Agency for Research on Cancer. (2024). *Cancer today*. https://gco.iarc.fr/today/home

Joaquín-Mingorance, M., Arbinaga, F., Carmona-Márquez, J., & Bayo-Calero, J. (2019). Coping strategies and self-esteem in women with breast cancer. *Anales de Psicología*, *35*(2), 188–194. https://doi.org/10.6018/analesps.35.2.336941

Keaver, L., McGough, A. M., Du, M., Chang, W., Chomitz, V., Allen, J. D., Attai, D. J., Gualtieri, L., & Zhang, F. F. (2021). Self-Reported Changes and Perceived Barriers to Healthy Eating and Physical Activity among Global Breast Cancer Survivors: Results from an Exploratory Online Novel Survey. *Journal of the Academy of Nutrition and Dietetics*, *121*(2), 233–241.e8. https://doi.org/10.1016/j.jand.2020.09.031

Kernis, M. H. (1995). *Efficacy, Agency, and Self-Esteem*. https://doi.org/10.1007/978-1-4899-1280-0

Kim, J., Kim, J., Han, A., & Nguyen, M. C. (2021). Leisure time physical activity, social support, health perception, and mental health among women with breast cancer. *Leisure Studies*, *40*(3), 352–362. https://doi.org/10.1080/02614367.2020.1869290

Koenig, H. G. (2012). Religion, Spirituality, and Health: The Research and Clinical Implications. *ISRN Psychiatry*, *2012*, 1–33. https://doi.org/10.5402/2012/278730

Kruif, A. J. T. C. M., Westerman, M. J., Winkels, R. M., Koster, M. S., van der Staaij, I. M., Van Den Berg, M. M. G. A., Vries, J. H. M., Boer, M. R., Kampman, E., & Visser, M. (2021). Exploring changes in dietary intake, physical activity and body weight during chemotherapy in women with breast cancer: A Mixed-Methods Study. *Journal of Human Nutrition and Dietetics*, *34*(3), 550–561. https://doi.org/10.1111/jhn.12843

Lazarus, R. S., & Folkman, S. (1984). Stress: Appraisal and Coping In *Encyclopedia of Behavioral Medicine* (pp. 1913–1915). Springer. https://doi.org/10.1007/978-1-4419-1005-9_215

Leal, M. M., Nwora, E. I., de Melo, G. F., & Freitas, M. H. (2022). Praying for a Miracle: Negative or Positive Impacts on Health Care? *Frontiers in Psychology, 13*, 840851. https://doi.org/10.3389/fpsyg.2022.840851

Martins, T. C. D. F., Silva, J. H. C. M. D., Máximo, G. D. C., & Guimarães, R. M. (2021). Transição da morbimortalidade no Brasil: um desafio aos 30 anos de SUS. *Ciência & Saúde Coletiva*, *26*(10), 4483–4496. https://doi.org/10.1590/1413-812320212610.10852021

Mkuu, R. S., Harvey, I. S., Brown, E., Spears, E. C., Jira, M. G., Johnson, K. L., Montour, T., & Alexander, J. (2021). "I Struggle with Breast Cancer and I Struggle with God": Insights from African American Breast Cancer Survivors. *Journal of Racial and Ethnic Health Disparities*, *9*(2), 566–575. https://doi.org/10.1007/s40615-021-00986-w

National Institute of Cancer (Brazil) (2022). *Estimativa 2023: incidência de câncer no Brasil.* https://www.inca.gov.br/publicacoes/livros/estimativa-2023-incidencia-de-cancer-no-brasil

Pargament, K. I. (2007). *Spiritually integrated psychotherapy: Understanding and addressing the sacred*. Guilford Press. https://psycnet.apa.org/record/2007-14177-000

Pargament, K. I., Smith, B. W., Koenig, H. G., & Perez, L. (1998). Patterns of Positive and Negative Religious Coping with Major Life Stressors. *Journal for the Scientific Study of Religion*, *37*(4), 710. https://doi.org/10.2307/1388152

Pearlin, L. I., Menaghan, E. G., Lieberman, M. A., & Mullan, J. T. (1981). The Stress Process. *Journal of Health and Social Behavior*, *22*(4), 337–356. https://doi.org/10.2307/2136676

Pierrisnard, C., Baciuchka, M., Mancini, J., Rathelot, P., Vanelle, P., & Montana, M. (2018). Body image and psychological distress in women with breast cancer: a French online survey on patients' perceptions and expectations. *Breast Cancer*, *25*(3), 303–308. https://doi.org/10.1007/s12282-017-0828-2

Rosenberg, M. (1965). *Rosenberg Self-Esteem Scale (RSES)* [Database record]. APA PsycTests. https://doi.org/10.1037/t01038-000

Tsai, P. L., Kuo, T. T., Ku, C. H., Liao, G. S., Lin, C. K., & Pan, H. H. (2021). Self-Esteem as a Predictor of Mental Adjustment in Patients with Breast Cancer. *International Journal of Environmental Research and Public Health*, *18*(23), 12588. https://doi.org/10.3390/ijerph182312588

Valverde, M. S., Nieto, R. G., & Gutiérrez, L. Á. S. (2014). Imagen corporal y autoestima en mujeres masectomizadas. *Psicooncología*, *11*(1). https://doi.org/10.5209/rev_psic.2014.v11.n1.44916

Versluis, A., van Alphen, K., Dercksen, W., de Haas, H., van den Hurk, C., & Kaptein, A. A. (2022). "Dear hair loss"—illness perceptions of female patients with chemotherapy-induced alopecia. *Supportive Care in Cancer*, *30*(5), 3955–3963. https://doi.org/10.1007/s00520-021-06748-y

Yektatalab, S., & Ghanbari, E. (2020). The relationship between anxiety and self-esteem in women suffering from breast cancer. *Journal of Mid-life Health*, *11*(3), 126. https://doi.org/10.4103/jmh.jmh_140_18

In memoriam
Dr. Francisco Gómez Mont Ávalos

El Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz informa y lamenta el sencible fallecimiento de nuestro querido amigo, el doctor Francisco Gómez Mont Ávalos.

Fundador, colaborador en míltipes tareas, generoso, sabio consejero y benefactor de nuestra Institución, Inspiró y organizó en los últimos 22 años los Coloquios de Neurociencias y Humanidades, Conectoma, Danza y Salud Mental, promoviendo y difundiendo el estudio sistémico e interdisciplinario de la salud mental.

Poseedor de una extraordinaria calidad humana.

Enviamos a su familia y amogos nuestras sinceras condolencias.

Descanze en paz.

Ciudad de México, 14 de mayo 2026

GUÍA PARA LOS AUTORES

La revista Salud Mental publica artículos originales sobre psiquiatría, psicología, neurociencias y disciplinas afines de acuerdo con los siguientes formatos:

1. **Editoriales**
   Se escriben por invitación del Director-Editor de la revista. Deben expresar opiniones autorizadas sobre temas específicos de interés para la comunidad científica y para el área de la salud mental. Su objetivo es estimular el debate y promover nuevas líneas de investigación. *Extensión máxima: 1000 palabras*.
2. **Artículos originales (sección revisada por pares)**
   Presentan resultados de investigaciones no publicados en otras revistas. Pueden desarrollarse a partir de las siguientes metodologías:
   - **Metodología cuantitativa:** Incluye resultados primarios y secundarios de estudios transversales, ensayos clínicos, casos y controles, cohortes y estudios cuasi experimentales. *Extensión máxima: 3500 palabras*.
     De acuerdo con el tipo de estudio, los manuscritos deben cumplir con las guías:
     - Los ensayos clínicos aleatorizados deben adecuarse a las guías *CONSORT* (http://www.consort-statement.org).
     - Los estudios con diseños no experimentales, a las guías *TREND* (https://stacks.cdc.gov/view/cdc/149677).
     - Los estudios transversales, de cohorte, y de casos y controles, a la guía *STROBE* (http://www.strobe-statement.org).
   - **Metodología cualitativa:** Incluye reportes de grupos focales, entrevistas a profundidad, redes semánticas y análisis de contenido. *Extensión máxima: 5000 palabras*.
     Deben cumplir con la guía *COREQ* (https://doi.org/10.1093/intqhc/mzm042).
3. **Artículos de revisión (sección revisada por pares)**
   - **Revisiones sistemáticas:** Preferentemente deben incluir un metaanálisis. *Extensión máxima: 4000 palabras*.
4. **Casos clínicos (sección revisada por pares)**
   Incluye reportes de efectos de un método diagnóstico o terapéutico que sea útil o relevante en el ámbito médico, académico o científico. *Extensión máxima: 2000 palabras.*
   Deben cumplir con la guía *CASE REPORT* (https://www.care-statement.org/checklist)

*Nota***:** El conteo de palabras para cada una de estas secciones excluye el título, los resúmenes y las palabras clave, así como los apartados de financiamiento, conflictos de interés y agradecimientos; tampoco se consideran las palabras incluidas en tablas, figuras y referencias.

IDIOMAS

Salud Mental recibe y publica únicamente manuscritos en inglés.

ASPECTOS ÉTICOS EN LA PUBLICACIÓN

Vea los Lineamientos éticos en el sitio web de Salud Mental (revistasaludmental.gob.mx/index.php/salud_mental/).

AUTORÍA

El número de autores dependerá del tipo de manuscrito enviado. Para artículos originales y artículos de revisión el número máximo de autores será de ocho. Solo cuando se trate de estudios multicéntricos el número máximo de autores será de doce, siempre y cuando se justifique de acuerdo con el alcance del estudio.

En caso de autoría colectiva, se incluirá el nombre de los redactores o responsables del trabajo seguido de «*y el grupo...*» cuando todos los miembros del grupo se consideren coautores del trabajo. Si se desea incluir el nombre del grupo, aunque no todos sus miembros sean considerados coautores, se mencionarán a los autores responsables seguido de *«en nombre del grupo...»* o *«por el grupo...»*. En cualquier caso, los nombres e instituciones de los miembros del grupo se incluirán en un anexo al final del manuscrito.

LINEAMIENTOS EDITORIALES

Es muy importante que los autores consideren los siguientes puntos antes de enviar sus manuscritos:

1. Los manuscritos deben redactarse de forma clara y concisa, sin errores de ortografía ni de sintaxis.
2. El texto debe estar escrito en formato Word, en fuente Times New Roman de 12 puntos, a doble espacio, con márgenes de 2.5 cm. y en tamaño carta.
3. Las páginas se numeran consecutivamente, empezando por la página del título y con el número escrito en la esquina superior derecha.
4. La primera página (donde se encuentra el título) debe contener los siguientes apartados en el orden que aquí se menciona:
   - **Título del trabajo en español y en inglés.** El título debe ser descriptivo e indicar los resultados principales del estudio. *Extensión máxima: 25 palabras*
   - **Título corto en español y en inglés.** *Extensión máxima: 6 palabras*.
   - **Nombre completo del autor y de los coautores.** Los autores deberán colocarse en listado; luego, en superíndice, deberá colocarse un número arábigo que indique la institución de adscripción.
   - **Número ORCID de los autores.** Es requisito que cada uno de los autores cuente con su número de identificación ORCID, el cual se puede conseguir en https://orcid.org/register
   - **Adscripción de los autores.** Se debe indicar con números arábigos y en superíndice. Las adscripciones se colocan inmediatamente después de los nombres de los autores (no como notas en pie de página). Es necesario que la adscripción especifique: departamento, área, institución, ciudad y país de cada autor. No es necesario indicar la dirección postal. Las instituciones deben escribirse en su idioma original, sin traducción. Si los autores añaden siglas, éstas deben pertenecer al nombre oficial. No se deben escribir cargos ni grados de los autores (doctor, residente, investigador, etc.).

     Ejemplo:
     Juan José García-Urbina,[1]
     Héctor Valentín Esquivias Zavala[2]
     [1] Dirección de Investigaciones Epidemiológicas y Psicosociales, Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz, Ciudad de México, México.
     [2] Departamento de Publicaciones, Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz, Ciudad de México, México.

- Al final de la primera página, en el apartado ***"Correspondencia"***, se proporcionarán los datos de contacto del autor corresponsal (dirección postal completa, teléfono, correo electrónico). Es con quien Salud Mental se comunicará durante todo el proceso editorial.

  Ejemplo:

  Correspondencia:
  Juan José García-Urbina
  Dirección de Investigaciones Epidemiológicas y Psicosociales, Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz.
  Calz. México-Xochimilco 101, San Lorenzo Huipulco, Tlalpan, 14370, Ciudad de-México, México.
  Tel: 55 4152-3624
  E-mail: jurb@imp.edu.mx

5. La segunda página debe contener los resúmenes del trabajo presentado en inglés y español. *Extensión máxima: 250 palabras.*
   - ***Artículos originales y Revisiones sistemáticas.*** Los resúmenes deben estar conformados por: Introducción, Objetivo, Método, Resultados y Discusión y conclusión.
   - ***Casos Clínicos.*** Los resúmenes deben estar conformados por: Introducción, Objetivo, Principales hallazgos, Intervenciones y resultados y Discusión y conclusión.
   - ***Palabras clave.*** Al final de cada resumen se incluirá un mínimo de cuatro y un máximo de seis palabras clave, separadas por comas y en minúsculas. Las palabras clave deben ser las mismas en inglés y en español. Éstas suelen emplearse para la indexación de los artículos, por lo cual tres de ellas deben encontrarse en el MeSH (*Medical Subject Headings*) que se puede consultar en: http://www.nlm.nih.gov/mesh/MBrowser.html.
6. A partir de la tercera página comienza el cuerpo del manuscrito, el cual deberá conservar la estructura señalada en el resumen.
   - ***Introducción (o Antecedentes en el caso de las Revisiones narrativas).*** El último párrafo de este apartado debe incluir de forma clara los objetivos del trabajo y, si se cree necesario, las hipótesis.
   - ***Método.*** Es preciso que cuente con las siguientes secciones:

     • Diseño del estudio
     • Participantes/descripción de la muestra
     • Sedes
     • Mediciones
     • Procedimientos
     • Análisis estadísticos
     • Lineamientos éticos.

> *Nota*: En caso de los artículos de revisión y casos clínicos, estas secciones pueden ser modificadas de acuerdo con la guía PRISMA (revisiones sistemáticas o la guía CASE REPORT (casos clínicos).

   - **Resultados.** Se presentarán en una secuencia lógica dentro del texto. Pueden apoyarse con tablas, gráficas y figuras.
   - **Discusión y conclusión.** En esta sección se destacarán los aspectos nuevos e importantes del estudio y las conclusiones que derivan del mismo, así como las posibles implicaciones de sus hallazgos y sus limitaciones.

7. Después del apartado de Discusión y conclusión, es preciso agregar las declaraciones de los autores en el siguiente orden:
   - ***Financiamiento.*** En este apartado se debe declarar si el estudio o la preparación del manuscrito recibió algún tipo de financiamiento, indicando el nombre de la entidad que proporcionó los fondos.

     Ejemplo:

     Este estudio fue financiado en parte por el CONSEJO NACIONAL DE CIENCIA Y TECNOLOGÍA. (No. XXXXXXX).

     Si no se recibió ningún apoyo financiero, los autores deben declararlo también.

     Ejemplo:

     Ninguno.
   - ***Conflicto de intereses.*** En esta sección, los autores deberán declarar si tienen conflictos de intereses relacionados con su actividad científica. Tener un conflicto de interés no supone necesariamente un impedimento para la publicación del manuscrito. Si no existe conflicto de interés se debe insertar la siguiente frase: *"Los autores declaran no tener algún conflicto de intereses"*.
   - ***Agradecimientos.*** Cuando se considere necesario, se mencionarán después de las declaraciones anteriores los agradecimientos a personas, centros o entidades que hayan colaborado o apoyado en la investigación.
8. **Referencias.** Las referencias se colocan después de las declaraciones del autor (Financiamiento, Conflicto de intereses y Agradecimientos), y ***deben seguir exclusivamente las normas de publicación de la American Psychological Association (APA), en su última edición*** (https://normas-apa.org).
9. **Tablas y figuras.** Salud Mental establece un máximo de cinco elementos gráficos en total. ***El estándar solicitado para la elaboración de tablas y figuras es el de la American Psychological Association (APA), última edición*** (https://normas-apa.org)***.*** Éstas se colocarán al finaldel manuscrito después de las referencias:
   - Las tablas deben contener título y, en la parte inferior, una nota con el desglose de las siglas.
   - Las figuras deben enviarse en un formato de alta resolución (mínimo 300 dpi).
   - Los títulos de las tablas y los pies de las figuras deben ser claros, breves y llevar siempre el número correspondiente que los identifique. Dentro del texto, el autor debe indicar entre paréntesis y con mayúsculas en qué parte del texto sugiere insertar los elementos gráficos.

     Ejemplo:

     Se cambiaron las definiciones de algunos patrones conductuales (Tabla 3) de manera que fueran más comprensibles en el idioma español y se redefinieron las categorías que agrupan dichos patrones con base en la literatura especializada. (INSERTAR AQUÍ TABLA 3)

ARCHIVOS COMPLEMENTARIOS

1. ***Carta de autorización de uso de la obra*.** Debe estar firmada por todos los autores y enviarse en formato PDF que se puede descargar en https://revistasaludmental.gob.mx/public/Carta-autorizacion-para-publicacion.pdf.
2. ***Carta de presentación.*** El autor debe exponer las fortalezas de su aportación científica, resaltando el alcance, la originalidad y la importancia de su contribución

al campo de la salud mental. *Es de carácter obligatorio mencionar a tres revisores nacionales o internacionales en el campo de conocimiento del manuscrito sometido, favor de indicar el nombre completo y correo electrónico de cada uno de los revisores.* Debe cargarse en formato PDF.

ÉNFASIS Y PUNTUACIÓN

1. Es importante que los manuscritos eviten en general las notas a pie de página, aunque se pueden considerar si son claramente necesarias.
2. Las cursivas deben utilizarse para:
   - Destacar palabras extranjeras.
   - Enfatizar expresiones populares.
   - Mencionar títulos de libros, documentos ya publicados y publicaciones periódicas.
3. Las cursivas pueden emplearse para:
   - Resaltar términos significativos o importantes cuando se mencionan por primera vez.
   - Destacar una palabra u oración dentro de una cita.
4. Las comillas dobles deben usarse solamente para:
   - Citar párrafos de otros autores dentro del texto.
   - Citar textualmente fragmentos del discurso de los sujetos de estudio.
5. Evite el uso de paréntesis doble, es decir, un paréntesis dentro de otro. En su lugar utilice corchetes.
6. Puede emplearse guiones largos para indicar oraciones parentéticas.
7. Deben utilizarse de forma correcta todos los signos de puntuación. Por ejemplo, si emplea signos de interrogación en un texto en español, deben colocarse los de apertura y cierre correspondientes; se procede de igual manera con las comillas.

FÓRMULAS MATEMÁTICAS Y ESTADÍSTICAS

Para presentar los resultados se deben considerar las siguientes indicaciones:

1. Escribir con letra las cifras de cero a nueve y con números las cifras de 10 en adelante.
2. Utilizar números cuando se trate de fechas, muestras, etcétera.
3. Incluir en los datos estadísticos los intervalos de confianza.
4. Los símbolos estadísticos se escriben en cursivas (por ejemplo, *M, SD, n, p)*.
5. Expresar la probabilidad exacta con dos o tres decimales (por ejemplo, p = .04; p = .002) sin el cero adelante del punto decimal. En caso de ser menor a .001 indicarlo con un < .001.
6. Dejar un espacio antes y después de cada signo (a + b = c en lugar de a+b=c).
7. Emplear puntos en lugar de comas para indicar decimales.

VERIFIQUE LO SIGUIENTE ANTES DE SOMETER SU MANUSCRITO

Antes de enviar su manuscrito, cerciórese de adjuntar la documentación solicitada. A los autores, se les devolverá aquellos envíos que no cumplan con los lineamientos editoriales.

1. Manuscrito en formato en WORD.
2. Carta de presentación en formato PDF.
3. Carta de autorización de uso de obra en formato PDF.

GUIDELINES FOR AUTHORS

Salud Mental publishes original articles on psychiatry, psychology, neurosciences and other related fields in the following formats:

1. **Editorials**
   Written at invitation of the Director Editor, editorials express authoritative opinions on specific topics of interest to the scientific community and the area of mental health. They are designed to foster debate and promote new lines of research. *Maximum extension: 1000 words*.
2. **Original articles (peer-reviewed section)**
   These articles present research results unpublished in other journals, and can be written using the following methodologies:
   - *Quantitative methodology.* This methodology includes primary and secondary results from cross-sectional studies, clinical trials, cases and controls, cohorts, and quasi-experimental studies. *Maximum extension: 3500 words*.

     Depending on the type of study, manuscripts should adhere to the following guidelines:
     - Randomized clinical trials should adhere to the *CONSORT guidelines* (http://www.consort-statement.org).
     - Studies with non-experimental designs should adhere to the *TREND guidelines* (https://stacks.cdc.gov/view/cdc/149677).
     - Cross-sectional, cohort, and case-control studies should adhere to the *STROBE guidelines* (http://www.strobe-statement.org).
   - *Qualitative methodology.* This methodology includes focus group reports, in-depth interviews, semantic networks, and content analysis. *Maximum extension: 5000 words*.

     Articles using this type of methodology should comply with the *COREQ guidelines* (https://doi.org/10.1093/intqhc/mzm042).
3. **Review articles (peer-reviewed section)**
   - **Systematic reviews.** These reviews should preferably include a meta-analysis. *Maximum extension: 4000 words*.
4. **Case reports**
   They include reports on the effects of a diagnostic or therapeutic method that is useful or relevant in the medical, academic, or scientific field. *Maximum length: 2000 words.*
   These should comply with the *CASE REPORT guidelines* (https://www.care-statement.org/checklist).

Note. The word count for each of these sections excludes the title, abstracts, and keywords, as well as the funding, conflicts of interest and acknowledgments sections. Words included in tables, figures and references are not considered either.

LANGUAGES

Salud Mental receives and publishes only manuscripts in English.

ETHICAL ASPECTS IN PUBLISHING

See Ethical Guidelines for the journal at https://revistasaludmental.gob.mx/index.php/salud_mental/ethicalguidelines

AUTHORSHIP

The number of authors will depend on the type of manuscript submitted. The maximum number of authors for original or review articles is eight. Only in the case of multicenter studies will the maximum number of authors be increased to twelve, provided this is justified by the scope of the study.

In the event of collective authorship, the name of the editors or those responsible for the article will be included followed by “and the group...” when all members of the group consider themselves co-authors of the work. If the name of the group is to be included, even if not all its members are considered co-authors, the authors responsible will be mentioned followed by “on behalf of the ...group or “by the...group.” In any case, the names and institutions to which members of the group are affiliated should be included in an appendix at the end of the manuscript.

EDITORIAL GUIDELINES

It is of the utmost importance for authors to consider the following before sending their manuscript:

1. Manuscripts should be written clearly and concisely, with no spelling or grammatical errors.
2. The text should be written in Word format, Times New Roman font, size 12, with double-spacing and 2.5 cm margins on letter size sheets.
3. Pages should be numbered consecutively, beginning with the title page, with the number written in the upper right corner.
4. The first page (showing the title) should contain the following sections in the order mentioned here:
   - *Title of article in Spanish and English*. The title should be descriptive and indicate the main results of the study. *Maximum extension: 25 words.*
   - *Short title in Spanish and English*. *Maximum extension: 6 words.*
   - *Full name of author and co-authors*. The authors must be listed and then an Arabic number must be placed in superscript, indicating the institution to which they are affiliated.
   - *Author ORCID number.* It is a requirement that all authors have their ORCID identification number, which can be obtained at https://orcid.org/register
   - *Author affiliation*. This should be indicated with Arabic numerals and in superscript. Affiliations should be placed immediately after authors’ names (not as footnotes). Affiliations should specify the department, area, institution, city, and country of each author. It is not necessary to indicate the postal address. Institutions must be written in their original language, without translation. If the authors add acronyms, these must be included in the official name. No positions or degrees of the authors (such as doctor, resident, or researcher) should be written.

   . For example:

   Juan José García-Urbina,[1] Héctor Valentín Esquivias Zavala[2]

   [1] Dirección de Investigaciones Epidemiológicas y Psicosociales, Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz, Ciudad de México, México.
   [2] Departamento de Publicaciones, Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz, Ciudad de México, México.

- The **“Correspondence”** section should be placed at the end of the first page, indicating the corresponding author with their postal address, phone and email address. This will be the only author Salud Mental will contact during the process.

  For example:

  Correspondence:
  Juan José García-Urbina
  Dirección de Investigaciones Epidemiológicas y Psicosociales, Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz.
  Calz. México-Xochimilco 101, San Lorenzo Huipulco, Tlalpan, 14370, Ciudad de México, México.
  Phone: 55 4152-3624
  E-mail: jurb@imp.edu.mx

5. The second page should contain abstracts of the article in English and Spanish. Each abstract should contain a maximum of 250 words.
   - **Abstracts of original articles and systematic reviews** should comprise the following: Introduction, Objective, Method, Results, and Discussion and Conclusion.
   - **Abstracts of Clinical Cases** should comprise Introduction, Objective, Main findings, Interventions, Results, and Discussion and Conclusion.
   - **Keywords.** At the end of each abstract, a minimum of four and a maximum of six keywords should be included, separated by commas and in lower case. Keywords must be the same in English and Spanish. These are used for indexing articles, which is why three of them must be found in the *MeSH (Medical Subject Headings)* (http://www.nlm.nih.gov/mesh/MBrowser.html).
6. The body of the manuscript begins on the third page, which should follow the structure indicated in the abstract:
   - **Introduction (or Background for Narrative Reviews)**. The last paragraph of this section should clearly include the objectives of the review and, if necessary, the hypotheses.
   - **Method.** This should contain the following sections:
     - Study design
     - Subjects/sample description
     - Sites
     - Measurements
     - Procedure
     - Statistical analysis
     - Ethical considerations
       In the case of review articles and clinical cases, these sections may be modified in keeping with the PRISMA guideline (systematic reviews) or the CASE REPORT guideline (clinical cases).
   - **Results.** These should be presented in a logical sequence within the text. They can be supported with tables, graphs, and figures.
   - **Discussion and Conclusion**. This section will highlight new and relevant aspects of the study and the conclusions derived from it, as well as the possible implications of its findings and its limitations.
7. After the Discussion and Conclusion section, author statements should be added in the following order:
   - **Funding**. In this section, authors should declare whether the study or the preparation of the manuscript received any type of funding, indicating the name of the entity that provided the funds.

     For example:

     This study was partially funded by CONSEJO NACIONAL DE CIENCIA Y TECNOLOGÍA (No. XXXXXXX).

     If no financial support was received, authors must state it was well.

     For example:

     None.
   - **Conflict of interest.** In this section, authors must declare whether they have conflicts of interest related to their scientific activity. Having a conflict of interest will not necessarily prevent publication of the manuscript. If there is no conflict of interest, the following phrase must be inserted: “The authors declare that they have no conflicts of interest.”
   - **Acknowledgments**. If deemed necessary, acknowledgment of the people, centers or entities that have collaborated or supported the research will be mentioned after the previous statements.
8. **References.** Are placed after the authors’ declarations (Funding, Conflicts of interest, and Acknowledgements), and must adhere to the ***Publication Guidelines of the American Psychological Association (APA), last edition*** (https://normas-apa.org).
9. **Tables and figures.** *Salud Mental* establishes a maximum total of five graphic elements. The standard requested for tables and figures adheres to the ***Guidelines of the American Psychological Association (APA), last edition*** (https://normas-apa.org). These will be placed in the same document as the manuscript after the references.
   - Tables must contain a title and a note with an explanation of the acronyms used at the bottom.
   - Figures must be submitted in a high resolution format (minimum image size 300 dpi).
   - Titles of the tables and figure captions must be clear, brief, and always have an identifying number. Within the text, the author must indicate in parentheses and capital letters where the graphic elements should be inserted.

     For example:

     The definition of some behavioral patterns was changed (Table 3) so that they were more comprehensible in Spanish and the categories that group such patterns were redefined based on specialized literature. (INSERT TABLE 3 HERE)

COMPLEMENTARY FILES

1. **Authorization letter for Publication**. This should be signed by all the authors and submitted in PDF format. Download the form at https://revistasaludmental.gob.mx/public/Authorization-letter-for-publication.pdf.
2. **Cover letter**. The author should describe the strengths of their scientific contribution, highlighting the scope, originality, and importance of their contribution to the field of mental health. *It is mandatory to mention three national or international reviewers in the field of knowledge of the submitted manuscript, please indicate the full name and email address of each of the reviewers.* This must be uploaded in PDF.

EMPHASIS AND PUNCTUATION

1. Manuscripts should generally avoid footnotes, although they may be considered if essential.
2. Italics should be used to:
   - Highlight foreign words
   - Emphasize popular expressions
   - Mention titles of books, published documents and periodicals
3. Italics can be used to:
   - Highlight significant or important terms when they are first mentioned
   - Highlight a word or sentence within a quote
4. Double quotes should only be used for:
   - Citing paragraphs from other authors within the text
   - Quoting verbatim fragments of the study subjects' words
5. Avoid using double parentheses, in other words, one parenthesis inside another, and use square brackets instead.
6. Long dashes can be used to indicate parenthetical sentences.
7. All punctuation marks must be used correctly. For example, if question marks are used in a Spanish text, the corresponding opening and closing signs must be included together with quotation marks.

MATHEMATICAL AND STATISTICAL FORMULAE

The following points must be considered when results are presented:

1. Write figures from zero to nine in letters and use numbers for figures from 10 onwards.
2. Use numbers with dates and samples, etc.
3. Include confidence intervals in statistical data.
4. Statistical symbols are written in italics (M, SD).
5. Express exact probability to two or three decimal places (for example, $p = 0.04$; $p = 0.002$), *with no zero in front of the decimal point.* If it is less than .001, it should be written as follows < 0.001.
6. Leave a space before and after each sign (a + b = c instead of a+b=c).
7. Use periods instead of commas to indicate decimals.

PLEASE CHECK THE FOLLOWING BEFORE SUBMITTING YOUR MANUSCRIPT

Before submitting your manuscript, be sure to attach the requested documentation. Submissions failing to comply with the editorial guidelines will be returned to authors.

1. Manuscript in WORD format
2. Cover letter in PDF format
3. Letter authorizing the use of the article