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CONTENT

On the cover
The Penitent Mary Magdalene (1616-1618)
Oil on canvas, 146.5 x 108 cm

Artemisia Gentileschi (1593-1653)

Pitti Palace, Florence, Italy

Instituto Nacional de Psiquiatría
Ramón de la Fuente Muñiz

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EDITORIAL
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Training Strategies for Child and Adolescent Psychiatrists

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Child and adolescent psychopathology has become a major area of research and unmet public health needs in the past twenty years. Since this population is susceptible to experiencing mental health problems, child and adolescent psychiatrists (CAP) trained in emergent clinical areas are required to reduce the diagnostic and therapeutic gap.

Current paradigms favor early interventions, since the early years are crucial to optimal development and mental health in general, (Pérez-Escamilla et al., 2017), together with interventions and follow-up beginning in adolescence because most adult psychopathology stems from untreated mental illness in childhood and adolescence (Uhlhaas et al., 2023).

In Mexico, there is shortage of CAP, as evidenced by the most recent published update, (Heinze et al., 2019) in which only 365 CAP were registered, equivalent to just 0.96 CAP per 100,000 children and adolescents in Mexico. In the past twenty-five years, CAP training in Mexico has been treated as a subspecialty of psychiatry, meaning that after four years in psychiatry, specialists can apply for a two-year CAP training program. Given that medical degrees in Mexico take approximately six to eight years to complete, depending on the university, this means that it is only after twelve years of intense training that new CAP are ready to begin work. This may at least in partly explain the shortage of CAP, as compared to other countries where there may be more flexible programs. For example, in the United States, there are five different pathways (Hunt et al., 2020), whereas in Europe there are three different training models, with a sharp distinction being made between general psychiatry and CAP training (Milestone Consortium et al., 2019). Although every CAP resident is required to complete a research project to obtain their degree, this research is rarely published.

Some authors have outlined the following priorities for child and adolescent mental health in the next decade: increase the number of health personnel required to provide care for children, adolescents and families coping with mental disorders; make child and adolescent mental health services more responsive to broader public health needs; increase research and research training while also incorporating new research findings promptly and efficiently into clinical practice and research training; and strengthen advocacy efforts (Skokauskas et al., 2019).

The CAP training program delivered at the *Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz* (INPRFM) for the *Universidad Nacional Autónoma de México* for the past two decades has striven to achieve a balance between quality diagnostic (de la Peña et al., 2018a; Ulloa et al., 2006) and therapeutic (De la Peña Olvera, 2017) clinical training, the development of research skills with validity tools (de la Peña Olvera et al., 2015) and incorporating strategies into various fields such as neuroendocrine disturbances in major depressive disorder in children (Gaspar-Barba & de la Peña, 2011), while exposing residents to world perspectives on leadership by enabling them to participate in international activities such as the reliability and clinical utility project of the International Classification of Diseases (ICD-11) guidelines for children and adolescents (Robles et al., 2022) and coedit the World Federation Attention Deficit Hyperactivity Disorder Guide (Rohde et al., 2019). The program involves mentoring residents to provide wellness and quality of life during their professional training, which has been achieved through close contact with the

two new residents each academic year. Curricular activities have included pediatric development, and clinics focusing on the treatment of psychiatric disorders both inside and outside Mexico. Weekly activities include supervision with topics ranging from psychotherapeutic and family system to pharmacological approaches. Classes and journal clubs discuss key research tendencies such as the ICD-11 in child and adolescent populations (Garralda, 2024), dimensional (de la Peña & Feria, 2021) and transdiagnostic (de la Peña et al., 2024a) perspectives on psychopathology, as well as new evaluation scales and clinical interviews as the most recent psychosocial and biological therapeutic alternatives.

Since the beginning of the residence program, research paper publication has been a priority, with publishing projects being implemented. The Latin American League for the Study of Attention Deficit Hyperactivity Disorder (ADHD) guidelines for children (de la Peña Olvera et al., 2009) and adolescents (Palacios Cruz et al., 2009) were developed. The residents' research team studied how disruptive behavioral disorders can influence early bipolar disorder manifestations (Palacios-Cruz et al., 2013); and how ninety percent of the offspring of parents with bipolar disorder had a psychiatric disorder (Zavaleta-Ramírez et al., 2014) while female gender, comorbid externalizing disorders and depression characteristics are linked to lower functioning in these offspring (Licona-Martínez et al., 2014). In 2015, former and current residents contributed to the first child and adolescent psychopathology book in Latin America, (de la Peña Olvera et al., 2015) while 2017 saw the compilation of the first compendium of clinical guidelines for children and adolescents (De la Peña Olvera, 2017), both published in association with the National Association of Psychiatrists. For over fifteen years, the validity and reliability of the Kiddie Schedule for Affective Disorders and Schizophrenia had been studied and published, first for the Diagnostic and Statistical Manual for Mental Disorders in its fourth edition version (DSM-IV) (Ulloa et al., 2006) and more recently for the DSM-5 (de la Peña et al., 2018b; de la Peña et al., 2018a). Transdiagnostic specifiers, particularly limited prosocial emotions (LPE) had been studied, and in 2020 the residents' group published an article on the way LPE are associated with empathy (Serment et al., 2020) and a year later, on how LPE can be integrated with core and ancillary characteristics (de la Peña et al., 2022). During the COVID-19 pandemic with the Colombian and Dr. Juan N. Navarro Children's Psychiatric Hospital teams, we studied how sex and age were associated with coping strategies in the Latin American youth population (Ulloa et al., 2022). More recently, with the participation of several former residents, an article was published on the association between CLOCK gene risk factors and ADHD in the adolescent clinical population (Cabrera Lagunes et al., 2022), and the correlation analysis of the Global Assessment of Functioning and the World Health Organization Disability Assessment Schedule 2.0 in children and adolescents was evaluated (de la Peña et al., 2024b).

Certain academic and training needs have yet to be met in the CAP training program at the INPRFM and more research should focus on the preschool population. In neurostimulation and online interventions, if more residents are to be trained, this will require more clinicians, supervisors and researchers.

We encourage other CAP training courses not only in Mexico but throughout Latin America to focus on clinical research training, including the publication of scientific papers. National and international collaboration provides a global sense of unity, promoting leadership training among residents. CAP training programs must be high performance academic courses in which residents can acquire diagnostic and therapeutic milestones for neurodevelopmental, internalizing and externalizing disorders while ensuring their wellness and quality of life during their professional training.

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Conflict of interest

Both authors are part of the residents' training program of the INPRFM and UNAM in Mexico City.

REFERENCES

Cabrera Lagunes, A., Díaz-Anzaldúa, A., Rojas Andrade, G., Peschard, V.-G., Arias Caballero, A., Gaspar-Barba, C. E., Yunes Jimenez, A., De la Peña Olvera, F. R., Cruz Fuentes, C. S., Feria-Aranda, M., Sosa Mora, L., Pérez Molina, A., Guizar Sanchez, D., & Palacios-Cruz, L. (2022). Association between CLOCK gene polymorphisms and ADHD in Mexican teenagers: A comprehensive assessment. *Psychiatry Research*, *317*, 114835. https://doi.org/10.1016/j.psychres.2022.114835

De la Peña Olvera, F. R. (Ed.). (2017). *Compendio de Guías Clínicas en Psiquiatría: Niños y Adolescentes* (1st Ed.). APM Ediciones y Convenciones en Psiquiatría.

de la Peña Olvera, F. R., Palacios Cruz, L., Rodríguez Delgado, A., & Vázquez Hernández, J. L. (2015). *Psicopatología básica de niños y adolescentes* (1st Ed.). Asociación Psiquiátrica Mexicana.

de la Peña Olvera, F., Barragán Pérez, E., Rohde, L. A., Patiño Durán, L. R., Zavaleta Ramírez, P., Ulloa Flores, R. E., Isaac, A. M., Murguía, A., Pallia, R., & Larraguibel, M. (2009). Algoritmo de Tratamiento Multimodal para Escolares Latinoamericanos con Trastorno por Déficit de Atención con Hiperactividad (TDAH). *Salud Mental*, *32*(Supl 1), S17-S29.

de la Peña, F. R., & Feria, M. (2021). Diagnostic dimensionality and transdiagnostic clinical manifestations. *Salud Mental*, *44*(3), 103-105. https://doi.org/10.17711/SM.0185-3325.2021.014

de la Peña, F. R., Cortés-Meda, G., & Sarmiento Hernández, E. I. (2024a). Transdiagnostic Specifiers: Challenges in Children and Adolescents Psychiatry Classification. *Salud Mental*, *47*(3), 97-98. https://doi.org/10.17711/SM.0185-3325.2024.013

de la Peña, F. R., Escalona, M. P., Ulloa, R. E., Palacios-Cruz, L., Palacio, J. D., Mayer, P., Diaz, R., & Rosetti, M. F. (2024b). Comparing the Global Assessment of Functioning (GAF) and the World Health Organization Disability Assessment Schedule (WHODAS) 2.0 in children and adolescents. *Salud Mental*, *47*(3), 137-143. https://doi.org/10.17711/SM.0185-3325.2024.018

de la Peña, F. R., Rosetti, M. F., Palacio, J. D., Palacios-Cruz, L., & Ulloa, R. E. (2022). Limited Prosocial Emotions in a Clinical Population of Children and Ad-

olescents: Proposal for Core and Ancillary Characteristics. *The Canadian Journal of Psychiatry*, *67*(4), 290-295. https://doi.org/10.1177/07067437211004893

de la Peña, F. R., Rosetti, M. F., Rodríguez-Delgado, A., Villavicencio, L. R., Palacio, J. D., Montiel, C., Mayer, P. A., Félix, F. J., Larraguibel, M., Viola, L., Ortiz, S., Fernández, S., Jaímes, A., Feria, M., Sosa, L., Palacios-Cruz, L., & Ulloa, R. E. (2018a). Construct validity and parent–child agreement of the six new or modified disorders included in the Spanish version of the Kiddie Schedule for Affective Disorders and Schizophrenia present and Lifetime Version DSM-5 (K-SADS-PL-5). *Journal of Psychiatric Research*, *101*, 28-33. https://doi.org/10.1016/j.jpsychires.2018.02.029

de la Peña, F. R., Villavicencio, L. R., Palacio, J. D., Félix, F. J., Larraguibel, M., Viola, L., Ortiz, S., Rosetti, M., Abadi, A., Montiel, C., Mayer, P. A., Fernández, S., Jaimes, A., Feria, M., Sosa, L., Rodríguez, A., Zavaleta, P., Uribe, D., Galicia, F., …Ulloa, R. E. (2018b). Validity and reliability of the kiddie schedule for affective disorders and schizophrenia present and lifetime version DSM-5 (K-SADS-PL-5) Spanish version. *BMC Psychiatry*, *18*(1), 193. https://doi.org/10.1186/s12888-018-1773-0

Garralda, M. E. (2024). Child and adolescent psychiatric disorders and ICD-11. *The British Journal of Psychiatry*, 1-3. https://doi.org/10.1192/bjp.2024.200

Gaspar-Barba, E., & de la Peña, F. (2011). Neuroendocrine Disturbances in Paediatric Population with Major Depressive Disorder. In P. de Gortari (Ed.), *Psychoneuroendocrinology*.

Heinze, G., Bernard-Fuentes, N., Carmona-Huerta, J., Chapa, G. del C., & Guízar-Sánchez, D. P. (2019). Physicians specializing in psychiatry of Mexico: An update 2018. *Salud Mental*, *42*(1), 13-24. https://doi.org/10.17711/SM.0185-3325.2019.003

Hunt, J., Reichenberg, J., Lewis, A. L., & Jacobson, S. (2020). Child and adolescent psychiatry training in the USA: Current pathways. *European Child & Adolescent Psychiatry*, *29*(1), 63-69. https://doi.org/10.1007/s00787-019-01402-9

Licona-Martínez, A., Palacios-Cruz, L., Feria-Aranda, M., Zavaleta-Ramírez, P., Vargas-Soberanis, A., Becerra-Palars, C., & de la Peña-Olvera, F. (2014). Asociación de comorbilidades y funcionamiento global en hijos de padres con trastorno bipolar. *Salud Mental*, *37*(1), 9-14. https://doi.org/10.17711/SM.0185-3325.2014.002

Milestone Consortium, Russet, F., Humbertclaude, V., Dieleman, G., Dodig-Ćurković, K., Hendrickx, G., Kovač, V., McNicholas, F., Maras, A., Paramala, S., Paul, M., Schulze, U. M. E., Signorini, G., Street, C., Tah, P., Tuomainen, H., Singh, S. P., Tremmery, S., & Purper-Ouakil, D. (2019). Training of adult psychiatrists and child and adolescent psychiatrists in europe: a systematic review of training characteristics and transition from child/adolescent to adult mental health services. BMC medical education, 19(1), 204. https://doi.org/10.1186/s12909-019-1576-0

Palacios Cruz, L., Zavaleta Ramírez, P., Patiño Durán, R., Abadi, A., Diaz Jaimes, D., Taddey, N., Garrido, G., Rubio, E., Grañana, N., Muñoz, C., & Sosa Mora, L. (2009). Algoritmo de Tratamiento Multimodal para Adolescentes Latinoamericanos con Trastorno por Déficit de Atención con Hiperactividad (TDAH). *Salud Mental*, *32*(Supl 1), S31-S44.

Palacios-Cruz, L., Arias-Caballero, A., Cortés Sotres, F., de la Peña-Olvera, F., Feria Aranda, M., Cárdenas Godinez, M., Apiquian-Guitart, R., Cabrera-Lagunes, A., Berlanga, C., Fresán, A., & Heinze-Martin, G. (2013). Asociación de los trastornos externalizados y la edad de inicio en pacientes con trastorno bipolar tipo I y II ¿Son los síntomas de los trastornos externalizados predictores de una edad de inicio más temprano? *Salud Mental*, *36*(3), 241-251. https://doi.org/10.17711/SM.0185-3325.2013.031

Pérez-Escamilla, R., Rizzoli Córdoba, A., Alonso Cuevas, A., & Reyes Morales, H. (2017). Advances in early childhood development: From neurons to large scale programs. *Boletín Médico del Hospital Infantil de México (English Edition)*, *74*(2), 86-97. https://doi.org/10.1016/j.bmhime.2017.11.022

Robles, R., de la Peña, F. R., Medina-Mora, M. E., de los Dolores Márquez-Caraveo, M. E., Domínguez, T., Juárez, F., Rojas, A. G., Sarmiento-Hernández, E. I., Feria, M., Sosa, L., Aguerre, R. E., Ortiz, S., Real, T., Rebello, T., Sharan, P., & Reed, G. M. (2022). ICD-11 Guidelines for Mental and Behavioral Disorders of Children and Adolescents: Reliability and Clinical Utility. *Psychiatric Services*, *73*(4), 396-402. https://doi.org/10.1176/appi.ps.202000830

Rohde, L. A., Buitelaar, J. K., Gerlach, M., & Faraone, S. V. (Eds.). (2019). *The World Federation of ADHD guide*. Artmed.

Serment, M., de la Peña, F. R., & Rodriguez-Delgado, A. (2020). Correlation between Limited Prosocial Emotions and Empathy in Adolescents Clinical Population. *Research in Pediatrics & Neonatology*, *4*(4), 356-362. https://doi.org/10.31031/RPN.2020.04.000595

Skokauskas, N., Fung, D., Flaherty, L. T., von Klitzing, K., Pūras, D., Servili, C., Dua, T., Falissard, B., Vostanis, P., Moyano, M. B., Feldman, I., Clark, C., Boričević, V., Patton, G., Leventhal, B., & Guerrero, A. (2019). Shaping the future of child and adolescent psychiatry. *Child and Adolescent Psychiatry and Mental Health*, *13*(1), 19. https://doi.org/10.1186/s13034-019-0279-y

Uhlhaas, P. J., Davey, C. G., Mehta, U. M., Shah, J., Torous, J., Allen, N. B., Avenevoli, S., Bella-Awusah, T., Chanen, A., Chen, E. Y. H., Correll, C. U., Do, K. Q., Fisher, H. L., Frangou, S., Hickie, I. B., Keshavan, M. S., Konrad, K., Lee, F. S., Liu, C. H., … Wood, S. J. (2023). Towards a youth mental health paradigm: A perspective and roadmap. *Molecular Psychiatry*, *28*(8), 3171-3181. https://doi.org/10.1038/s41380-023-02202-z

Ulloa, R. E., Apiquian, R., de la Peña, F. R., Díaz, R., Mayer, P., Palacio, J. D., Palacios-Cruz, L., Hernández, A., García, P., & Rosetti, M. F. (2022). Age and sex differences in the impact of the COVID-19 pandemic on mental health and coping mechanisms in Latin American youth. *Journal of Psychiatric Research*, *156*, 372-378. https://doi.org/10.1016/j.jpsychires.2022.10.005

Ulloa, R. E., Ortiz, S., Higuera, F., Nogales, I., Fresán, A., Apiquian, R., Cortés, J., Arechavaleta, B., Foulliux, C., Martínez, P., Hernández, L., Domínguez, E., & de la Peña, F. (2006). Interrater reliability of the Spanish version of Schedule for Affective Disorders and Schizophrenia for School Age Children-Present and Lifetime version (K-SADS-PL). *Actas Españolas de Psiquiatría*, *34*(1), 36-40.

Zavaleta-Ramírez, P., De la Peña Olvera, F. R., Vargas-Soberanis, M. A., Feria Aranda, M., Sosa Mora, L., Caballero, A. A., Becerra Palars, C., & Palacios-Cruz, L. (2014). Estudio comparativo de psicopatología en hijos de padres con trastorno bipolar. *Salud Mental*, *37*(6), 477. https://doi.org/10.17711/SM.0185-3325.2014.057

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Emotional Dysregulation and Worry as Mediators between Stressful Life Events and Posttraumatic Stress Symptoms in Adult Mexican Women: A Cross-Sectional Study

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ABSTRACT

Introduction. Women experience numerous episodes of adverse events, often linked to violence, which create emotional difficulties that contribute to the development of post-traumatic stress disorder. However, more research is required to understand the nature of post-traumatic reactions and the underlying psycho-emotional processes. **Objective.** To determine whether emotional dysregulation and worry mediate the relationship between the experience of stressful events and post-traumatic stress symptoms in a sample of adult Mexican women seeking online psychological treatment. **Method.** A cross-sectional study was conducted with a non-probabilistic sample of 687 women ages 18 to 76. **Results.** The data show that emotional dysregulation mediated the relationship between the type of trauma and post-traumatic stress symptoms for illness- and death-related events, but not for other types of stressors, whereas worry mediated the association between sexual and physical assault and post-traumatic stress symptoms. **Discussion and conclusion.** This study contributes to current psychopathology models focused on the transdiagnostic perspective. The findings may guide interventions targeting emotion regulation and worry as modifiable risk factors for the development of post-traumatic stress.

Keywords: Worry, emotional dysregulation, PTSS, women, violence.

RESUMEN

Introducción. Las mujeres experimentan múltiples episodios de eventos adversos que con frecuencia están vinculados a la violencia, los cuales generan dificultades emocionales que influyen en el desarrollo del trastorno por estrés postraumático. **Objetivo.** Examinar si la desregulación emocional y la preocupación median la relación entre las experiencias de eventos estresantes y los síntomas de estrés postraumático en una muestra de mujeres adultas mexicanas que buscan tratamiento psicológico en línea. **Método.** Se realizó un estudio transversal con una muestra no probabilística de 687 mujeres entre 18 y 76 años. **Resultados.** Los datos indicaron que la desregulación emocional medía la relación entre el tipo de trauma y los síntomas de estrés postraumático en eventos relacionados con la enfermedad y la muerte, pero no en otros tipos de estresores, mientras que la preocupación medía la asociación entre la agresión sexual y física y los síntomas de estrés postraumático. **Discusión y conclusión.** Este estudio contribuye a los modelos actuales de la psicopatología centrados en la perspectiva transdiagnóstica. Los hallazgos pueden guiar las intervenciones dirigidas a la regulación emocional y la preocupación como a factores de riesgo modificables para el desarrollo de estrés postraumático.

Palabras clave: Preocupación, desregulación emocional, PTSS, mujeres, violencia.

INTRODUCTION

Scientific evidence has highlighted the link between adverse life events and mental health, showing that post-traumatic responses range from psychopathology to post-traumatic growth. However, understanding these post-traumatic responses requires the study of the risk/protective factors and mediators explaining the mechanisms for the development and maintenance of psychological disorders. For this reason, the factors involved in the ability to recover from exposure to stressful or traumatic events have been studied. The findings show that the relationship between external demands (possible stressors) and the impact on mental health is mediated by transdiagnostic psychological variables acting as either protective (Hilko & Chalder, 2018; Sandín et al., 2009) or risk factors (Tyra et al., 2021).

The COVID-19 pandemic saw a worldwide increase in depression symptoms, post-traumatic stress, confusion, worry and anger (Brooks et al., 2020; Czeisler et al., 2021; Chávez-Valdez et al., 2021; Rodríguez-Quiroga et al., 2020; Santomauro et al., 2021), mainly in individuals with a previous psychiatric diagnosis or vulnerability factor (Campos et al., 2021). Women in particular experienced a greater psychological impact (Akel et al., 2021; Al-Jbouri et al., 2021; Demissie & Bitew, 2021; Galindo-Vázquez et al., 2020; Pérez-Cano et al., 2020; Wang et al., 2020). This was due to various risk factors that increase their vulnerability, such as limited access to health services, social inequality, reproductive problems, parenting and family care, as well as domestic violence (Almeida et al., 2020; Brooks et al., 2020; Connor et al., 2020; Dlamini, 2021; Rodríguez-Quiroga et al., 2020; Sediri et al., 2020; Thibaut & van Wijngaarden-Cremers, 2020).

Gender violence is one of the stressors most commonly reported by women. This phenomenon occurs across all societies, social classes and cultural levels (United Nations Entity for Gender Equality and the Empowerment of Women [UN Women], 2021; World Health Organization [WHO], 2021; Sardinha et al., 2022). During the COVID-19 pandemic, there was a sudden increase in the manifestations of violence against women (Dlamini, 2021; Piquero et al., 2021). Indeed, it was reported that at least 243 million women experienced sexual and/or physical violence at the hands of their partners (UN Women, 2020). In Mexico, the incidence of domestic violence has also risen. between 2019 and 2021, there was an increase in emergency calls regarding violence perpetrated against women. Violence against women rose by 47% (from 197,693 to 291,331), sexual abuse increased by 15% (from 5,347 to 6,169) while sexual harassment expanded by 27% (from 7,470 to 9,505). Although there has been no increase in emergency calls regarding intimate partner violence, numbers have remained high (2019: 274,487; 2021: 259,452; SSPC, 2020).

These situations of violence can cause emotional consequences, such as anxiety, depression, worry, Post Traumatic Stress Symptoms (PTSS) and Post Traumatic Stress Disorder (PTSD) (Almeida et al., 2020; Chávez-Valdez et al., 2021; Davey, 1994; Liu et al., 2020; Wang et al., 2020). Repetitive negative thinking, such as worry, is a persistent thinking style and transdiagnostic cognitive mechanism contributing to personal distress, negative emotional states, and emotional maladjustment. Researchers have studied how the dimension of worry is present in female victims of violence and tends to predict the development of PTSS (Cabras et al., 2020; UN Women, 2020) following exposure to trauma (Neria et al., 2008). It is estimated that 31% to 84% of victims of gender-based violence develop symptoms of post-traumatic stress disorder (Coker et al., 2005; Karakurt et al., 2014), together with re-experiencing, avoidance (cognitive and behavioral) and living with a sense of threat (Huerta Rosales et al., 2014; Irizarry & Rivero, 2018; Neria et al., 2008).

Likewise, one of the main factors associated with PTSD after a traumatic event is emotional dysregulation (Paulus et al., 2018; Pencea et al., 2020; Seligowski et al., 2015; Tull et al., 2011). This is defined as a transdiagnostic difficulty that can directly affect health since the individual shows a low acceptance of emotional experiences, limited ability to inhibit impulsive behaviors when negative emotions are experienced, unwillingness to experience negative emotions as part of life and poor strategies for modulating their emotions (Gratz & Roemer, 2004; Villalta et al., 2020). These alterations significantly contribute to the deterioration and distress of trauma survivors (Berking & Whitley, 2014; Cloitre et al., 2013; Coker et al., 2005; Tyra et al., 2021; Yiğit & Guzey-Yiğit, 2019).

Women experience multiple episodes of adverse events linked to violence. Women who have experienced intimate partner violence from different perpetrators showed a pattern of greater difficulty with emotional regulation (Lilly et al., 2014; Muñoz-Rivas et al., 2021; Ruork et al., 2021). In victims of sexual violence, emotional dysregulation is a predictor of risky sexual practices after trauma, together with negative self-concept and interpersonal problems correlating with PTSS (Holladay et al., 2021). It is therefore suggested that the effect of these transdiagnostic variables be investigated to improve interventions that not only focus on PTSS, but also on aspects of emotional dysregulation, especially in the first few months after the trauma, since this would contribute to an improvement in people's lives and a reduction of trauma (Cloitre et al., 2013; Gilmore et al., 2020; Messman-Moore et al., 2010; Villalta et al., 2020). Other prospective studies have shown that emotional dysregulation is associated with and predicts the development of PTSD symptoms, in both the first three months (Forbes et al., 2020) and the first year after trauma (Pencea et al., 2020),

even when controlling for other PTSD risk factors, such as age, race, ethnicity, childhood trauma, lifetime trauma exposure (exposure to traumatic events), number of stressful events experienced, type of interpersonal trauma, level and intensity of symptoms of depression and PTSD at the time of the stressful life event (Forbes et al., 2020; Pencea et al., 2020). In addition, during the COVID-19 emergency, the mediating role of emotional dysregulation in PTSS related to COVID-19, specifically in regard to the heterogeneity of symptoms, has been demonstrated (Siegel et al., 2021; Tyra et al., 2021; Velotti et al., 2021).

In this respect, dimensional cognitive variables, particularly emotional dysregulation and worry in adult life, may be associated with the development or manifestation of various forms of psychopathology (Bardeen et al., 2013; Tull et al., 2011). There is evidence of a robust relationship between negative emotions, difficulties in emotional regulation and the severity of post-traumatic stress symptoms (PTSS) in people exposed to different types of traumas (McLean & Foa, 2017). Seligowski et al. (2015) analyzed fifty-seven studies and obtained seventy-four effect sizes by testing eight random-effects models. The largest effects were seen for general emotional dysregulation, rumination, thought suppression and experiential avoidance, while medium effects were found for expressive suppression and worry. The findings of this meta-analysis suggest that various aspects of emotion regulation are associated with PTSS symptoms in a variety of samples (type of trauma).

However, more research is required to understand the nature of post-traumatic reactions and the underlying psycho-emotional processes. It is therefore relevant to explore transdiagnostic variables, such as worry and emotional dysregulation, to examine how women cope with stressful events that impact emotion regulation difficulties, and whether these difficulties subsequently contribute to PTSS. Improved understanding of the mediators linked to emotional regulation strategies and worry when experiencing a stressful event could reveal modifiable risk factors for reducing PTSD symptoms among women exposed to high-risk traumas, such as those stemming from violence.

Based on the previous findings, this study aimed to determine whether emotional dysregulation and worry mediate the association between type of stressful event and posttraumatic stress symptoms. The following hypotheses were proposed. First, trauma derived from violence (such as physical and sexual assault) would be associated with greater emotional dysregulation and worry compared to other types of traumas (specifically, family problems or separation). Second, emotional dysregulation and worry would mediate the relationship between experiences of stressful events and posttraumatic stress symptoms in adult women.

METHOD

Study design

A non-experimental, quantitative, correlational, cross-sectional study was conducted using multiple regression, with a non-probabilistic sample of 687 women ages 18 to 76. The present cross-sectional study was part of a larger research/intervention study exploring clinical factors of Mexican people seeking online psychological support for people experiencing any kind of emotional or stress-related disorder.

Participants

Non-probability sampling yielded 687 female participants ages 18 to 76 (M = 31.74, SD = 9.94) who were community members recruited from a larger randomized clinical trial investigating the efficacy of an online transdiagnostic psychological treatment for emotional and trauma-related disorders. Since this was a secondary analysis, sample size was not determined a priori but was dependent on that of the larger project. For the current study, participants were selected if they had experienced exposure to trauma according to the *Posttraumatic Stress Disorder Checklist for DSM-5* (PCL-5). Participants were not required to demonstrate high PTSS or a PTSD diagnosis. Sociodemographic information on the sample is presented in Table 1.

Table 1
Sociodemographic Information

	N	%
Marital status		
Single	329	47.9
Married or cohabiting	245	35.7
Divorced, separated or widowed	96	14.0
Other	17	2.5
Education		
Middle school or less	40	5.8
High school	147	21.4
Undergraduate	403	58.7
Graduate	65	9.5
Other	32	4.7
Type of event		
Family problems and separation	251	36.5
Sexual assault	85	12.4
Death	162	23.6
Physical assault	77	11.2
Illness	112	16.3
Time since the event		
A month ago or less	80	11.6
One to three months	69	10.0
Three months to a year	139	20.2
Over a year ago	399	58.1

Procedure

Participants were recruited from the community via social networks (such as social media advertisements on Facebook) from March 2021 to April 2022. To take part in the study, they were required to fill out a questionnaire on SurveyMonkey (which presented the scales in random order to prevent fatigue). The study was advertised as an online psychotherapy intervention for emotional disorders. Although it included subsequent phases, the online baseline data were used for this study. Before taking part in the study, participants were informed about its aims and provided electronic informed consent. Because of the nature of the online intervention study, the data were not anonymized. However, access to the database was limited to the principal investigator and two assistants. Anonymized versions of the data were created for research purposes.

Measures

Difficulties in Emotion Regulation Scale (*DERS*; Gratz & Roemer, 2004). This is a thirty-six-item, self-report measure assessing individuals' typical levels of emotional dysregulation across six domains: nonacceptance of negative emotions, difficulty engaging in goal-directed behaviors when distressed, difficulty controlling impulsive behaviors when distressed, limited access to emotion regulation strategies perceived as effective, and lack of emotional awareness, and lack of emotional clarity. Items are rated on a five-point Likert scale, with higher scores indicating greater emotional dysregulation. The Mexican version has adequate internal consistency with an $\alpha = .80$. It consists of fifteen items, comprising difficulties in emotion regulation as well as emotional awareness (De la Rosa-Gómez et al., 2021). Only the fourteen items measuring difficulties in emotion regulation were used in this study.

Penn State Worry Questionnaire (*PSWQ-11*; Meyer et al., 1990). The PSWQ measures the frequency and intensity of worry. The original questionnaire includes sixteen items rated on a 1–5 scale (1 = *Not at all typical of me*, 5 = *Very typical of me*). The brief version (PSWQ-11), adapted and validated in Spain, comprises eleven items (Sandín et al., 2009). In the Mexican population, the PSWQ-11 obtained a better model fit than the original questionnaire (PSWQ-16) and an adequate internal consistency coefficient ($\alpha = .88$; Padros-Blazquez et al., 2018).

Posttraumatic Stress Disorder Checklist for DSM-5 (*PCL-5*; Weathers et al., 2013). The PCL-5 is a self-report measure to determine the symptom severity of PTSD, with twenty items reflecting the DSM-5 diagnostic criteria of PTSD. Individuals are asked how much they have been bothered by each item over the past month. Items are scored on a Likert scale ranging from 0 to 4, with higher scores indicating more acute PTSD symptoms. The checklist has adequate internal consistency for psychometric properties in the Mexican population, with an alpha of .97, as well as appropriate convergent validity (*rs* = .58 to .88; Durón-Figueroa et al., 2019). It is important to note that this instrument only assesses symptoms related to post-traumatic stress, rather than providing a diagnosis of PTSD itself. Consequently, PCL-5 scores should be interpreted from a dimensional perspective, rather than being regarded as the basis for clinical diagnosis.

Stressful life events. Participants answered the following open-ended question: *Sometimes people experience difficult situations that create a high degree of stress. Please think of a stressful or threatening event you experienced at some point in your life that continues to cause you emotional distress. If you remember more than one, try to focus on the one that causes you the most emotional distress. Write what this event was below*. Additionally, to determine the time of the event, participants were asked: *How long ago did it happen*? with options 1 = *A month ago or less*, 2 = *One to three months*, 3 = *Three months to a year*, 4 = *Over a year ago*. Adverse events were classified as family problems and separation, sexual assault, death, physical assault, and illness. This coding process was independently conducted by two research assistants, following coding instructions previously developed by the research team. Discrepancies were reviewed by two authors (AHP and PDV) to reach a consensus.

Statistical analyses

First, univariate summary statistics (mean, SD), as well as bivariate correlations were calculated for continuous variables. The bivariate association between type of event and PTSS was also examined, for which an ANOVA test was used. For the mediation analysis, *family problems and separation* was chosen as the reference category for the type of event variable. Four dummy binary variables were therefore created for type of event. The statistical significance of the indirect effects was evaluated through bias-corrected 95% RI obtained from 5000 bootstrap samples. Time since the event was also included as a control variable in the model, with ≥ 1 year as the reference category. Given the random order in which measures were presented, missing data were assumed to be missing completely at random (MCAR), so that only participants with complete data were included ($n = 687$).

Ethical considerations

This study uses data collected before randomization and treatment onset. Procedures were approved by the institution's Research Ethics Committee (CE/FESI/082020/1363), and the study has been registered with Clinical Trials (NCT05081830). All participants read and agreed to an electronic consent form before completing the

Table 2
Descriptive Statistics and Bivariate Correlations

Variable	*M*	*SD*	*1*	*2*	*3*
1. Emotional dysregulation	42.62	13.79	1		
2. Worry	42.41	9.27	.54***	1	
3. PTSS	44.68	15.34	.65***	.56***	1

Note: *M* = mean; *SD* = standard deviation; ***p < .001.

self-report questionnaires online. Only adults ages eighteen or older were allowed to register. No confidential data were required from participants such as their names, addresses or telephone numbers.

RESULTS

Preliminary analyses

The zero-order correlations between emotional dysregulation, worry and PTSS were all strong and statistically significant (Table 2). The strongest correlation was between emotional dysregulation and PTSS (r = .65, p < .001). PTSS mean scores differed significantly between the five types of event (family problems and separation, sexual assault, death, physical assault, and illness), $F(4, 682) = 3.21$, p = .013, η^2 = .02.

Mediation model

Figure 1 presents the results of the mediation model. Both emotional dysregulation and worry were positively associated with PTSS. Sexual and physical assault were associated with greater worry. Death-and illness-related events were significantly associated with emotional dysregulation. The indirect effect of sexual events on PTSS through worry was statistically significant (Unstandardized $a*b$ = 1.80, 95% CI [0.73, 3.12]), suggesting that experiencing these events leads to higher levels of worry, which, in turn, increase PTSS. Similarly, the mediating role of worry on the association between physical events and PTSS was also significant (Unstandardized $a*b$ = 1.96, 95% CI [0.83, 3.29]). As for emotional dysregulation, the indirect effect of death-related events on PTSS was significant (Unstandardized $a*b$ = -1.84, 95% CI [-3.40, -0.38]). Emotional dysregulation also mediated the relationship between illness-related events and PTSS (Unstandardized $a*b$ = -3.00, 95% CI [-4.86, -1.33]). Finally, although not shown in Figure 1, time since the event was also included as a control variable, although no statistically significant association was found with regard to PTSS.

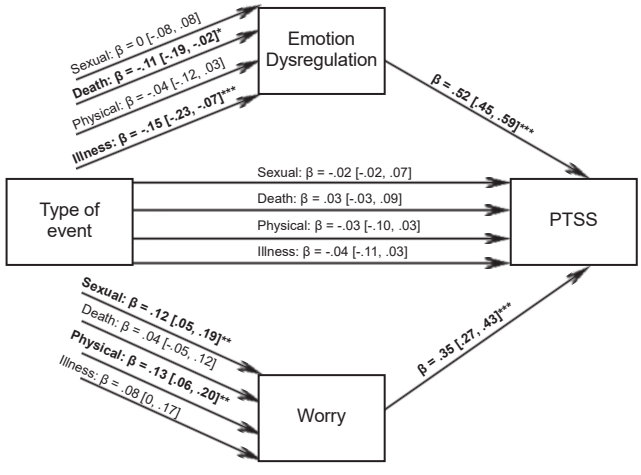

Figure 1. Standardized Coefficients (and 95% CI) of the Mediation Model.

Note. 95% CI are shown in brackets. Significant results are shown in bold. *p < .05 **p < .01 ***p < .001.

DISCUSSION AND CONCLUSION

The principal purpose of this study was to assess whether emotional dysregulation and worry mediate the relationship between experiences of stressful events and PTSS within a sample of adult Mexican women seeking online psychological treatment. The results confirm the hypothesis that emotional dysregulation and worry mediate the relationship between experiences of various types of trauma and PTSS. However, an analysis by dimension and type of event found that emotional dysregulation mediated the relationship between death and illness-related events and PTSS, but not sexual and physical assault in our sample of women. These findings were not consistent with previous research, which found that emotional dysregulation mediated the relationship between sexual assault trauma and PTSS (Raudales et al., 2019; Seligowski et al., 2015). Nevertheless, the sample in this study could have been influenced by the increase in illness and deaths due to COVID-19 (Domínguez-Rodríguez et al., 2022). Although there was an increase in violence against women during the COVID-19 pandemic (Dlamini, 2021; Piquero et al., 2021), particularly sexual and/or physical violence by their partners (UN Women, 2020), our results show that sexual and physical assault were not significantly associated with emotional dysregulation. This could be explained by previous findings of women survivors of intimate partner violence suggesting that emotional dysregulation is a better predictor of PTSS than type of abuse (Ruork et al., 2021). Nevertheless, an alternative interpretation is also plausible. Some of the literature suggests that interpersonal trauma has a more substantial impact on emotional dysregulation than non-interpersonal traumatic events (Ehring & Quack, 2010; Raudales et al., 2019). This could explain why events linked to death and

illness, which are arguably non-interpersonal, displayed a weaker association with dysregulation than events related to family problems. Notably, instances of sexual and physical violence showed no significant differences when compared to family problems, all of which involve interpersonal events.

Findings highlight the importance of emotional difficulties in PTSS development. Specifically, the study demonstrated the mediating role of worry in the association between sexual and physical assault and PTSS. These findings could be explained by the fact that repetitive negative thoughts, such as worry, increase vulnerability to PTSD (Ardino et al. 2013; McEvoy et al., 2013). Worry involves thoughts about the future (Olatunji et al., 2010) which, when associated with having been a victim of sexual and physical abuse, affect problem-solving and healthy information processing, contributing to the development of PTSS (Neria et al., 2008). Similar studies report that adult women with a history of sexual assault showed intrusive thoughts related to abuse (Rosenthal et al., 2006). Worry increased the severity of PTSS as a strategy for controlling unpleasant thoughts of the traumatic event. It is therefore suggested that female victims of violence often make chronic attempts to avoid unpleasant internal experiences (such as thoughts, emotions, and memories) as a means of regulation.

Although some studies have reported that time since the stressful traumatic event has been associated with higher PTSS (Feeny et al., 2000), in our study, although time since the event was included as a control variable, no statistically significant association with PTSS was found. However, it is known that potentially traumatic stressful life events can hamper the development and consolidation of adaptive emotional regulation strategies, particularly in victims of sexual abuse who live with or depend on the aggressor (such as relatives, bosses, and partners), who learn to normalize abuse as a coping strategy through avoidance, emotional numbing, submission, guilt, and worry. However, over time, these strategies cease to be functional and the discomfort becomes chronic, manifesting itself in difficulty in recognizing and regulating emotions (Freyd et al., 2001). Accordingly, additional research is required to assess the impact of various trauma types on the development of emotional dysregulation, including worry and other dimensional variables in women in various contexts.

These are some of the limitations that must be considered for a better understanding of research findings. In the first place, the sample consisted only of women, which, although they were the target population due to the relevance of the study phenomenon, means that the results cannot be generalized. Second, a structured instrument was not employed to measure types of stressful events. Instead, an open-ended question was used that had to be coded and grouped into common categories at the discretion of the researchers, meaning that they could have been some bias in the classification of stressors. Future studies should use a specific instrument to measure the type and severity of stressful life events. Along these same lines, data were collected cross-sectionally and therefore do not provide evidence of a temporal relationship between emotional dysregulation, worry, and PTSS. Although this study suggests the presence of a possible mediating variable, it is not possible to evaluate this relationship thoroughly. It is suggested that future studies be longitudinal and use larger samples to specifically determine whether stressor types via emotional dysregulation and worry mediate the development and severity of PTSS in women. Finally, this study was a secondary data analysis using data from a larger study designed to provide online psychological treatment in a context impacted by the COVID-19 pandemic. Some variables of interest (such as additional emotion regulation strategies) could therefore not be included, since they were not part of the primary study.

Difficulties in emotional regulation and worry are well-established correlates of anxiety and depression that act as risk factors for the development of PTSD and its continuation. This study contributes to the current models of psychopathology and intervention programs, specifically those focusing on transdiagnostic models and emotional dysregulation, a significant treatment target for stress and trauma-related disorders.

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Conflicts of interest

The authors declare they have no conflicts of interest.

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REFERENCES

Akel, M., Berro, J., Rahme, C., Haddad, C., Obeid, S., & Hallit, S. (2021). Violencia contra las mujeres durante la pandemia de COVID-19. *Revista de Violencia Interpersonal*, *37*, 13-14. https://doi.org/10.1177/0886260521997953

Al-Jbouri, N., Mashkury, Z., & Al-Ameri, R. (2021). Salud mental durante la pandemia de COVID-19 / Bagdad Al-Karkh. *Revista Internacional de Psiquiatría Social*, *68*, 4. https://doi.org/10.1177/00207640211004987

Almeida, M., Shrestha, A. D., Stojanac, D., & Miller, L. J. (2020). The impact of the COVID-19 pandemic on women's mental health. *Archives of Women's Mental Health*, *23*(6), 741-748. https://doi.org/10.1007/s00737-020-01092-2

Ardino, V., Milani, L., & Di Blasio, P. (2013). PTSD and re-offending risk: the mediating role of worry and a negative perception of other people's support. *European Journal of Psychotraumatology*, *4*. https://doi.org/10.3402/ejpt.v4i0.21382

Bardeen, J. R., Kumpula, M. J., & Orcutt, H. K. (2013). Emotion regulation difficulties as a prospective predictor of posttraumatic stress symptoms following a mass shooting. *Journal of Anxiety Disorders*, *27*(2), 188-196. https://doi.org/10.1016/j.janxdis.2013.01.003

Berking, M., & Whitley, B. (2014). Emotion regulation: Definition and relevance for mental health. En M. Berking & B. Whitley (Eds.), *Affect regulation training: A practitioners' manual* (pp. 5-17). New York, NY: Springer. https://doi.org/10.1007/978-1-4939-1022-9_2

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. *Lancet*, *395*(10227), 912-920. https://doi.org/10.1016/S0140-6736(20)30460-8

Cabras, C., Mondo, M. Diana, A., & Sechi, C. (2020). Relationships between Trait Emotional Intelligence, mood states, and future orientation among female Italian victims of Intimate Partner Violence. *Heliyon*, *6*(11), e05538. https://doi.org/10.1016/j.heliyon.2020.e05538

Campos, J., Campos, L., Martins, B., Valadão, F., Ruano, R., & Maroco, J. (2021). El impacto psicológico del COVID-19 en personas con y sin trastornos de salud mental. *Informes Psicológicos*, *125*(5), 2435-2455. https://doi.org/10.1177/00332941211026850

Chávez-Valdez, S. M., Domínguez Rodríguez, A., Esparza-Del Villar, O. A., Hernández Jiménez, M. J., de la Rosa-Gómez, A., Arenas-Landgrave, P., Martínez-Luna, S. C., Ramírez-Martínez, F. R., & Salinas-Saldívar, J. T. (2021). Coping strategies associated to widespread fear and post-traumatic stress criteria in a Mexican sample during COVID-19 pandemic: A cross-sectional study. *Salud Mental*, *44*(4), 159-166. https://doi.org/10.17711/sm.0185-3325.2021.021

Cloitre, M., Garvert, D. W., Brewin, C. R., Bryant, R. A., & Maercker, A. (2013). Evidencia para el PTSD propuesto por la CIE-11 y el PTSD complejo: un análisis de perfil latente. *Revista Europea de Psicotraumatología*, *4*. https://doi.org/10.3402/ejpt.v4i0.20706

Coker, A. L., Weston, R., Creson, D. L., Justice, B., & Blakeney, P. (2005). PTSD symptoms among men and women survivors of intimate partner violence: the role of risk and protective factors. *Violence and Victims*, *20*(6), 625-643.

Connor, J., Madhavan, S., Mokashi, M., Amanuel, H., Johnson, N., Pace, L., & Bartz, D. (2020). Health risks and outcomes that disproportionately affect women during the Covid-19 pandemic: A review. *Social Science & Medicine*, *266*(1):113364. https://doi.org/10.1016/j.socscimed.2020.113364

Czeisler, M. É., Howard, M. E., & Rajaratnam, S. M. W. (2021). Mental Health During the COVID-19 Pandemic: Challenges, Populations at Risk, Implications, and Opportunities. *American Journal of Health Promotion*, *35*(2), 301-311. https://doi.org/10.1177/08901171209839826

Davey, G. C. L. (1994). Worrying, social problem-solving abilities, and social problem-solving confidence. *Behaviour Research and Therapy*, *32*(3), 327-330. https://doi.org/10.1016/0005-7967(94)90130-9

De la Rosa-Gómez, A., Hernández-Posadas, A., Valencia, P. D., & Guajardo-Garcini, D. A. (2021). Análisis dimensional de la Escala de Dificultades en la Regulación Emocional (DERS-15) en universitarios mexicanos. *Revista Evaluar*, *21*(2), 80-97. https://doi.org/10.35670/1667-4545.v21.n2.34401

Demissie, D. B., & Bitew, Z. W. (2021). Efecto en la salud mental de la pandemia de COVID-19 entre mujeres embarazadas y / o lactantes: una revisión sistemática y un metanálisis. *Medicina Abierta SAGE*, *9*. https://doi.org/10.1177/20503121211026195

Dlamini, N. J. (2021). Violencia de género, pandemia gemela a COVID-19. *Sociología Crítica*, *47*(4-5), 583-590. https://doi.org/10.1177/0896920520975465

Dominguez-Rodriguez, A., Herdoiza-Arroyo, P. E., Martínez-Arriaga, R. J., Bautista-Valerio, E., Mateu-Mollá, J., de la Rosa-Gómez, A., Farfallini, L., Hernández-Jiménez, M. J., Esquivel-Santoveña, E. E., Ramírez-Martínez, F. R., Castellanos-Vargas, R. O., Arzola-Sánchez, C. A., Arenas-Landgrave, P., & Martínez-Luna, S. C. (2022). Prevalence of Anxiety Symptoms and Associated Clinical and Sociodemographic Factors in Mexican Adults Seeking Psychological Support for Grief During the COVID-19 Pandemic: A Cross-Sectional Study. *Frontiers in Psychiatry*, *13*, 749236. https://doi.org/10.3389/fpsyt.2022.749236

Durón-Figueroa, R., Cárdenas-López, G., Castro-Calvo, J., & De la Rosa-Gómez, A. (2019). Adaptación de la Lista Checable de Trastorno por Estrés Postraumático para DSM-5 en Población Mexicana. *Acta de Investigación Psicológica*, *9*(1), 26-36. https://doi.org/10.22201/fpsi.20074719e.2019.1.03

Ehring, T., & Quack, D. (2010). Emotion regulation difficulties in trauma survivors: the role of trauma type and PTSD symptom severity. *Behavior Therapy*, *41*(4), 587-598. https://doi.org/10.1016/j.beth.2010.04.004

Feeny, N., Zoellner, L., Fitzgibbons, L., & Foa E. (2000). Exploring the Roles of Emotional Numbing, Depression, and Dissociation in PTSD. *Journal of Traumatic Stress*, *13*, 489-498. https://doi.org/10.1023/A:1007789409330

Forbes, C. N., Tull, M. T., Rapport, D., Xie, H., Kaminski, B., & Wang, X. (2020). Emotion dysregulation Prospectively Predicts Posttraumatic Stress Disorder Symptom Severity 3 Months After Trauma Exposure. *Journal of Traumatic Stress*, *33*(6), 1007-1016. https://doi.org/10.1002/jts.22551

Freyd, J., Deprince, A., & Zurbriggen, E. (2001) Self-Reported Memory for Abuse Depends Upon Victim-Perpetrator Relationship. *Journal of Trauma & Dissociation*, *2*(3), 5-15. https://doi.org/10.1300/J229v02n03_02

Galindo-Vázquez, O., Ramírez-Orozco, M., Costas-Muñiz, R., Mendoza-Contreras, L. A., Calderillo-Ruíz, G., & Meneses-García, A. (2020). Symptoms of anxiety, depression and self-care behaviors during the COVID-19 pandemic in the general population. [Síntomas de ansiedad, depresión y conductas de autocuidado durante la pandemia de COVID-19 en la población general]. *Gaceta Médica de México*, *156*(4), 298-305. https://doi.org/10.24875/GMM.20000266

Gilmore, A., Lopez, C., Muzzy, W., Brown, W., Grubaugh, A., Oesterle, D., & Acierno, R. (2020). Emotion dysregulation Predicts Dropout from Prolonged Exposure Treatment among Women Veterans with Military Sexual Trauma-Related Posttraumatic Stress Disorder. *Women's Health Issues*, *30*(6), 462-469. https://doi.org/10.1016/j.whi.2020.07.004

Gratz, K., & Roemer, L. (2004). Multidimensional Assessment of Emotion Regulation and Dysregulation: Development, Factor Structure, and Initial Validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment*, *26*(1), 41-54. https://doi.org/10.1023/B:JOBA.0000007455.08539.94

Hilko, T., & Chalder, T. (2018). Childhood adversity as a transdiagnostic risk factor for affective disorders in adulthood: A systematic review focusing on biopsychosocial moderating and mediating variables. *Clinical Psychology Review*, *65*, 81-151. https://doi.org/10.1016/j.cpr.2018.08.002

Holladay, K. R., Hagedorn, W. B., Boote, D. N., & Ladier, D. T. (2021). The Trauma of Cyber-Sexual Assault: Heightened Dimensions of Emotional Dysregulation Among Survivors. *The Practitioner Scholar: Journal of the International Trauma Training Institute*, *3*, 60-77.

Huerta Rosales, R., Miljánovich, M., Pequeña, J., Campos, E., Santivañez, R., & Aliaga, J. (2014). Estrés post traumático e inadaptación en mujeres víctimas de violencia doméstica en la relación de pareja en función de la edad. *Revista de Investigación en Psicología*, *17*(2), 59-75. https://doi.org/10.15381/rinvp.v17i2.11258

Irizarry, W., & Rivero, M. (2018). Post-traumatic stress disorder in women victim of domestic violence: An Integrative Review of Literature. *Nure Investigación*, *15*(95), 1-17.

Karakurt, G., Smith, D., & Whiting, J. (2014). Impact of Intimate Partner Violence on Women's Mental Health. *Journal of Family Violence*, *29*(7), 693-702. https://doi.org/10.1007/s10896-014-9633-2

Lilly, M., London, M., & Bridgett, D. (2014). Using SEM to examine emotion regulation and revictimization in predicting PTSD symptoms among childhood abuse survivors. *Psychological Trauma: Theory, Research, Practice, and Policy*, *6*(6), 644-651. https://doi.org/10.1037/a0036460

Liu, N., Zhang, F., Wei, C., Jia, Y., Shang, Z., Sun, L., Wu, L., Sun, Z., Zhou, Y., Wang, Y., & Liu, W. (2020). Prevalence and predictors of PTSS during COVID-19 outbreak in China hardest-hit areas: Gender differences matter. *Psychiatry Research*, *287*, 112921. https://doi.org/10.1016/j.psychres.2020.112921

McEvoy, P., Watson, H., Watkins, E., & Nathan, P. (2013). The relationship between worry, rumination, and comorbidity: Evidence for repetitive negative thinking as a transdiagnostic construct. *Journal of Affective Disorders*, *151*(1), 313-320. https://doi.org/10.1016/j.jad.2013.06.014

McLean, C., & Foa, E. (2017). Emotions and emotion regulation in posttraumatic stress disorder. *Current Opinion in Psychology*, *14*, 72-77. https://doi.org/10.1016/j.copsyc.2016.10.006

Messman-Moore, T. L., Walsh, K. L., & DiLillo, D. (2010). Emotion dysregulation and risky sexual behavior in revictimization. *Child Abuse & Neglect*, *34*(12), 967-976. https://doi.org/10.1016/j.chiabu.2010.06.004

Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the penn state worry questionnaire. *Behaviour Research and Therapy*, *28*(6), 487-495. https://doi.org/10.1016/0005-7967(90)90135-6

Muñoz-Rivas, M., Bellot, A., Montorio, I., Ronzón-Tirado, R., & Redondo, N. (2021). Profiles of Emotion Regulation and Post-Traumatic Stress Severity among Female Victims of Intimate Partner Violence. *International Journal of Environmental Research and Public Health*, *18*(13), 6865. http://dx.doi.org/10.3390/ijerph18136865

Neria, Y., Nandi, A., & Galea, S. (2008). Post-traumatic stress disorder following disasters: a systematic review. *Psychological Medicine*, *38*(4), 467-480. https://doi.org/10.1017/S0033291707001353

Olatunji, B. O., Wolitzky-Taylor, K. B., Sawchuk, C. N., & Ciesielski, B. G. (2010). Worry and the anxiety disorders: A meta-analytic synthesis of specificity to GAD, *Applied and Preventive Psychology*, *14*(1-4), 1-24. https://doi.org/10.1016/j.appsy.2011.03.001

Padros-Blazquez, F., Gonzalez-Betanzos, F., Martinez-Medina, M. P., & Wagner, F. (2018). Psychometric characteristics of the original and brief version of the Penn State Worry Questionnaire (PSWQ) in Mexican samples. *Actas Españolas de Psiquiatría*, 46(4), 117-124.

Paulus, D. J., Gallagher, M. W., Bartlett, B. A., Tran, J., & Vujanovic, A. A. (2018). The unique and interactive effects of anxiety sensitivity and emotional dysregulation in relation to posttraumatic stress, depressive, and anxiety symptoms among trauma-exposed firefighters. *Comprehensive Psychiatry*, *84*, 54-61. https://doi.org/10.1016/j.comppsych.2018.03.012

Pencea, I., Munoz, A. P., Maples-Keller, J. L., Fiorillo, D., Schultebraucks, K., Galatzer-Levy, I., Rothbaum, B. O., Ressler, K. J., Stevens, J. S., Michopoulos, V., & Powers, A. (2020). Emotion dysregulation is associated with increased prospective risk for chronic PTSD development. *Journal of Psychiatric Research*, *121*, 222-228. https://doi.org/10.1016/j.jpsychires.2019.12.008

Pérez-Cano, H. J., Moreno-Murguía, M. B., Morales-López, O., Crow-Buchanan, O., English, J. A., Lozano-Alcázar, J., & Somilleda-Ventura, S. A. (2020). Anxiety, depression, and stress in response to the coronavirus disease-19 pandemic. *Cirugía y Cirujanos*, *88*(5), 562-568. https://doi.org/10.24875/CIRU.20000561

Piquero, A. R., Jennings, W. G., Jemison, E., Kaukinen, C., & Knaul, F. M. (2021). Domestic violence during the COVID-19 pandemic - Evidence from a systematic review and meta-analysis. *Journal of Criminal Justice*, *74*, 101806. https://doi.org/10.1016/j.jcrimjus.2021.101806

Raudales, A., Short, N. A., & Schmidt, N. B. (2019). Emotion dysregulation mediates the relationship between trauma type and PTSD symptoms in a diverse trauma-exposed clinical sample. *Personality and Individual Differences*, *139*(8), 28-33. https://doi.org/10.1016/j.paid.2018.10.033

Rodríguez-Quiroga, A., Buiza, C., de Mon, M. A. A., & Quintero, J. (2020). Update on COVID-19 and mental health. *Medicine - Programa de Formación Médica Continuada Acreditado*, 13(23), 1285-1296. https://doi.org/10.1016/j.med.2020.12.010

Rosenthal, M. Z., Cheavens, J. S., Lynch, T. R., & Follette, V. (2006). Thought suppression mediates the relationship between negative mood and PTSD in sexually assaulted women. *Journal of Traumatic Stress*, *19*(5), 741-745. https://doi.org/10.1002/jts.20162

Ruork, A. K., McLean, C. L., & Fruzzetti, A. E. (2021). It Happened Matters More Than What Happened: Associations Between Intimate Partner Violence Abuse Type, Emotion Regulation, and Post-Traumatic Stress Symptoms. *Violence Against Women*, *28*(5), 1158-1170. https://doi.org/10.1177/10778012211013895

Sandín, B., Chorot, P., Valiente, R. M., & Lostao, L. (2009). Validación española del cuestionario de preocupación PSWQ: estructura factorial y propiedades psicométricas. *Revista de Psicopatología y Psicología Clínica*, *14*(2). https://doi.org/10.5944/rppc.vol.14.num.2.2009.4070

Santomauro, D., Mantilla, A., Shadid, J., Zheng, P., Ashbaugh, C., Pigorr, D., Abbafati, C., Adolph, C., Amlag, J. O., Aravkin, A. Y., Bang-Jensen, B. L., Bertolacci, G. J., Bloom, S. S., Castellano, R., Castro, E., Chakrabarti, S., Chattopadhyay, J., Cogen, R. M., Collins, J. K., … Ferrari, A. (2021). Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. *Lancet*, *398*(10312), 1700-1712. https://doi.org/10.1016/S0140-6736(21)02143-7

Sardinha, L., Maheu-Giroux, M., Stöckl, H., Meyer, S. R., & García-Moreno, C. (2022). Global, regional, and national prevalence estimates of physical or sexual, or both, intimate partner violence against women in 2018. *Lancet*, *399*(10327), 803-813. https://doi.org/10.1016/S0140-6736(21)02664-7

Secretaría de Seguridad y Protección Ciudadana [SSPC]. (2020). *Información sobre violencia contra las mujeres e incidencia delictiva y llamadas de emergencia al 911*. Retrieved from https://www.gob.mx/sesnsp/acciones-y-programas/incidencia-delictiva-299891?state=published

Sediri, S., Zgueb, Y., Ouanes, S., Ouali, U., Bourgou, S., Jomli, R., & Nacef, F. (2020). Women's mental health: acute impact of COVID-19 pandemic on domestic violence. *Archives of Women's Mental Health*, *23*(6), 749-756. https://doi.org/10.1007/s00737-020-01082-4

Seligowski, A. V., Lee, D. J., Bardeen, J. R., & Orcutt, H. K. (2015). Emotion regulation and posttraumatic stress symptoms: a meta-analysis. *Cognitive Behaviour Therapy*, *44*(2), 87-102. https://doi.org/10.1080/16506073.2014.980753

Siegel, A., Mor, I., & Lahav, Y. (2021). Profiles in COVID-19: peritraumatic stress symptoms and their relation with death anxiety, anxiety sensitivity, and emotion dysregulation. *European Journal of Psychotraumatology*, *12*(1), 1968597. https://doi.org/10.1080/20008198.2021.1968597

Thibaut, F., & van Wijngaarden-Cremers, P. J. M. (2020). Women's Mental Health in the Time of Covid-19 Pandemic. *Frontiers in Global Women's Health*, *1*, 588372. https://doi.org/10.3389/fgwh.2020.588372

Tull, M. T., Hahn, K. S., Evans, S. D., Salters-Pedneault, K., & Gratz, K. L. (2011). Examining the Role of Emotional Avoidance in the Relationship Between Posttraumatic Stress Disorder Symptom Severity and Worry. *Cognitive Behaviour Therapy*, *40*(1), 5-14. https://doi.org/10.1080/16506073.2010.515187

Tyra, A. T., Ginty, A. T., & John-Henderson, N. A. (2021). Emotion Regulation Strategies Predict PTSS During the COVID-19 Pandemic in an American Indian Population. *International Journal of Behavioral Medicine*, *28*(6), 808-812. https://doi.org/10.1007/s12529-021-09964-2

United Nations Entity Dedicated to Gender Equality and the Empowerment of Women [UN Women]. (2020). *Violence Against Women and Girls: the Shadow Pandemic*. Retrieved from https://www.unwomen.org/es/news/stories/2020/4/statement-ed-phumzile-violence-against-women-during-pandemic

United Nations Entity Dedicated to Gender Equality and the Empowerment of Women [UN Women]. (2021). *Una de cada tres mujeres en el mundo sufre violencia física o sexual desde que es muy joven*. Retrieved from https://news.un.org/es/story/2021/03/1489292#:~:text=La%20violencia%20de%20g%C3%A9nero%20es,pareja%20o%20de%20otras%20personas

Velotti, P., Civilla, C., Rogier, G., & Beomonte Zobel, S. (2021). A Fear of COVID-19 and PTSD Symptoms in Pathological Personality: The Mediating Effect of Dissociation and Emotion dysregulation. *Frontiers in Psychiatry*, *12*, 590021. https://doi.org/10.3389/fpsyt.2021.590021

Villalta, L., Khadr, S., Chua, K.-C., Kramer, T., Clarke, V., Viner, R. M., Stringaris, A., & Smith, P. (2020) Complex post-traumatic stress symptoms in female adolescents: the role of emotion dysregulation in impairment and trauma exposure after an acute sexual assault. *European Journal of Psychotraumatology*, *11*(1). https://doi.org/10.1080/20008198.2019.1710400

Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). Immediate Psychological Responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (COVID-19) Epidemic among the General Population in China. *International Journal of Environmental Research and Public Health*, *17*(5), 1729. https://doi.org/10.3390/ijerph17051729

Weathers, F., Litz, B., Keane, T., Palmieri, P., Marx, B., & Schnurr, P. (2013). *The PTSD Checklist for DSM-5 (PCL-5)*. Retrieved from https://www.ptsd.va.gov/

World Health Organization [WHO]. (2021). *Violencia contra la mujer*. Retrieved from https://www.who.int/es/news-room/fact-sheets/detail/violence-against-women

Yiğit, I., & Guzey-Yiğit, M. (2019). Psychometric properties of Turkish version of Difficulties in Emotion Regulation Scale-Brief Form (DERS-16). *Current Psychology*, *36*, 1503-1511. https://doi.org/10.1007/s12144-017-9712

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Association between Sleep Quality and Personality Based on the Big Five Factor Model in a Non-clinical Sample

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ABSTRACT

Introduction. Sleep is essential for maintaining health, well-being, and functionality. The personality traits of the Five Factor Model (FFM) have proven promising as determinants of sleep quality. **Objective.** To explore the relationship between personality traits and sleep quality in a Brazilian sample by testing a predictive model based on multiple linear regression. **Method.** The study involved 447 adult participants (with an average age of 37.7 years), who completed an online survey including the following instruments: a sociodemographic questionnaire, the Pittsburgh Sleep Quality Index (PSQI-BR), the Patient Health Questionnaire (PHQ-4), and the Big Five Inventory (BFI). Participants were selected through social media advertisements calling for volunteers for a study on sleep quality. **Results.** The regression model revealed that age, educational attainment, family income, BMI, neuroticism, and psychopathological symptoms were predictors of sleep quality. The gender, conscientiousness, extraversion, and agreeableness variables were not predictors of sleep quality in the multivariate analysis. **Discussion and conclusion.** The study emphasizes the role of neuroticism in predicting sleep quality over other personality traits. Additionally, the results suggest that the risk of or protection against the development of anxiety and depressive symptoms is a key mechanism linking personality traits to sleep. These findings can therefore contribute to identifying individuals at risk for sleep disturbances and developing health intervention strategies.

Keywords: Personality, sleep quality, behavioral medicine, mental health.

RESUMEN

Introducción. El sueño es esencial para mantener la salud, el bienestar y la funcionalidad. Los rasgos de personalidad del Modelo de Cinco Factores (MCF) han mostrado ser prometedores como determinantes de la calidad del sueño. **Objetivo.** Explorar la relación entre los rasgos de personalidad y la calidad del sueño en una muestra brasileña, probando un modelo predictivo basado en la regresión lineal múltiple. **Método.** El estudio involucró a 447 participantes adultos (edad promedio: 37.7 años) que completaron una encuesta en línea utilizando los siguientes instrumentos: un cuestionario sociodemográfico, el Índice de Calidad del Sueño de Pittsburgh (PSQI-BR), el Cuestionario de Salud del Paciente (PHQ-4) y el Inventario de los Cinco Grandes (BFI). Los participantes fueron seleccionados mediante anuncios en redes sociales que invitaban a participar voluntariamente en un estudio sobre la calidad del sueño. **Resultados.** El modelo de regresión reveló que la edad, el nivel de educación, el ingreso familiar, el IMC, el neuroticismo y la presencia de síntomas psicopatológicos fueron predictores de la calidad del sueño. Las variables de género, conciencia, extraversión y amabilidad no fueron predictoras de la calidad del sueño en el análisis multivariante. **Discusión y conclusión.** El estudio enfatiza el papel del neuroticismo en la predicción de la calidad del sueño sobre otros rasgos de personalidad. Además, los resultados sugieren que el riesgo o protección contra el desarrollo de síntomas de ansiedad y depresivos es un mecanismo clave que vincula los rasgos de personalidad con el sueño. Por lo tanto, estos hallazgos pueden ayudar a identificar a individuos en riesgo de trastornos del sueño y en el desarrollo de estrategias de intervención en salud.

Palabras clave: Personalidad, calidad del sueño, medicina conductual, salud mental.

INTRODUCTION

Sleep plays a crucial role in maintaining health and well-being in a variety of ways. Chronic sleep deprivation has been associated with an increased risk of developing cardiovascular diseases (Guasch-Ferré et al., 2022), obesity (Hur et al., 2021), Type 2 diabetes mellitus (Mostafa et al., 2022), metabolic syndrome (Smiley et al., 2019), and a weakened immune response (Prather et al., 2021). Sleep deprivation has also been associated with a higher incidence of depressive and anxiety disorders (Chen et al., 2017; Chunnan et al., 2022), exacerbation of suicidal behavior (Wang et al., 2019), substance abuse, and psychotic disorders (Hertenstein et al., 2019).

Since sleep patterns can be modified using health interventions, they constitute a modifiable risk factor for various conditions (Kyle & Henry, 2017). They provide an opportunity for health damage prevention and improving the quality of life and functioning of individuals. To understand the development of changes in sleep quality, it is crucial to realize that it is shaped by the complex interaction of various factors. This will make it possible to identify targets for therapeutic strategies, enabling the enhancement and individualization of treatment (Grandner & Fernandez, 2021).

Personality is a promising determinant of modifying sleep quality because its relatively stable nature can enhance understanding of the development of health conditions across the lifespan (Kern & Friedman, 2017). The Five Factor Model (FFM) categorizes personality traits into five measurable domains: neuroticism, conscientiousness, extraversion, agreeableness, and openness to experience (John, 2021). Certain features of this model make it suitable for the context of health psychology. The clear division into independent and measurable domains is useful since it permits direct correlations with specific outcomes. Moreover, its well-established cross-cultural validity enables the comparison of results across different world regions (Kern & Friedman, 2017).

According to FFM, neuroticism is associated with greater vulnerability to stress and an increased likelihood of experiencing negative emotions such as sadness, fear, and anger. Conversely, conscientiousness is associated with a predilection for self-discipline, organization, diligence, and goal-orientation. Extraversion describes individuals who lean towards sociability, are active, and often experience positive emotions. Agreeableness is characterized by a tendency to be cooperative, empathetic, trustworthy, and altruistic. Lastly, openness to experience denotes an inclination towards creativity, imagination, and embracing new experiences (John, 2021).

Evaluations of the personality traits of the Five-Factor Model (FFM) and their potential correlations with sleep have found that neuroticism consistently demonstrates a negative correlation with sleep quality, which is more pronounced than that of other personality traits. On the other hand, the traits of conscientiousness and extraversion were associated with better sleep quality in most studies. However, the traits of agreeableness and openness to experience showed inconsistent results (Souza, 2023).

It is crucial, however, to assess personality traits together with the determinants of sleep quality because they may have unique relationships with personality and enhance our understanding of the association between personality and sleep (Costa et al., 2019; Sutin et al., 2011; Weisberg et al., 2011; Williams et al., 2021). Since multivariate analyses can compare the predictive power of each variable, they were used to determine the extent to which each variable contributes to sleep quality.

The present study primarily aimed to explore the relationship between personality traits and sleep quality. It therefore sought to describe the sample profile in terms of sleep quality, personality profile based on the FFM model, sociodemographic and clinical data, and test a multiple regression model designed to predict sleep quality based on these variables.

METHOD

Participants

The questionnaire was answered by 489 participants from the general population, aged eighteen and over, regardless of gender and residing in any region of Brazil. Convenience sampling was used to recruit participants. An online survey was disseminated through social media (such as Instagram, email, and WhatsApp), targeting those in this age bracket. The invitation specified that the study involved a questionnaire on sleep quality, explaining that participation would be voluntary. The informed consent form (ICF) was provided in the first section of the online survey, requiring participants to provide their consent before accessing the main questionnaire. The self-administered questionnaire showed an average response time of approximately fourteen minutes.

A total of 489 individuals answered the online survey. However, fourteen participants were excluded due to the incorrect completion of the questionnaires, nineteen were excluded for being sixty-five years or older, four for being under 18, and one for frequently appearing as an outlier, indicating incorrect completion. Furthermore, four participants who identified as transgender or another gender were excluded because the small sample size would make statistical analysis unfeasible. The final data analysis therefore included 447 participants. Answer spaces left blank for weight and height items were completed with average values.

Measurements

Sociodemographic Questionnaire: This was prepared by the research team to identify the characteristics of the study sample. It included age (in years), gender (male, female, or other), educational attainment (complete or incomplete primary, secondary, or tertiary education), employment status, family income (in minimum wages), and previous medical and psychiatric history.

Brazilian Portuguese version of the Pittsburgh Sleep Quality Index (PSQI-BR): This instrument comprises ten items assessing sleep quality across seven components: subjective quality, latency, duration, habitual efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. The sum of the seven components yields a global score ranging from 0 to 21. The cutoff point of five can be used to distinguish "good sleepers" from "poor sleepers." The index has been used across various populations, including those with clinical illnesses, and can be used to assess sleep impairment regardless of the underlying cause. In the Brazilian validation study, it demonstrated a high degree of internal consistency with a Cronbach's alpha of .82 (Bertolazi et al., 2011; Buysse et al., 1989).

Patient Health Questionnaire (PHQ-4): This is an ultra-brief tool comprising four items useful for screening depressive and anxiety symptoms. It contains two subscales: the first two assessing depressive symptoms and the last two evaluating anxiety symptoms, yielding two scores ranging from zero to six. Scores above three on each scale indicate the presence of depression or anxiety symptoms (Kroenke et al., 2009). A Brazilian study identified a Cronbach's alpha of .77 and .79 for depression and anxiety, respectively (Silva & Faro, 2021).

Big Five Inventory (BFI): This comprises forty-four items, with four items for each personality factor. Each item is rated from one to five based on agreement or disagreement with propositions about self-perception. Each factor receives an independent score calculated from the arithmetic mean of the scores of the four items assessing them. In a Brazilian sample, internal consistency, as indicated by Cronbach's alpha, was .72, .69, .56, .69, and .69 for extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience, respectively (Gouveia et al., 2021).

Statistical analysis

The data analysis was conducted using JAMOVI 2.3. Initially, descriptive-exploratory statistical analyses were performed to determine sample characteristics and verify normality assumptions for the variables included in the study. Outlier values in personality trait measurements were filled with the mean value plus or minus one standard deviation, depending on their original trend: conscientiousness, three cases; extraversion, two cases; agreeableness, six cases; and openness to experience, three cases. Student's t-tests or Mann-Whitney U tests were performed to explore the association between sleep quality and binary variables, while correlation tests were used to assess the association between sleep quality and continuous variables. Statistical significance was set at p value < .05. Based on the correlation test results, variables were selected for inclusion in the multiple linear regression model (using the "Enter" method), in which the overall PSQI-BR score was used as the dependent variable.

Ethical considerations

The Human Research Ethics Committee of the Federal University of Sergipe (CAAE: Tag: 59193422.8.0000.5546) approved the project associated with this study. The online ICF was placed in the initial section of the online survey, requiring participants to provide their agreement before accessing the actual questionnaire. The ICF informed participants of their rights when participating in the study and provided a brief explanation of the topic of the study and its overall objective. Since the survey was intended for adults, participants who indicated that they were under eighteen were excluded from the data analysis.

RESULTS

The majority of the sample were female (74.5%, 333). The average age was 37.7 years (SD = 13.0), with 86.1% (385) having completed or partially completed higher education and 13.9% (62) having completed or partially completed secondary or primary education. The family income of 37.6% (168) of the participants was less than or equal to three minimum wages. The average score for the PSQI-BR was 7.84 (SD = 3.89). According to the established cut-off point of ≥ 6, it was found that 69.4% (310) of participants had poor sleep.

The PHQ-4 results showed that 34.2% (153) of participants displayed depression symptoms and 42.1% (188) anxiety symptoms. Combining the results of the two subscales revealed that 52.6% (235) showed no symptoms, 13.2% (59) only anxiety symptoms, 5.4% (24) only depression symptoms, while 28.9% (129) displayed both symptoms. Women showed more anxiety ($X^2[1] = 13.3$, $p < .001$) and depression ($X^2[1] = 67.8$, $p < .001$) symptoms.

Associations with higher PSQI-BR scores were found in the following variables: older age ($r[445] = .176$, $p < .001$), higher BMI ($r[445] = .161$, $p < .001$), female gender ($U[445] = 16109$, $p = .009$), primary or secondary educational attainment ($t[445] = 6.18$, $p < .001$), family income of less than three minimum wages ($t[445] = 5.71$, $p < .001$), presence of depression symptoms ($t[445] = -10.4$, $p < .001$), and presence of anxiety symptoms ($U[445] = 10095$, $p < .001$).

Table 1
Pearson's r values in partial correlation tests between FFM traits and overall PSQI-BR score, controlling for sociodemographic and clinical variables

Control	*Neuroticism*	*Conscientiousness*	*Extraversion*	*Agreeableness*	*Openness to experience*
Without control	.420***	-.118*	-.107*	-.108*	.032
Age	.440***	-.172***	-.119*	-.131**	.004
+ Gender	.430***	-.178***	-.129**	-.133**	.019
+ Education	.415***	-.172***	-.104*	-.119*	.031
+ Income	.406***	-.167***	-.102*	-.108*	.013
+ BMI	.399***	-.170***	-.117*	-.105*	.018
+ Anxiety or depressive symptoms	.176***	-.100*	-.015	.006	.018

Note: The control variable indicated in each line was added to the analysis performed in the preceding line.
*** $p < .001$; ** $p < .1$; * $p < .5$.

The presence of anxiety and depressive symptoms was associated with high neuroticism ($t[44] = -12.861$, $p < .001$ and $t[445] = -11.309$, $p < .001$) and low conscientiousness ($t[445] = 3.352$, $p < .001$ and $t[445] = 3.980$, $p < .001$), extraversion ($U[445] = 19516$, $p < .001$ and $t[445] = 5.334$, $p < .001$), and agreeableness ($t[445] = 4.136$, $p < .001$ and $t[445] = 5.739$, $p < .001$).

Sleep quality was correlated with low neuroticism ($r[445] = .420$, $p < .001$) and high conscientiousness ($r[445] = -.181$, $p = .012$), extraversion ($r[445] = -.107$, $p = .024$), and agreeableness ($r[445] = -.108$, $p = .022$), but showed no correlation with openness to experience ($r[445] = .032$, $p = .500$). Table 1 displays the results of partial correlation tests between PSQI-BR and personality traits, controlling for sociodemographic and clinical variables.

To test the multiple regression model, the "depression symptoms" and "anxiety symptoms" variables were reformulated into a trichotomous variable. The variable was encoded in the regression model as a *dummy* comprising the following items: absence of depression or anxiety symptoms, presence of only depression or anxiety symptoms, and concurrent presence of depression and anxiety symptoms. This choice was made due to the strong association between the presence of anxiety and depression symptoms ($X^2[1] = 170$, $p < .001$, Cramer's $V = .617$), which could result in multicollinearity.

Table 2
Multiple Linear Regression Summary for the Global Score of PSQI-BR using Sociodemographic Data, Personality Traits, and Symptoms of Anxiety and Depression

			95% CI				*95% CI*			
Predictor	*B*	*SE*	LL	UL	*p*‡	*β*	LL	UL	*ΔR2adj*	*p*†
Intercept	-2.118	1.675	-5.410	1.174	.207	-	-	-	-	-
Age (years)	.052	.012	.028	.076	< .001	.174	.093	.254	.029*	-
Gender									.011	.013
Male – Female	.362	.342	-.311	1.034	.291	.093	-.079	.265		
Educational attainment									.062	< .001
Higher – Primary or secondary	1.195	.474	.264	2.127	.012	.307	.068	.547		
Family income									.025	< .001
Greater than 3 MW – Less than 3 MW	.922	.330	.272	1.572	.006	.237	.070	.404		
BMI	.081	.029	.025	.137	.005	.112	.035	.189	.017	.002
Extraversion	.055	.197	-.331	.441	.780	.011	-.068	.091	.012	.014
Agreeableness	.581	.286	.020	1.142	.042	.087	.003	.171	.005	.118
Conscientiousness	-.411	.228	-.859	.038	.072	-.073	-.152	.007	.016	.003
Neuroticism	.908	.217	.481	1.335	< .001	.204	.108	.299	.117	< .001
PHQ-4									.100	< .001
Anxiety or depression – None	2.233	.411	1.426	3.040	< .001	.574	.367	.782		
Both – None	3.391	.412	2.582	4.200	< .001	.872	.664	1.080		

Note: B: Regression coefficient. SE: Standard Error. *p*‡: *p*-value for the variable in the final model. β: Standardized regression coefficient. ΔR^2_{adj}: Increase in the adjusted determination coefficient. *p*†: *p*-value corresponding to the increase in the determination coefficient. 95% CI: Confidence Interval. LL: Lower Limit. UL: Upper Limit. MW: Minimum Wage. BMI: Body Mass Index. * As it is the first variable entered, the value refers to the adjusted determination coefficient (R^2_{adj}) rather than R^2_{adj}.
$R^2_{adj} = .387$, $F(11, 435) = 26.6$, $p < .001$. The *F*-test varied from 14.2 to 26.6 with the inclusion of variables, showing a *p*-value of < .001. The Akaike Information Criterion (AIC) value varied from 2474 to 2278 with the inclusion of variables. The VIF (Variance Inflation Factor) value ranged from 1.04 (gender) to 1.31 (neuroticism). Durbin-Watson Statistics = 1.96.

The final regression model showed a satisfactory fit, with an adjusted coefficient of determination (R^2_{adj}) of .387, indicating that it could explain 38.7% of the PSQI-BR score variance. Despite showing statistically significant associations at the bivariate level, the gender, conscientiousness, and extraversion variables were not found to predict sleep quality in the multiple linear regression model (Table 2).

The variables found to be significant in predicting sleep quality were age (β = .174, p < .001), educational attainment (β = .307, p = .012), family income (β = .237, p = .006), BMI (β = .112, p = .005), neuroticism (β = .204, p < .001), agreeableness (β = .087, p = .042), and presence of psychopathological symptoms (anxiety or depression symptoms [β = .574, p < .001] and both symptomologies [β = .872, p < .001]). In terms of individually explained variance, the most significant variables, in descending order, were neuroticism (ΔR^2_{adj} = .117, p < .001), psychopathological symptoms (ΔR^2_{adj} = .100, p < .001), educational attainment (ΔR^2_{adj} = .062, p < .001), age (ΔR^2_{adj} = .029), family income (ΔR^2_{adj} = .025, p < .001), and BMI (ΔR^2_{adj} = .017, p = .002).

DISCUSSION AND CONCLUSION

The global scores for the PSQI-BR in the present study were higher than those of similar studies worldwide. The average score was 7.84 (*SD* = 3.89), compared to 4.76 (*SD* = 2.92) in Italy (Cellini al., 2017), and 6.93 (*SD* = 4.31) in the USA (Gamaldo et al., 2020). This outcome was expected, given that Brazil has one of the highest global prevalence rates of insomnia (Morin & Jarrin, 2022). In a bivariate analysis, the PSQI-BR score was associated with higher neuroticism and lower conscientiousness, extraversion, and agreeableness. This finding aligns with the results of previous studies (Souza, 2023). The present study therefore contributes to advancing the understanding of this association by proposing a multivariate analysis, considering other determinants of sleep quality, as discussed below.

Neuroticism demonstrated predictive power for sleep quality (β = .204, p < .001), displaying the most significant increase in explanatory capacity in the regression model (ΔR2aj = .117, p < .001). This finding underscores the significance of this trait over others, encouraging more in-depth research. In the existing literature, various mechanisms have been proposed to explain the link between neuroticism and the deterioration of sleep quality. These include increased stress sensitivity and vulnerability to anxiety and depressive disorders that may present with sleep-related symptoms (Lai, 2018; Gamaldo et al., 2020), the presence of unhealthy sleep habits (Sella et al., 2020), heightened cognitive activation and the inability to control one's thoughts (Cellini et al., 2017), together with an inflated assessment of sleep impairment (Sutin et al., 2020). The association between neuroticism and sleep could explain the positive outcomes achieved through mindfulness-based therapies for insomnia symptoms (Perini et al., 2023). This is because individuals with high neuroticism exhibit greater stress reactivity and benefit more from emotional regulation strategies (Carver & Connor-Smith, 2010).

Despite correlating with sleep quality at a bivariate level, conscientiousness and extraversion traits failed to show predictive capacity in the regression model tested (β = -.073, p = .072 and β = .011, p = .780, respectively). Nevertheless, it was observed that the conscientiousness trait maintained a statistically significant correlation with sleep quality, even when all other non-personality trait variables had been controlled for. This suggests that the loss of this trait in the regression model was linked to its association with other personality traits. The tendency toward impulsivity is a prime example of behavior that intersects with traits from the FFM. Impulsivity has a strong inverse correlation with the "self-control" facet of conscientiousness, but can also stem from novelty-seeking in highly extroverted individuals or manifest as neuroticism when stemming from emotional instability (Jackson & Roberts, 2017). The main mechanism proposed to explain the relationship between conscientiousness and sleep is the adoption of healthy habits. Individuals with higher conscientiousness are more likely to engage in regular physical exercise and follow a healthy diet, thereby reducing the risk of obesity and other conditions that can negatively impact sleep (Duggan et al., 2014; Rochefort et al., 2019). At the same time, possible explanations for the association between extraversion and sleep include increased physical activity (Gamaldo et al., 2020) and reduced stress sensitivity (Lai, 2018).

The trait of agreeableness showed predictive power for poor sleep quality in the regression model (β = .087, p = .042), contrary to what was found in the bivariate analysis (r[445] = -.108, p = .022). However, when added to the model, it did not significantly increase explained variance (ΔR^2_{aj} = .005, p = .118). Furthermore, this trait showed no correlation with sleep quality when controlling for the same variables in the model, excluding other personality traits. These findings suggest that most of the information provided by the agreeableness trait may be redundant or already explained by other traits, thereby only minimally contributing to predicting sleep quality.

Another crucial point to consider is the weakening strength of the correlations between all four personality traits and sleep quality when the effects of anxiety and depressive symptoms are controlled for. This result suggests that a significant portion of the predictive power of personality traits for sleep quality stems from their exposure to or protection against the development of psychopathological symptoms. Both depression and anxiety disorders follow a pattern in relation to the personality traits of the FFM: high neuroticism and low conscientiousness and extraver-

sion (Kotov et al., 2010). Findings on agreeableness show contradictions across studies, while openness to experience typically has no correlation with the incidence of mental disorders (Bagby et al., 2017).

Age was a predictive variable for sleep quality in the regression model tested (β = .174, $p < .001$). As age increases, sleep tends to deteriorate in regard to both quality and quantity. Changes can manifest as difficulty falling and remaining sleep, a reduction in total sleep duration, changes in sleep patterns, and alterations in sleep architecture. Although these changes are more intense among older adults, they may be observed during adulthood (Chaput et al., 2018). Furthermore, personality traits can change as a person ages. In the present study, the association between conscientiousness and sleep quality strengthened when age was controlled for as a variable. This can be explained by the normative pattern of modification of this trait, characterized by its increase over time (Costa et al., 2019).

BMI was a predictor of sleep quality in the regression model (β = .112, $p = .005$). Sleep disruption has been associated with the disruption of satiety-related hormones, resulting in increased food intake. Furthermore, increased fatigue, decreased physical activity, and increased opportunities to eat can contribute to the exacerbation of obesity (St-Onge et al., 2011). Conversely, a higher BMI has been associated with the worsening of Obstructive Sleep Apnea Syndrome (OSAS) (Bacaro et al., 2020). BMI therefore has a complex, bidirectional relationship with sleep, as observed in the regression model. However, contrary to expectations, this variable showed no correlation with conscientiousness and did not alter the association between this trait and sleep (Jia et al., 2022).

Educational attainment (β = .307, $p = .012$) and family income (β = .237, $p = .006$) were also significant predictors of sleep quality. The literature indicates that socioeconomic variables such as educational attainment, parents' educational attainment, annual family income, perception of financial well-being, type of employment, and employment status can influence sleep patterns, thereby supporting the findings of the present study (Philippens et al., 2022; Sosso et al., 2021).

The main limitations of this study are associated with its non-probabilistic sampling. Most participants, for instance, have either completed or partially completed higher education (86.1%), a figure that contrasts with the 23.3% reported by the Brazilian Institute of Geography and Statistics (IBGE, 2022) for the total Brazilian population. This may have occurred due to the fact that the survey was disseminated on social media restricted to the university environment. Another example is the predominance of females in the sample. This demographic skew could potentially introduce a bias into average PSQI scores, suggesting that results should be interpreted with caution, although the higher incidence of insomnia among women has been well-documented (Zeng et al., 2020). Nonetheless, a similar pattern can be observed in previous studies (Souza, 2023), suggesting that this should not restrict the comparison of the findings of this study with those of others. Due to methodological and statistical limitations, this study did not consider other sleep-related determinants such as sleep habits, type of occupation, geographical and climatic factors, and family history of sleep alterations. Another potential limitation is the lack of objective sleep measures such as actigraphy or polysomnography. Comparing objectively and subjectively measured sleep can provide insights into the role of individual sleep assessment, which is of interest when evaluating personality (Catherman et al., 2023).

Despite these limitations, the present study contributes to the understanding of the association between personality traits and other variables in predicting sleep quality. In short, the importance of neuroticism in predicting sleep quality is emphasized over other personality traits in the FFM. Beyond personality-related aspects, neuroticism has shown significant importance when compared to other determinants of sleep quality, prompting further investigations into its role in sleep and overall health. Future research on this topic could also use objective sleep measurements and opt for a longitudinal design, allowing for an understanding of the role of personality over time in its association with sleep and other variables. Understanding and improving sleep care is an opportunity for health psychology, with potential implications for various aspects of health and well-being.

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Conflict of interest

The authors declare that they have no conflicts of interest.

REFERENCES

Bacaro, V., Ballesio, A., Cerolini, S., Vacca, M., Poggiogalle, E., Donini, L. M., Lucidi, F., & Lombardo, C. (2020). Sleep duration and obesity in adulthood: an updated systematic review and meta-analysis. *Obesity Research & Clinical Practice*, *14*(4), 301-309. https://doi.org/10.1016/j.orcp.2020.03.004

Bagby, R. M., Uliaszek, A. A., Gralnick, T. M., & Al-Dajani N. (2017). Axis I Disorders. In T. A. Widiger (Ed.). *The Oxford Handbook of the Five Factor Model* (pp. 479-506). Oxford University Press.

Bertolazi, A. N., Fagondes, S. C., Hoff, L. S., Dartora, E. G., da Silva Miozzo, I. C., de Barba, M. E. F., & Barreto, S. S. M. (2011). Validation of the Brazilian Portuguese version of the Pittsburgh sleep quality index. *Sleep Medicine*, *12*(1), 70-75. https://doi.org/10.1016/j.sleep.2010.04.020

Buysse, D. J., Reynolds III, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiat-

ric practice and research. *Psychiatry Research*, *28*(2), 193-213. https://doi.org/10.1016/0165-1781(89)90047-4

Carver, C. S., & Connor-Smith, J. (2010). Personality and coping. *Annual Review of Psychology*, *61*, 679-704. https://doi.org/10.1146/annurev.psych.093008.100352

Catherman, C., Cassidy, S., Benca-Bachman, C. E., Barber, J. M., & Palmer, R. H. C. (2023). Associations between neuroticism, subjective sleep quality, and depressive symptoms across the first year of college. *Journal of American College Health*, *71*(2), 381-388. https://doi.org/10.1080/07448481.2021.1891917

Cellini, N., Duggan, K. A., & Sarlo, M. (2017). Perceived sleep quality: The interplay of neuroticism, affect, and hyperarousal. *Sleep Health*, *3*(3), 184-189. https://doi.org/10.1016/j.sleh.2017.03.001

Chaput, J. P., Dutil, C., & Sampasa-Kanyinga, H. (2018). Sleeping hours: what is the ideal number and how does age impact this? *Nature and Science of Sleep*, *10*, 421-430. https://doi.org/10.2147/NSS.S163071

Chen, P. J., Huang, C. L. C., Weng, S. F., Wu, M. P., Ho, C. H., Wang, J. J., Tsai, W. C., & Hsu, Y. W. (2017). Relapse insomnia increases greater risk of anxiety and depression: evidence from a population-based 4-year cohort study. *Sleep Medicine*, *38*, 122-129. https://doi.org/10.1016/j.sleep.2017.07.016

Chunnan, L., Shaomei, S., & Wannian, L. (2022). The association between sleep and depressive symptoms in US adults: data from the NHANES (2007–2014). *Epidemiology and Psychiatric Sciences*, *31*, e63. https://doi.org/10.1017/S2045796022000452

Costa, P. T., Jr., McCrae, R. R., & Löckenhoff, C. E. (2019). Personality across the life span. *Annual Review of Psychology*, *70*, 423-448. https://doi.org/10.1146/annurev-psych-010418-103244

Duggan, K. A., Friedman, H. S., McDevitt, E. A., & Mednick, S. C. (2014). Personality and healthy sleep: the importance of conscientiousness and neuroticism. *PloS One*, *9*(3), e90628. https://doi.org/10.1371/journal.pone.0090628

Gamaldo, A. A., Sardina, A. L., Sutin, A., Cruz, T. E., Salas, R. M. E., Gamaldo, C. E., Buxton, O. M., & Andel, R. (2020). Facets of personality related to sleep habits in Black adults. *Sleep Health*, *6*(2), 232-239. https://doi.org/10.1016/j.sleh.2019.10.004

Gouveia, V. V., Araújo, R.D. C. R., de Oliveira,I. C. V., Gonçalves, M. P., Milfont, T., de Holanda Coelho, G. L., Santos, W., de Medeiros, E. D., Soares, A. K. S., Monteiro, R. P., de Andrade, J. M., Cavalcanti, T. M., Nascimento B. & Gouveia, R. (2021). A Short Version of the Big Five Inventory (BFI-20): Evidence on Construct Validity. *Revista Interamericana de Psicología/Interamerican Journal of Psychology*, *55*(1), e1312. https://doi.org/10.30849/ripijp.v55i1.1312

Grandner, M. A., & Fernandez, F. X. (2021). The translational neuroscience of sleep: a contextual framework. *Science*, *374*(6567), 568-573. https://doi.org/10.1126/science.abj8188

Guasch-Ferré, M., Li, Y., Bhupathiraju, S. N., Huang, T., Drouin-Chartier, J. P., Manson, J. E., Sun, Q., Rimm, E. B., Rexrode, K. M., Willett, W. C., Stampfer, M. J., & Hu, F. B. (2022). Healthy lifestyle score including sleep duration and cardiovascular disease risk. *American Journal of Preventive Medicine*, *63*(1), 33-42. https://doi.org/10.1016/j.amepre.2022.01.027

Hertenstein, E., Feige, B., Gmeiner, T., Kienzler, C., Spiegelhalder, K., Johann, A., Jansson-Fröjmark, M., Palagini, L., Rücker, G., Riemann, D., & Baglioni, C. (2019). Insomnia as a predictor of mental disorders: a systematic review and meta-analysis. *Sleep Medicine Reviews*, *43*, 96-105. https://doi.org/10.1016/j.smrv.2018.10.006

Hur, S., Oh, B., Kim, H., & Kwon, O. (2021). Associations of diet quality and sleep quality with obesity. *Nutrients*, *13*(9), 3181. https://doi.org/10.3390/nu13093181

Instituto Brasileiro de Geografia e Estatística [IBGE]. (2022). *Pesquisa Nacional por Amostra de Domicílios Contínua. Nota técnica 02/2022 (jul. 2022 - atualizada em 15 ago. 2022): Sobre o módulo anual de Educação em 2020 e 2021*. Retrieved from https://www.ibge.gov.br/estatisticas/sociais/populacao/17270-pnad-continua.html?= HYPERLINK "https://www.ibge.gov.br/estatisticas/sociais/populacao/17270-pnad-continua.html?=&t=notas-tecnicas"& HYPERLINK "https://www.ibge.gov.br/estatisticas/sociais/populacao/17270-pnad-continua.html?=&t=notas-tecnicas"t=notas-tecnicas

Jackson, J. J., & Roberts, B. (2017). Conscientiousness. In T. A. Widiger (Ed.). *The Oxford Handbook of the Five Factor Model* (pp. 479-506). Oxford University Press.

Jia, X., Huang, Y., Yu, W., Ming, W. K., Qi, F., & Wu, Y. (2022). A moderated mediation model of the relationship between family dynamics and sleep quality in college students: the role of Big Five personality and only-child status. *International Journal of Environmental Research and Public Health*, *19*(6), 3576. https://doi.org/10.3390/ijerph19063576

John, O. P. (2021). History, measurement, and conceptual elaboration of the Big Five trait taxonomy: The paradigm matures. In O. P. John & R. W. Robins (Eds.). *Handbook of Personality: Theory and Research* (pp. 35-82). The Guilford Press.

Kern, M. L., & Friedman, H. S. (2017). Health psychology. In T.A.Widiger (Ed.). *The Oxford Handbook of the Five Factor Model* (pp. 403-422). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199352487.013.2

Kotov, R., Gamez, W., Schmidt, F., & Watson, D. (2010). Linking "big" personality traits to anxiety, depressive, and substance use disorders: A meta-analysis. *Psychological Bulletin*, *136*(5), 768-821. https://doi.org/10.1037/a0020327

Kroenke, K., Spitzer, R. L., Williams, J. B. W., & Löwe, B. (2009). An ultra-brief screening scale for anxiety and depression: The PHQ-4. *Psychosomatics*, *50*(6), 613-621. https://doi.org/10.1176/appi.psy.50.6.613

Kyle, S. D., & Henry, A. L. (2017). Sleep is a modifiable determinant of health: Implications and opportunities for health psychology. *British Journal of Health Psychology*, *22*(4), 661-670. https://doi.org/10.1111/bjhp.12251

Lai, C. C. W. (2018). The mediating role of sleep quality in the relationship between personality and subjective well-being. *SAGE Open*, *8*(2), 2158244018773139. https://doi.org/10.1177/2158244018773139

Morin, C. M., & Jarrin, D. C. (2022). Epidemiology of insomnia: prevalence, course, risk factors, and public health burden. *Sleep Medicine Clinics*, *17*(2), 173-191. https://doi.org/10.1016/j.jsmc.2022.03.003

Mostafa, S. A., Mena, S. C., Antza, C., Balanos, G., Nirantharakumar, K., & Tahrani, A. A. (2022). Sleep behaviours and associated habits and the progression of pre-diabetes to type 2 diabetes mellitus in adults: A systematic review and meta-analysis. *Diabetes and Vascular Disease Research*, *19*(3), 14791641221088824. https://doi.org/10.1177/14791641221088824

Perini, F., Wong, K. F., Lin, J., Hassirim, Z., Ong, J. L., Lo, J., Ong J. C., Doshi, K & Lim, J. (2023). Mindfulness-based therapy for insomnia for older adults with sleep difficulties: A randomized clinical trial. *Psychological Medicine*, *53*(3), 1038-1048. https://doi.org/10.1017/S0033291721002476

Philippens, N., Janssen, E., Kremers, S., & Crutzen, R. (2022). Determinants of natural adult sleep: An umbrella review. *Plos One*, *17*(11), e0277323. https://doi.org/10.1371/journal.pone.0277323

Prather, A. A., Pressman, S. D., Miller, G. E., & Cohen, S. (2021). Temporal links between self-reported sleep and antibody responses to the influenza vaccine. *International Journal of Behavioral Medicine*, *28*, 151-158. https://doi.org/10.1007/s12529-020-09879-4

Rochefort, C., Hoerger, M., Turiano, N. A., & Duberstein, P. (2019). Big Five personality and health in adults with and without cancer. *Journal of Health Psychology*, *24*(11), 1494-1504. https://doi.org/10.1177/1359105317753714

Sella, E., Carbone, E., Toffalini, E., & Borella, E. (2020). Personality traits and sleep quality: The role of sleep-related beliefs. *Personality and Individual Differences*, *156*, 109770. https://doi.org/10.1016/j.paid.2019.109770

Silva, L., & Faro, A. (2021). Adaptação e propriedades psicométricas da versão brasileira da Escala de Frustração e Desconforto. *Avances en Psicología Latinoamericana*, *39*(2). https://doi.org/10.12804/revistas.urosario.edu.co/apl/a.10561

Smiley, A., King, D., & Bidulescu, A. (2019). The association between sleep duration and metabolic syndrome: the NHANES 2013/2014. *Nutrients*, *11*(11), 2582. https://doi.org/10.3390/nu11112582

Sosso, F. A. E., Holmes, S. D., & Weinstein, A. A. (2021). Influence of socioeconomic status on objective sleep measurement: A systematic review and meta-analysis of actigraphy studies. *Sleep Health*, *7*(4), 417-428. https://doi.org/10.1016/j.sleh.2021.05.005

Souza, L. S. M. (2023). *Personalidade segundo o modelo dos cinco grandes fatores e suas relações com a qualidade do sono em uma amostra não clínica* [Dissertação de mestrado, Universidade Federal de Sergipe]. Biblioteca Central Universidade Federal de Sergipe.

St-Onge, M. P., Roberts, A. L., Chen, J., Kelleman, M., O'Keeffe, M., RoyChoudhury, A., & Jones, P. J. (2011). Short sleep duration increases energy intakes but does not change energy expenditure in normal-weight individuals. *The Amer-*

ican Journal of Clinical Nutrition, *94*(2), 410-416. https://doi.org/10.3945/ajcn.111.013904

Sutin, A. R., Ferrucci, L., Zonderman, A. B., & Terracciano, A. (2011). Personality and obesity across the adult life span. *Journal of Personality and Social Psychology*, *101*(3), 579-592. https://doi.org/10.1037/a0024286

Sutin, A. R., Gamaldo, A. A., Stephan, Y., Strickhouser, J. E., & Terracciano, A. (2020). Personality traits and the subjective and objective experience of sleep. *International Journal of Behavioral Medicine*, *27*(4), 481-485. https://doi.org/10.1007/s12529-019-09828-w

Wang, X., Cheng, S., & Xu, H. (2019). Systematic review and meta-analysis of the relationship between sleep disorders and suicidal behaviour in patients with depression. *BMC Psychiatry*, *19*(1), 1-13. https://doi.org/10.1186/s12888-019-2302-5 OK

Weisberg, Y. J., DeYoung, C. G., & Hirsh, J. B. (2011). Gender differences in personality across the ten aspects of the Big Five. *Frontiers in Psychology*, *2*, 178. https://doi.org/10.3389/fpsyg.2011.00178

Williams, A. L., Craske, M. G., Mineka, S., & Zinbarg, R. E. (2021). Neuroticism and the longitudinal trajectories of anxiety and depressive symptoms in older adolescents. *Journal of Abnormal Psychology*, *130*(2), 126. https://doi.org/10.1037/abn0000638

Zeng, L. N., Zong, Q. Q., Yang, Y., Zhang, L., Xiang, Y. F., Ng, C. H., Chen, L. G., & Xiang, Y. T. (2020). Gender difference in the prevalence of insomnia: a meta-analysis of observational studies. *Frontiers in Psychiatry*, *11*, 577429. https://doi.org/10.3389/fpsyt.2020.577429

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Validity and Reliability of Turkish Language Version of Baby Preparation and Worry Scale

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ABSTRACT

Introduction. The Baby Preparation and Anxiety Scale (Baby-PAWS) is the only instrument focusing on expectant mothers' practical concerns about the transition to parenthood (being able to care for the baby, securing childcare, personal well-being, and partner involvement) and measuring these parameters. **Objective.** The aim of this study is to determine the validity and reliability of Baby-PAWS, by adapting it to the Turkish population. **Method.** Two hundred and twenty expectant mothers over the age of eighteen in the third trimester of pregnancy were included in our methodological study. The content and language of Baby-PAWS were also validated. Data were subsequently obtained through confirmatory and explanatory factor analysis, correlation analysis and the Cronbach's alpha coefficient test. **Results.** It was found that although the Turkish language version of Baby-PAWS did not have three sub-dimensions as in the original, the one-dimensional Baby-PAWS was a valid, reliable scale tool suitable for the Turkish population. Cronbach's alpha coefficient of the revised scale was .85. **Discussion and conclusion.** The Turkish language version of Baby-PAWS is a suitable instrument in terms of language and content validity, and its single-factor structure can be applied to the Turkish population and correctly identify expectant mothers' concerns about self-care, partner/relationship issues, self-care, and relying on others to care for the baby after its birth.

Keywords: Baby preparation, worry scale, assessment tool, validity, reliability, Turkish language version.

RESUMEN

Introducción. La Escala de Ansiedad y Preparación para el Bebé (Baby-PAWS) es la única escala que se centra en las preocupaciones prácticas de las futuras madres sobre la transición a la paternidad (poder cuidar al bebé, asegurar el cuidado infantil, el bienestar personal y la participación de la pareja), midiendo estos parámetros. **Objetivo.** El objetivo de este estudio es determinar la validez y fiabilidad del Baby-PAWS, adaptándolo a la cultura turca. **Método.** En nuestro estudio metodológico se incluyeron 220 mujeres embarazadas mayores de 18 años que se encontraban en el tercer trimestre del embarazo. Se ha realizado la validez del contenido y del idioma del Baby-PAWS. Posteriormente los datos se obtuvieron mediante análisis factorial confirmatorio y explicativo, análisis de correlación y prueba del coeficiente alfa de Cronbach. **Resultados.** Se determinó que la forma turca Baby-PAWS no tenía tres subdimensiones como en el original y que la forma unidimensional Baby-PAWS era una herramienta de escala válida y confiable adecuada para la cultura turca. El coeficiente alfa de Cronbach de la escala revisada se determinó como .85. **Discusión y conclusión.** La versión turca del Baby-PAWS es una herramienta de medición adecuada en términos de lenguaje y validez de contenido y su estructura de un solo factor se puede aplicar a la cultura turca y puede identificar correctamente las preocupaciones de las futuras madres sobre el autocuidado y los problemas de pareja/relaciones, el cuidado personal y la dependencia de otros para cuidar al bebé después de nacer.

Palabras clave: Preparación del bebé, escala de preocupación, herramienta de evaluación, validez, confiabilidad, forma turca.

INTRODUCTION

The transition from pregnancy to parenthood is one of the most radical changes that occurs in women's lives (Versele et al., 2022). As a result of significant physiological and psychological changes experienced during this transition, expectant mothers can experience worry, general anxiety or anxiety disorders according to the criteria in the Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5) (Rees et al., 2019; Arifin et al., 2021). Worry is a cognitive event accompanied by concerns related to future events, which usually cannot be controlled and are perceived to have negative or uncertain outcomes. Worry related to birth may be affected by factors such as previous pregnancy and birth experiences, labor, problems during pregnancy, social support or other people's negative stories about birth (Abdi et al., 2018). Anxiety disorders differ from normal feelings of worry and stress; generalized anxiety disorder involves continuous feelings of worry together with physical symptoms such as restlessness, tiredness, muscle tension and insomnia, affecting daily life (World Health Organization [WHO], 2020). Antenatal anxiety symptoms reported by expectant mothers may be associated with fears related to pregnancy (such as congenital disorders or miscarriage) or a pre-existing situation and may continue with or without depressive symptoms (Centre of Perinatal Excellence [COPE], 2017).

During pregnancy, a woman has an increased propensity to worry. Even in low-risk pregnancies, 26% of women experience anxiety, while anxiety rates are reported to be up to five times higher in high-risk pregnancies (those with obstetric complications, weak social support and a history of anxiety or depression in the woman or family) compared to low-risk pregnancies (Rees et al., 2019; Wu et al., 2020; Doty et al., 2022).

During the prenatal period, many women are observed to experience worry, anxiety and depression symptoms at levels that can negatively affect maternal health, parenting, and mother-infant interaction (De Asis-Cruz et al., 2020). Children of mothers experiencing high anxiety during the prenatal period have been reported to have a high probability of preterm birth, be small for their gestational age and have behavioral and emotional problems that may continue after childhood (Grigoriadis et al., 2018; Frigerio & Nazzari, 2021). Findings in the literature results show that antenatal maternal stress increases negative health outcomes across children's lifespan (Uguz et al., 2019; Weis et al., 2020; Wu et al., 2020).

National studies performed to determine anxiety status in pregnancy appear to use newly developed scales or scales that have been validated for the Turkish population. These scales include the Pregnancy-related Anxiety Scale, Perinatal Anxiety Screening Scale and Perceived Stress Scale (Örücü & Demir, 2009; Yazıcı et al., 2019; Kurt & Arslan., 2021) These assessment tools are generally designed to diagnose a single problem, and there are none focusing on practical concerns (such as the ability to care for the baby, securing childcare, personal well-being, and spouse involvement) or measuring expectant mothers' concerns about the transition to parenthood. There is a need for reliable, valid tools to detect significant components of prenatal distress, such as worry and anxiety, that place women and children at high risk when experienced during pregnancy and labor. Creating a Turkish language version of an objective scale tool to measure baby preparation and worry, and examining its validity-reliability, will make it possible to identify the concerns of soon-to-be mothers related to the transition to parenthood, baby care, well-being and partner participation with a valid, reliable scale.

The aim of this study was to adapt the Baby Preparation and Worry Scale (Baby-PAWS) developed by Erickson et al. to Turkish culture and perform validity and reliability studies to add a new scale tool specific to this field to the literature.

METHOD

Design of the study

This is a prospective, observational validity and reliability study.

Language Validity

The original English version of Baby-PAWS was adapted to Turkish using the translate-retranslate technique. It was translated into Turkish by two professional translators with a good level of English and subsequently checked by a lecturer proficient in English who chose the most suitable translation for each item. The Turkish version of the scale was subsequently retranslated from Turkish to English by a linguistic expert and the items compared with the original scale to ensure equivalence.

Content Validity

Once the linguistic validity of Baby-PAWS had been determined, it was examined by five experts to ensure that content validity including cultural equivalence had been provided. Content validity was assessed using the Davis technique. The CVI points for the items on the Baby Preparation and Worry Scale were between .90 and 1.0. Content validity was therefore ensured without having to remove any items from the scale.

Participants

The population for this study comprised expectant mothers in the third trimester contacted online through preg-

nancy platforms (Instagram, Facebook, pregnancy class WhatsApp groups, etc.). For sample calculations, the sample included 220 expectant mothers, fulfilling the criterion that the sample number should be at least twenty times the number of scale items (eleven items) (Potur et al. 2015; Altıparmak & Taş Arslan, 2016). The sample for the research included pregnant women in keeping with the inclusion criteria of the study.

Research inclusion criteria. Married women (women in Turkish society avoid disclosing pregnancy outside marriage due to social pressure), over the age of eighteen, who had at least completed primary school, were in the third trimester of pregnancy and agreed to participate in the study were included.

Research exclusion criteria. Pregnant women with chronic diseases or a history of psychiatric disorders were not included in the research.

Measurements

The Personal Information Form, Depression, Anxiety and Stress Scale-21 (DASS-21) and Baby Preparation and Worry Scale linguistically validated for the Turkish population were used for data collection.

Personal Information Form

This form included questions on the age, employment status, educational attainment, partner's educational attainment, income level, family type, length of marriage and obstetric features of the expectant mother.

Depression Anxiety Stress-21 Scale

The Depression Anxiety Stress Scale-21 (DASS-21) was developed by Lovibond and Lovibond (1995) and adapted to Turkish by Sarıçam (2018). The scale, comprising twenty-one items, has 4-point Likert type responses: 0 'does not apply to me', 1 'applies to me a little', 2 'generally applies to me' and 3 'fully applies to me.' Each subscale related to depression, anxiety and stress contains seven items and participants were asked about the degree to which these statements had applied to them in the past week. Points on the scale were calculated adding the total for the 0, 1, 2, and 3 point selections. The cut-off points are > 4 for the depression subscale, > 3 for the anxiety subscale and > 7 for the stress subscale. The Cronbach alpha internal consistency reliability coefficients for the scale were .81 for the stress subscale, .85 for the anxiety subscale and .87 for the depression subscale.

Baby Preparation and Worry Scale

The Baby Preparation and Worry Scale (Baby-PAWS) was designed to measure concerns related to the practical aspects of the transition to parenthood. The full title of the article by Erickson et al. (2020) was "Baby Preparation and Worry Scale (Baby-PAWS): Instrument development and psychometric evaluation." The revised 2020 version of the scale comprises eleven items. The original form of the scale had subdimensions on 'self and partner worry,' 'non-parental childcare worry,' and 'baby care worry.' Items on the scale were rated according to a 7-point Likert scale (1 = never, 2 = very rarely, 3 = less than half the time, 4 = about half the time, 5 = more than half the time, 6=almost always, 7=always). The Cronbach alpha coefficients for the scale subdimensions were $\alpha = .90$, $\omega = .91$ for self and partner worry; $\alpha = .77$, $\omega = .79$ for non-parental childcare worry; $\alpha = .74$, $\omega = .75$ for baby care worry; and $\alpha = .89$, $\omega = .90$ for the eleven-item Baby-PAWS. This is the first tool specially designed to measure worry related to the practical aspects of the transition to parenthood and provides an important basis with a three-factor structure and internal consistency.

Statistical analysis

The linguistic validity of the scale was ensured using the translate-retranslate method. The content validity index (CVI) was determined based on expert opinion. The LISREL 8.80 and SPSS Statistics VS 22 programs were used for data analysis, including percentages, numbers, minimum and maximum values, and mean and standard deviations for descriptive statistics. The Davis technique was used for content validity; GFI, x^2/SD, CFI, RMSEA, SRMR, AGFI fit indexes and PATH diagram were used for confirmatory factor analysis (CFA); basic component analysis, Bartlett and Kaiser-Meyer-Olkin (KMO) coefficients were used for exploratory factor analysis (EFA); and item-total correlations and Cronbach alpha coefficient techniques were used for internal consistency.

Ethical considerations

Permission was obtained from Erickson by email to perform Turkish validity and reliability studies for Baby-PAWS. Permission was obtained from the Ordu University Clinical Research Ethics Committee for the research (Decision Number: 2021/160). Expectant mothers agreeing to participate in the study provided written consent through Google Forms.

RESULTS

The mean age of the expectant mothers participating in the study was 30.26 ± 6.05 years, while the mean number of pregnancies was 1.78 ± .92. Of this group, 41.8% had completed undergraduate or higher education, 60% were housewives, 67.3% had incomes equal to expenditure, 82.7% had not previously miscarried, 77.7% had planned their pregnancies, 64.1% had not received prenatal care, 86.4% did

Table 1
Anti-image Correlations

	BP 1	*BP 2*	*BP 3*	*BP 4*	*BP 5*	*BP 6*	*BP 7*	*BP 8*	*BP 9*	*BP 10*	*BP 11*
BP 1	.847[a]										
BP 2	-.270	.859[a]									
BP 3	.164	-.278	.769[a]								
BP 4	-.092	-.102	-.483	.780[a]							
BP 5	-.159	.044	-.195	.000	.849[a]						
BP 6	-.159	-.031	-.020	-.047	-.165	.865[a]					
BP 7	-.130	-.022	-.144	.086	.029	-.416	.855[a]				
BP 8	-.136	-.011	.146	-.187	-.229	-.043	-.012	.855[a]			
BP 9	-.042	-.076	-.204	.156	.111	-.001	-.181	-.190	.840[a]		
BP 10	.054	-.061	-.164	.012	.012	-.075	-.127	-.015	-.245	.905[a]	
BP 11	-.067	.115	.068	-.203	-.148	-.006	-.030	-.124	-.263	-.155	.859[a]

[a] = sample adequacy criterion.

not have risky pregnancies, 95.5% did not have genetic inherited disease and 50% were expecting a boy.

Investigation of Validity of Baby Preparation and Worry Scale

Findings related to Construct Validity

Once content validity had been determined, factor analysis was examined to identify the construct validity of the Baby Preparation and Worry Scale. Prior to this, Bartlett's and KMO tests were performed to assess the adequacy of the sample size and the suitability of the data for factor analysis. The KMO value was .841. This value means that the data were suitable for basic component analysis. The Bartlett test result showed that the data were related to each other and suitable for factor analysis ($x^2 = 810.830$, $p = .000$).

In addition, the anti-image correlations of Baby-PAWS items were assessed to determine whether the research data were suitable for factor analysis. All items met the sample adequacy criterion (Table 1).

Findings Related to Exploratory Factor Analysis

In the original Baby-PAWS, items 3, 4, 5, 10 and 11 were in the 'self and partner worry' dimension, items 2, 8 and 9 in the 'non-parental childcare worry' and items 1, 6 and 7 in the 'baby care worry' dimension. However, in the Turkish version of Baby-PAWS, several items were placed in different dimensions. In the Turkish version, items 2, 3 and 4 were placed in the 'self and partner worry' dimension, items 1, 5 and 8 in the 'non-parental childcare worry dimension and items 6, 7, 8, 9 and 10 in the 'baby care worry' dimension. However, this distribution showed no similarity with any theoretical or conceptual structure. It was therefore decided to investigate the scale again as a single dimension (Table 2).

When Baby-PAWS was investigated as a single dimension, all the items had factor loads of .30 and above and explained variance was 41.070%. Therefore, no items were removed from the scale and the scale was accepted as having a single dimension structure. After EFA, to ensure

Table 2
Factor Analysis Findings for Baby-PAWS

	Factor Loads		
Items	*1*	*2*	*3*
1. Not being able to figure out why the baby is crying	.179	.666	.209
2. Having a strong social support network I can rely on to help with childcare	.217	.144	.724
3. Finding quality time to be with my partner once we have the baby	.366	.087	.800
4. Having "me time" to relax and enjoy hobbies after the baby is born	.074	.333	.752
5. Changes in the relationship with my romantic partner	.053	.724	.248
6. Breastfeeding and/or the baby's diet	.498	.458	.222
7. Knowing what to do if the baby is sick or injured	.692	.274	.205
8. Not finding adequate childcare for my baby	.233	.726	.054
9. The costs of daycare and other financial needs of the baby	.791	.168	.156
10. Sharing duties like feeding and changing our baby with my partner	.756	.044	.270
11. Feeling exhausted/sleep-deprived and stressed-out after having the baby	.508	.474	.051
Explained variance (%)	**22.340**	**19.751**	**18.437**
Total explained variance (%)		**60.528**	

Table 3
Factor Analysis Findings for the Single-factor Turkish Language Version of Baby-PAWS

Items	*Factor Load*
1. Not being able to figure out why the baby is crying	.598
2. Having a strong social support network I can rely on to help with childcare	.600
3. Finding quality time to be with my partner once we have the baby	.703
4. Having “me time” to relax and enjoy hobbies after the baby is born	.630
5. Changes in the relationship with my romantic partner	.571
6. Breastfeeding and/or the baby’s diet	.692
7. Knowing what to do if the baby is sick or injured	.703
8. Not finding adequate childcare for my baby	.585
9. The costs of daycare and other financial needs of the baby	.681
10. Sharing duties like feeding and changing our baby with my partner	.649
11. Feeling exhausted/sleep-deprived and stressed-out after having the baby	.617
Total explained variance (%)	**41.070**

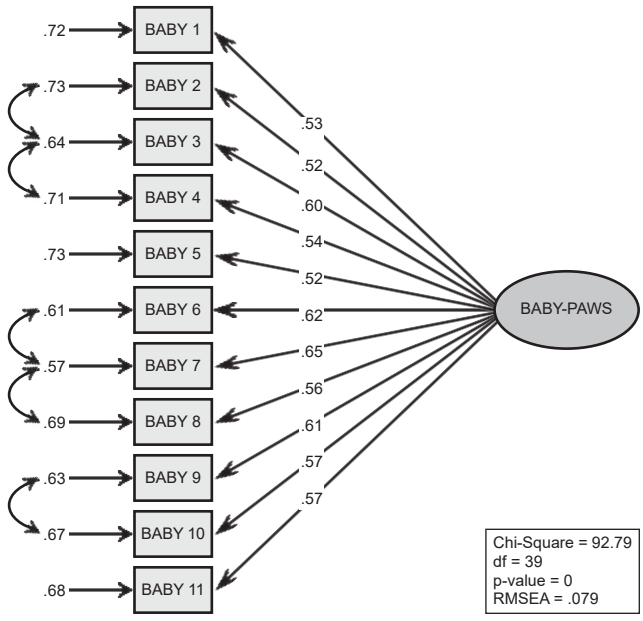

Figure 1. Confirmatory Factor Analysis of Baby-PAWS.

further guarantees for findings, a structural equation model was created using CFA (Table 3).

Findings related to confirmatory factor analysis. Many indexes were used to determine the fit of the model for Baby-PAWS, finding values of x^2/SD 2.38, AGFI .97, GFI .98, SRMR .063, RMSEA .079 and CFI .99. Based on these goodness of fit indexes, the model proved to be acceptable in its current t form.

Factor loads in the model varied from .52 to .65. There were five modifications to the model with items 2-3, 3-4, 6-7, 7-8 and 9-10 associated with each other. In the model, all t values were above 1.96 (7.12-11.22) (Figure 1).

Findings Related to Internal Consistency

The Cronbach alpha coefficient for Baby-PAWS was found to be .855. The item-total correlations for all items on the scale were above .40, and the removal of items did not cause a significant increase in the Cronbach alpha coefficient for the scale. As a result, no item was removed from the scale at this stage (Table 4).

Parallel Form Results

There was a statistically significant, low-level, positive correlation between Baby-PAWS points and Depression, Anxiety and Stress Scale points ($p < .05$). The Spearman Rho coefficient was between .135 and .251, ensuring the desired level of correlation between the two scales.

Table 4
Item-Total Correlations for Symptom Subdimensions and Cronbach Alpha Coefficients

Items	*Mean*	*SD*	*Item total correlation*	*Cronbach α if item deleted*
1. Not being able to figure out why the baby is crying	3.35	1.91	.506	.846
2. Having a strong social support network I can rely on to help with childcare	3.75	2.16	.499	.847
3. Finding quality time to be with my partner once we have the baby	3.71	2.01	.610	.838
4. Having “me time” to relax and enjoy hobbies after the baby is born	3.49	1.95	.531	.844
5. Changes in the relationship with my romantic partner	3.20	1.90	.475	.848
6. Breastfeeding and/or the baby’s diet	3.83	2.30	.595	.839
7. Knowing what to do if the baby is sick or injured	4.26	2.09	.611	.838
8. Not finding adequate childcare for my baby	3.18	2.08	.491	.847
9. The costs of daycare and other financial needs of the baby	3.93	2.33	.588	.840
10. Sharing duties like feeding and changing our baby with my partner	3.66	2.32	.551	.843
11. Feeling exhausted/sleep-deprived and stressed-out after having the baby	4.43	2.03	.524	.845
Cronbach’s α			**.855**	

Expectant mothers were found to have total mean points of 40.79 ± 14.79 (interval 11-77) for Baby-PAWS. Participants received the highest score of 4.43 for the item 'feeling exhausted/sleep-deprived and stressed-out after having the baby.' The lowest score of 3.18 were obtained by participants for the item 'not finding adequate childcare for my baby.

DISCUSSION AND CONCLUSION

International methods used to adapt a scale developed in a different culture include ensuring linguistic equivalence, performing validity and reliability studies, and comparing intercultural features (Çapık et al., 2018). The linguistic adaptation of the Baby-PAWS was performed using the translate-retranslate technique and it was found that the Turkish version is a suitable tool for measuring language equivalence.

Content validity is used to determine the adequacy of a scale tool in qualitatively and quantitively measuring a particular concept (Kartal & Bardakçı, 2018). The opinions of five lecturers who were experts in the field were used to measure the content validity of Baby-PAWS. The experts were asked to assess the cultural suitability, understandability and suitability for purpose. Using the Davis technique, the content validity of the scale was assessed and the experts were found to agree. According to the literature, the content validity index (CVI) in the Davis technique should be greater than .80 (Jesus & Valente, 2016). Based on the results, it was concluded that Baby-PAWS had adequate content validity.

In scale development studies, construct validity is examined to assess the ability of the scale to measure the related construct. In this case, the recommended analysis method is factor analysis (Jesus & Valente, 2016). CFA and EFA were undertaken for factor analysis. CFA was performed to determine whether the items could be grouped into various dimensions and whether the scale had subscales (Yaşlıoğlu, 2017). When the distribution into factors of the items in Baby-PAWS was investigated, the original structure separated into three subscales. However, the Turkish structure did not resemble this and the decision was made to review it as a single dimension. In the Dutch validation of the scale, the scale was found to be four dimensional (Bruinhof et al., 2024). This difference may be due to cultural differences and the fact that our data was collected on an online platform. The suitability of the data set was assessed using the Bartlett test and Kaiser-Meyer-Olkin (KMO) coefficient (Yöyen, 2016). Based on the KMO value (.841) and the Bartlett test (p = .000) for Baby-PAWS, the data were found to correlate with each other and be suitable for factor analysis. The strength of our study lies in the fact that it has sufficient power for factor analysis.

Baby-PAWS, investigated in a single dimension with eleven items, had factor loads varying from .571-.703. The factor loads for all the items on the scale were above .30 and explained variance was 41.070. As a result, no items were removed from the scale and the single-dimension structure was adopted. To obtain more definitive results after CFA, EFA was undertaken with structural equation modeling. Many indexes were examined to assess the fit of the model for the Baby Preparation and Worry Scale. According to the literature, SRMR and RMSEA values should be below .08, while the AGFI, CFI, and GFI values should be above .90 (Wang & Wang, 2012). Based on the relevant goodness of fit values, the model was concluded to be acceptable in this form.

Based on analyses of the structural equation example, after identifying an effective matrix, the output page of the analysis software was used to create a PATH index. In addition to the fit indexes, and the variables, factor loads, t values, the range of goodness of fit values and unexplained variances are summarized in this diagram. In short, outputs from the model are presented in graphic form (Çapık, 2014). In our study, the factor loads for the model varied between .52 and .65. In conclusion, the 11-item Baby-PAWS single-factor structure fit the model and the scale had construct validity.

The Cronbach alpha reliability coefficient method is generally used to determine the internal consistency of scale tools. The Cronbach alpha coefficient varies between 0 and 1. The closer the Cronbach alpha coefficient is to 1, the greater the reliability of the scale (Polit & Beck, 2009). The eleven items from the original version of Baby-PAWS had Cronbach alpha values of .89, with values of .90 for the first subscale (self and partner worry), .77 for the second subscale (non-parental childcare worry and .74 for the third subscale (baby care worry) (Erickson et al., 2020). Bruinhof et al. (2024) found the Cronbach alpha values of Baby-PAWS to be .85. In our study, the internal consistency Cronbach alpha reliability coefficient for Baby-PAWS was assessed and the scale was deemed to be highly reliable (α = .855).

Another method for measuring internal consistency is item-total points correlation, used to provide information on the reliability of each item on the scale. The variance of individual items is compared with the variance of the total test points and correlations are interpreted. For items to be acceptable, the item-total correlation coefficient should be at least .20. Items with values of less than .20 are removed from scales as they reduce reliability (Erdoğan et al., 2014). In Baby-PAWS, all items had item-total correlation above .30 and no notable increase occurred in the Cronbach alpha coefficient by deleting any item. As a result, no item was removed from the scale at this stage. This result confirmed the reliability of the items in the scale.

There was a statistically significant, low level, positive correlation between the points on Baby-PAWS and the Depression Anxiety Stress Scale-21 used in parallel (p < .05).

As the Spearman Rho coefficient was between .135 and .251, the desired level of correlation was ensured between the two scales. This result shows that the greater the worry related to the baby preparation process among expectant mothers, the higher the depression, anxiety and stress levels.

In conclusion, the one-dimension Baby Preparation and Worry Scale was found to be a valid, reliable scale tool suitable for Turkish culture.

The Baby Preparation and Worry Scale is recommended for use as a tool to identify the practical concerns of expectant mothers, such as their ability to care for the baby, provide child care, maintain personal well-being, and involve their partners. It is also suggested for use in interventional research related to baby preparation and worry. The validity and reliability of the scale should be further evaluated by using it in research with different sample groups. Additionally, correlations should be examined by using the scale in conjunction with other scales.

Limitations

This study has certain limitations, which should be taken into consideration when interpreting results. 1) The sample was obtained in online environments and only married women participated. Other women with limited access to the online environment were excluded, limiting the generalizability of results. Future research should expand the study population. 2) Response bias may have occurred due to the difference in cultural backgrounds. Although the survey was anonymized, this may have influenced results. Future research with a more diverse sample would allow for an examination of Baby-PAWS across socioeconomic strata and women experiencing perinatal health issues.

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Author contribution statement

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Conflict of interest

The authors declare they have no conflicts of interest.

REFERENCES

Abdi, F., Navidpour, F., & Dolatian, M. (2018). A Literature Review of Pregnancy Worries and Stress Scales. *Iranian Journal of Psychiatry and Behavioral Sciences*, *12*(3), e14581. https://doi.org/10.5812/ijpbs.14581

Altıparmak, D., & Taş Arslan, F. (2016). Adaptation of family centred care scale to Turkish a validity and realiability study. *Journal of Pediatric Research*, *3*(2), 97-103. https://doi.org/10.4274/jpr.60566

Arifin, S. R.M., Ismail, A. S., Samsudin, S., Hassan, N. A., & Mamat W.H., W. (2021). Prevalence and Factors Associated with the Depressive and Anxiety Symptoms Amongst Antenatal Women. *IIUM Medical Journal Malaysia*, *20*(1). https://doi.org/10.31436/imjm.v20i1.1772

Bruinhof, N., Sehic, E., Hancock, G. R., Gartstein, M. A., & de Weerth, C. (2024). Prenatal anticipatory stress: Baby preparation and worry scale-revised in the Dutch context. *Comprehensive Psychiatry*, *128*, 152437. https://doi.org/10.1016/j.comppsych.2023.152437

Çapık, C. (2014). Use of confirmatory factor analysis in validity and reliability studies. *Journal of Anatolia Nursing and Health Sciences*, *17*(3), 196-205.

Çapık, C., Gözüm, S., & Aksayan, S. (2018). Intercultural scale adaptation stages, language and culture adaptation: Updated guide. *Florence Nightingale Journal of Nursing*, *26*(3), 199-210. https://doi.org/10.26650/fnjn397481

Centre of Perinatal Excellence. (2017). *A guide for health professionals*. Retrieved from https://cope.org.au.

De Asis-Cruz, J., Krishnamurthy, D., Zhao, L., Kapse, K., Vezina, G., Andescavage, N., Quistorff, J., Lopez, C., & Limperopoulos, C. (2020). Association of Prenatal Maternal Anxiety With Fetal Regional Brain Connectivity. *JAMA Network Open*, *3*(12), e2022349. https://doi.org/10.1001/jamanetworkopen.2020.22349

Doty, M. S., Chen, H. Y., Ajishegiri, O., Sibai, B.M., Blackwell, S.C., & Chauhan, S. P. (2022). Daily meditation program for anxiety in individuals admitted to the antepartum unit: a multicenter randomized controlled trial (MEDITATE). *American Journal of Obstetrics & Gynecology MFM*, *4*(3), 100562. https://doi.org/10.1016/j.ajogmf.2022.100562

Erdoğan, S., Nahcıvan, N., & Esin, N.M. (2014). *Research process application and critical in nursing*. Nobel Medicine Bookstores.

Erickson, N. L., Neumann, A. A., Hancock, G. R., & Gartstein M. A. (2020). Baby preparation and worry scale (Baby-PAWS): Instrument development and psychometric evaluation. *Early Human Development*, *147*, 105080. https://doi.org/10.1016/j.earlhumdev.2020.105080

Frigerio A., & Nazzari, S. (2021). Antenatal maternal anxiety, maternal sensitivity and toddlers' behavioral problems: An investigation of possible pathways. *Early Human Development*, *157*, 105364. https://doi.org/10.1016/j.earlhumdev.2021.105364

Grigoriadis, S., Graves, L., Peer, M., Mamisashavili, L., Tomlinson, G., Vigod S. N., Dennis, C.-L., Steiner, M., Brown, C., Cheung, A., Dawson, H., Rector, N. A., Guenette, M., & Richter, M. (2018). Maternal anxiety during pregnancy and the association with adverse perinatal outcomes: systematic review and meta-analysis. *Journal of Clinical Psychology*, *79*(5):2-22. https://doi.org/10.4088/JCP.17r12011

Jesus, L. M., & Valente, A. R. (2016). *Cross-cultural adaptation of health assessment instruments*. Portugal, University of Aveiro, 8, 1-5.

Kartal, M., & Bardakçı, S. (2018). *Reliability and validity analysis with SPSS and amos applied examples*. Academician Bookstore.

Kurt, G., & Arslan, H. (2021). Turkish version of the Pregnancy-related Anxiety Scale: A psychometric study. *Perspectives in Psychiatric Care*, *57*(1), 157-166. https://doi.org/10.1111/ppc.12537

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, *33*(3), 335-343. https://doi.org/10.1016/0005-7967(94)00075-U

Örücü, M. Ç., & Demir, A. (2009). Psychometric evaluation of perceived stress scale for Turkish university students. *Stress and Health: Journal of the International Society for the Investigation of Stress*, *25*(1), 103-109. https://doi.org/10.1002/smi.1218

Polit, D. F., & Beck, C. T. (2009). *Essentials of nursing research: Appraising evidence for nursing practice*. Lippincott Williams & Wilkins.

Potur, D. C., Merih, Y. D., Külek, H., & Gürkan, Ö. C. (2015). Turkish validity and reliability study of the birth comfort scale. *Anatolian Journal of Nursing and Health Sciences*, *18*(4), 252-258.

Rees, S., Channon, S., & Waters C. S. (2019). The impact of maternal prenatal and postnatal anxiety on children's emotional problems: a systematic review. *European Child and Adolescent Psychiatry*, *28*(2), 257-280. https://doi.org/10.1007/s00787-018-1173-5

Sariçam, H. (2018). The psychometric properties of Turkish version of Depression Anxiety Stress Scale-21 (DASS-21) in health control and clinical samples. *Journal of Cognitive Behavioral Psychotherapy and Research*, *7*(1), 19-30.

Uguz, F., Yakut, E., Aydogan S., Bayman M. G., & Gezginc K. (2019). The impact of maternal major depression, anxiety disorders and their comorbidities on gestational age, birth weight, preterm birth and low birth weight in newborns. *Journal of Affective Disorders*, *259*, 382-385. https://doi.org/10.1016/j.jad.2019.08.076

Versele, V., Stok, F. M., Dieberger, A., Deliens, T., Aerenhouts, D., Deforche, B., Bogaerts, A., Devlieger, R., & Clarys, P. (2022). Determinants of Changes in Women's and Men's Physical Activity and Sedentary Behavior across the Transition to Parenthood: A Focus Group Study. *International Journal of Environmental Research and Public Health*, *19*(4), 2421. https://doi.org/10.3390/ijerph19042421

Wang, J., & Wang, X. (2012). *Structural equation modeling: applications using mplus: methods and applications*. West Susex: John Wiley & Sons.

Weis, K. L., Walker, K. C., Chan, W., Yuan, T. T., & Lederman, R. P. (2020). Risk of preterm birth and newborn low birthweight in military women with increased pregnancy-specific anxiety. *Military Medicine*, *185*(5-6), e678-e685. https://doi.org/10.1093/milmed/usz399

World Health Organisation [WHO]. (2020). *International classification of diseases 11th revision (Diagnostic manual ICD-11)*. Retrieved from https://icd.who.int/en/

Wu, Y., Lu, Y. C., Jacobs, M., Pradhan, S., Kapse, K., Zhao, L., Niforatos-Andescavage, N., Vezina, G., du Plessis, A. J., & Limperopoulos, C. (2020). Association of prenatal maternal psychological distress with fetal brain growth, metabolism, and cortical maturation. *JAMA Network Open*, *3*(1), e1919940-e1919940. https://doi.org/10.1001/jamanetworkopen.2019.19940

Yazıcı, E., Mutu Pek, T, Uslu Yuvacı, H., Köse, E, Cevrioglu, S., Yazıcı, A. B., Çilli, A. S., Erol, A., & Aydın, N. (2019). Perinatal Anxiety Screening Scale validiy and reliability study in Turkish (PASS-TR validity and reliability). *Psychiatry and Clinical Psychopharmacology*, *29*(4), 609-617. https://doi.org/10.1080/24750573.2018.1506247

Yaşlıoğlu, M. M. (2017). Factor analysis and validity in social sciences: Using exploratory and confirmatory factor analysis. *Journal of Istanbul University Faculty of Business Administration*, *46*,74-85.

Yöyen, E. G. (2016). A Turkish adaptation of short version of International Personality Inventory-IPI: Reliability and validity analysis. *International Journal of Social Sciences and Education Research*, *2*(4), 1058-1069. https://doi.org/10.24289/ijsser.278983

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Epidemiological Studies on COVID-19 and Mental Health in Mexico: Better Methodology for Better results: a Literature Review

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ABSTRACT

Background. Updated information is required on studies conducted in Mexico on the mental health consequences of COVID-19. **Objective.** In comparison with previous efforts, we increased the timeframe of the literature search to February 2023 and used a larger list of potential mental health outcomes. **Method.** We used common international literature databases and more local databases, such as SciELO, and the Biblioteca Virtual en Salud (BVS). We focussed on the methodological issues of these studies, their prevalence estimates and suspected risk factors. **Results.** We reported on ninety-five studies that included Mexican data on symptoms of alcohol use, anxiety, depression, gaming, sleep problems and suicidal thoughts and behaviours. In most cases, we found a cross-sectional survey with self-reported information on mental health symptoms usually although not always with validated screening instruments and scales. These studies were implemented on websites, and sometimes over the phone, on self-selected volunteers. We found a small subset of fourteen longitudinal datasets (for alcohol use, anxiety, depression, and suicidal thoughts and behaviours) that suggested a more cautious interpretation of the effects of the COVID-19 pandemic on the mental health of Mexicans. **Discussion and conclusion.** Although the initial rapid studies during the early phases of the pandemic yielded warning signs, they did not necessarily follow standard epidemiological principles. Methodological improvements are required for future studies on the mental health consequences of natural, man-made disasters and epidemic contingencies.

Keywords: COVID-19, mental health, Mexico, epidemiology, depression, anxiety.

RESUMEN

Antecedentes. Se necesita información actualizada de los estudios realizados en México sobre las consecuencias del COVID-19 en la salud mental. **Objetivo.** En comparación con estudios previos, en esta revisión de la literatura se incrementó el periodo de búsqueda a febrero de 2023 y se usó una lista más larga de eventos de salud mental. **Método.** Se buscó en las bases de datos internacionales convencionales y en las bases locales como SciELO y la Biblioteca Virtual en Salud (BVS), enfocándonos en los problemas metodológicos de los estudios, las estimaciones de prevalencia y sus factores de riesgo potenciales. **Resultados.** Reportamos 95 estudios que incluyeron datos mexicanos sobre síntomas de consumo de alcohol, ansiedad, depresión, problemas con videojuegos, sueño, y conductas y pensamientos suicidas. En la mayoría de los casos, encontramos encuestas transversales con autorreporte de los síntomas de salud mental evaluados con, pero a veces sin, escalas e instrumentos de tamizaje validados. Estos estudios fueron implementados en páginas web y, en ocasiones, vía telefónica, con voluntarios autoseleccionados. Encontramos un pequeño subgrupo de 14 estudios longitudinales (consumo de alcohol, ansiedad, depresión, y conductas y pensamientos suicidas) que sugieren una interpretación más moderada de los efectos de la pandemia por COVID-19 en la salud mental de la población mexicana. **Discusión y conclusión.** Los rápidos estudios iniciales realizados durante las primeras fases de la pandemia, aunque sirvieron como señal de alerta, no siguieron necesariamente los principios epidemiológicos estándar. Será necesario mejorar metodológicamente los estudios futuros sobre las consecuencias en la salud mental por desastres naturales, humanos y contingencias epidemiológicas.

Palabras clave: COVID-19, salud mental, México, epidemiología, depresión, ansiedad.

INTRODUCTION

The COVID-19 pandemic was particularly alarming because of its unknown means of transmission, rapid development of symptoms that were refractory to available treatment and severe negative outcomes. The immediate effect of COVID-19 was a major impact on mortality, but it also produced family losses, financial difficulties and social dysfunction. Borders were closed and residents were kept under lockdown with no immediate hope of returning to their everyday activities. Previous epidemics had been much shorter and more local, and the academic community knew little of the mental health consequences of this type of worldwide epidemic. Mental health consequences of the pandemic among the population and those treating COVID-19 cases that had tended to be overlooked came to the forefront of discussions, sometimes with pessimistic predictions (Santomauro et al., 2021).

There was an urgent need for information and guidance. In this era of the internet, quick, inexpensive options for obtaining information gained momentum. Typical mental health studies during the initial phases of the pandemic were cross-sectional surveys with self-reported information on mental health symptoms usually but not always validated by screening instruments and scales. These studies were implemented on websites, and sometimes by phone, on self-selected volunteers. As noted, non-probability and convenience samples without response rates and no background information on the population from which the sample had been drawn was then sometimes used to report prevalence rates of the mental health consequences of COVID-19 (Pierce et al., 2020). In a subsequent methodological improvement, cross-sectional surveys of delimited populations calculating non-response rates by basic age/sex groups using standard mental health instruments began to emerge as the epidemic progressed (Ma et al., 2021). Nevertheless, these surveys sometimes lacked estimates of previous mental health issues in the same populations to compare with those taken during COVID-19 (Kunzler et al., 2021). Cross-sectional surveys and accurate longitudinal cohort studies were subsequently instrumented and reported in the international literature (Prati & Mancini, 2021; WHO, 2022; Witteveen et al. 2023). More recently, meta-analyses of longitudinal studies on the mental health consequences of COVID-19 became available with summaries of up to date knowledge on the issue (Ahmed et al., 2023; Witteveen et al., 2023). In general, these meta-analyses of longitudinal cohort studies and large-scale international time-trend studies tended to report much more moderated mental health consequences of the COVID-19 pandemic. A recent meta-analysis of longitudinal studies even reported that anxiety and depression symptoms may have decreased from baseline to follow-up, while other mental health problems showed no change (Cénat et al., 2022).

The COVID-19 pandemic had an immediate impact on Mexico, with over 334,000 deaths and 7,633,355 cases by the end of August 2023 (Worldometer, 2023). As the country recovers and returns to normality, the health sector is attempting to draw lessons from this costly experience to prepare for the future. To what extent was the mental health of the Mexican population affected by COVID-19? What were the main studies and findings? International meta-analyses of both longitudinal and repeated cross-sectional studies do not include any Mexican studies (Ahmed et al., 2023; Witteveen et al., 2023). A meta-analysis of low- and middle-income countries reported six studies in Mexico, with no identifying data on either the studies or their results (Chen et al., 2022). Regardless of the lack of local studies, some international research (GBD, 2021) reported a 42.2% increase in depression and a 39.8% increase in anxiety during the COVID-19 epidemic in Mexico. We have only found one systematic review of Mexican studies, based on large-scale international scientific databases (Hernández-Díaz et al., 2022) including approximately fifteen studies up to December 2021. Updated information is therefore required. Objective: We extended the timeframe of the literature search to February 2023, used a longer list of potential mental health outcomes and more local databases, such as SciELO, and Biblioteca Virtual en Salud (BVS). We analyzed ninety-five studies including data on symptoms of depression, anxiety, suicidal thoughts and behaviours, alcohol use, gaming, and sleep problems in Mexico. We focused on the methodology of these studies, their prevalence estimates and suspected risk factors.

METHOD

Eligibility criteria

We included all the original quantitative research on the Mexican population ages twelve and older, published in English and Spanish from 2020 to 2023. Studies were included regardless of their study design, but were excluded if they were qualitative or narrative (case studies, essays, editorial letters, or commentaries on published papers). When data from the same sample were reported in two or more studies, we included those with the most comprehensive information.

Information sources and search strategy

Searches were conducted in February 2023 (the last one being performed on February 13) in the following electronic databases: PubMed, Embase, PsycINFO, Web of Science, Scopus, SciELO, and the *Biblioteca Virtual en Salud* (BVS). We searched for keywords and MeSH terms related to mental health and COVID-19, including depres-

sion, anxiety, alcohol, drugs, sleep problems, eating disorders, suicide, gaming, COVID-19, and SARS-CoV-2. By way of an example, our PubMed search algorithm was entered as: ("Mexico"[Mesh]) AND ("COVID-19"[Mesh] OR "SARS-CoV-2"[Mesh]) AND ("Anxiety Disorders"[Mesh] OR "Mental Health"[Mesh] OR "Ethanol"[Mesh] OR "Alcoholism"[Mesh] OR "Internet Addiction Disorder"[Mesh] OR "Behavior, Addictive"[Mesh] OR "Illicit Drugs"[Mesh] OR "Psychotropic Drugs"[Mesh] OR "Synthetic Drugs"[Mesh] OR "Cannabis"[Mesh] OR "Marijuana Use"[Mesh] OR "Suicide"[Mesh] OR "Suicide, Attempted"[Mesh] OR "Suicide Prevention"[Mesh] OR "Suicide, Completed"[Mesh] OR "Suicidal Ideation"[Mesh] OR "Self-Injurious Behavior"[Mesh] OR "Anxiety"[Mesh] OR "Anxiety Disorders"[Mesh] OR "Depression"[Mesh] OR "Depressive Disorder"[Mesh] OR "Sleep"[Mesh] OR "Feeding and Eating Disorders"[Mesh]). The full lists of search terms for each database are available as supporting information (Appendix A1). Bibliographic references listed in previous systematic reviews were screened for literature not included in the main searches, and we also searched the reference sections of the manuscripts included.

Records were retrieved in RIS format for each database and deduplicated in EndNote, used for the systematic removal of duplicate records in seven stages, based on a series of combinations for author, year, title, pages, and volume (Bramer et al., 2016).

Selection process

One author (BS) screened the deduplicated results for eligibility, based on their titles and abstracts, and the full texts of all potentially eligible studies were examined for inclusion. In the event of doubt, the final decision was made in conjunction with the senior author (GB). Each selected manuscript was classified by at least one of six mental outcomes.

Data items

For each manuscript, the following data were identified by all the authors and extracted and captured on an ad hoc spreadsheet by one author (BS), and subsequently reviewed by another (RO):

- *Author and publication year*
- *Research scope*. We classified studies as international (distinguishing between those that disaggregated Mexican data from those that only reported pooled data), national (if a population of two or more Mexican states were included in the study) or local (at the state, municipal, or city level)
- *Sample size*. Number of people included in the study. Whenever an international study disaggregated data by country, we recorded the sample size for the Mexican sample alone
- *Target population*. The type of population intended to be studied (such as adults, college students and healthcare workers)
- *Sampling method*. If a sample was selected based on the intended census of the target population, if there was a sampling frame or any kind of random sampling was used, or if it was a convenience sample (usually based on an open invitation through social media), when no further information on the sampling method was provided, we classified it as unclear. We included the response rate whenever it was reported
- *Type of data collection*. Online or telephone survey, face-to-face, or any other type
- *Sample characteristics*. We extracted the proportion of males (females, or any other population) in the sample, as well as their mean age in years
- *Research design*. We distinguished between cross-sectional (including surveys with only one measurement or panel studies with more than one), longitudinal, and any other kind of studies
- *Assessment tool*. We extracted the psychometric scale, subscale, or question used to assess the main outcome of the study
- *Prevalence of the mental health indicator assessed*. We included the prevalence (specifying its time frame, such as "in the past two weeks") of the main mental health measure. If reported, we included prevalence by severity levels and/or sex
- *Main results*. We extracted the main results for each outcome in terms of its association with the mental health of the Mexican population and other mental health variables.

Any issues regarding data extraction were resolved by consensus among all the authors.

Summary measures

Since this was a systematic review with no meta-analysis, we did not report any pooled measures.

Synthesis of results

Each manuscript was classified into one or more of the following six mental health outcomes: alcohol use, anxiety, depression, gaming, sleep disorders, and suicide. We performed a qualitative synthesis of results for each of these issues, as we decided not to pool results using meta-analysis techniques due to the high degree of heterogeneity in the instruments used in each study, the populations under study, and the representativeness of the samples.

Table 1
Summary of longitudinal studies, time-trend, and repeated surveys

First author and publication year	*Sample size (n)*	*Research scope*	*Target population*	*Sampling method*	*Type of data collection*	*Sample characteristics (sex%, mean age in years)*	*Research design*	*Survey method and assessment tool*	*Mental health*	*Main outcomes*
Alcohol										
Barrera-Núñez et al. (2022)	*N* 2018 = 50,654 homes visited nationwide *N* 2020 = 10,216 homes visited nationwide	National	Adolescents (10 to 19 years old) and adults (20 years or older)	Stratified random sampling	Face-to-face (direct interview in households)	Men: NA Mean: NA	Cross-sectional (two measurements)	Alcohol consumption in the past year Excessive consumption in the past 30 days	AC in adolescents in the past year: 2020 = 21.3% and 21.7% in 2018 Excessive AC in adolescents 2020 (women = 2.7% and men = 4.9%) AC in adults in the last year = 48.2% in 2018 and 54.3% in 2020 Excessive AC in adults in the past 30 days = 11.1% in women and 36.7% in men in 2018; 5.5.% in women, 18.3% in men in 2020	No changes in AC or excessive alcohol consumption were observed in either periods (2018 to 2020) in adolescents. In adult women, current alcohol consumption increased, but the prevalence of excessive consumption decreased. In men, although there was a slight increase in current consumption in some groups, excessive consumption decreased across all strata.
Dominguez-González et al. (2022)	*N* = 247 W1: Apr 2020 W2: Dec 2020	Local (CDMX)	Medical undergraduate students	Census	Online Survey	Men: 31.6% Mean: 20.7	Longitudinal	CAGE-Substance Abuse Screening Tool (CAGE-AID).	W1 = 11.74% W2 = 13.77%	No significant difference was found in alcohol consumption in either periods, for the total population or by sex.
Anxiety										
Betancourt-Ocampo et al. (2022)	*N* = 2,307 W1: Apr 7 and 17, 2020; W2: May 10 and 22, 2020; W3: Sep 28 and Oct 5	Local (State: State of México)	Users of older adults' social programs	Convenience sample (telephone invitation through an official database)	Telephone survey	Men: 38% Mean: 70.69	Longitudinal	Generalized Anxiety Disorder-7 (GAD-7).	Prevalence of high anxiety in the past two weeks: W1 = 3.9%; mean number of symptoms 2.56 Prevalence of high anxiety W2 = 5.1%; mean number of symptoms 2.75 Prevalence of high anxiety W3 = 7.8%; mean number of symptoms 3.17	Prevalence of high level of anxiety increased from wave 1 to wave 3.
Cortés-Álvarez et al. (2022)	Pre-pandemic stage: Nov 2019 *N*1 = 1,152; Pandemic stage: (Jun -Jul 2020 and Jun - Jul 2021) *N*2 = 1,088	National	Preschool and elementary school teachers, participants in COGNOS research project	Census	Pre-pandemic face-to-face; Pandemic contacted by mail	Men: 28.77% Mean: NA	Longitudinal	Depression and Anxiety Stress Scale-21 (DASS-21)	Anxiety prevalence mild, moderate, severe and extremely severe: Pre-pandemic (22.06%, 21.69%, 21.05% and 9.93%); Pandemic stage Jun-July 2020 (21.42%, 22.15%, 22.61% and 10.75%); Pandemic stage Jun-July 2021 (23.44%, 21.05%, 26.1% and 13.33%).	Significantly higher prevalence of severe to extremely severe anxiety. As the COVID-19 pandemic progressed, teachers experienced higher prevalence of severe anxiety symptoms, and a higher mean number of symptoms, especially women. A stronger association between burnout syndrome and anxiety was observed within the pandemic.
Jauregui Renaud et al. (2021)	*N*1 = 109 (Apr - Jul 2020) *N*2 = 29 (Dec 2020 - Jan 2021)	National	Healthcare workers	Convenience sample (open invitation)	Online survey	Men: 40.5% Mean: 33.7	Longitudinal for 109 participants and cross-sectional for 29 participants	Hospital Anxiety and Depression Scale (HADS). Short-form of the State-Trait Anxiety Inventory	Unreported prevalence of anxiety	The highest reports of state anxiety were observed when uncertainty prevailed, during the first wave of inpatients, while burnout increased across time, and resilience was invariant.

Table 1
Summary of longitudinal studies, time-trend, and repeated surveys (continued)

First author and publication year	*Sample size (n)*	*Research scope*	*Target population*	*Sampling method*	*Type of data collection*	*Sample characteristics (sex%, mean age in years)*	*Research design*	*Survey method and assessment tool*	*Mental health*	*Main outcomes*
Teruel Belismelis et al. (2021)	*N*1 = 833 (Apr 2020) *N*2 = 1,688 (May 2020) *N*3 = 1,674 (Jun 2020) *N*4 = 1,584 (Jul 2020) N5 = 1,538 (Aug 2020)	National	All	Stratified random sampling	Cellphone survey (Weekly and bi-monthly) in 2020	Men: NA Mean: NA	Cross-sectional (five measurements)	Generalized Anxiety Disorder (GAD-7)	Prevalence of anxiety in the last 2 weeks: Apr 32.4%, May 31.4%, Jun 32.5%, Jul 30.9% and Aug 32.4%	Income reduction and loss of employment in household were significantly associated with anxiety.
Toledo-Fernández et al. (2021)	*N*1 = 670 (W1: 8-18 Apr 2020) N2 = 670 (W2: 11-27 May 2020)	Local (State: State of Mexico)	Adults (18 to 60 years old) from a list of program's beneficiaries	Convenience sample (open invitation)	Email and telephone survey	Men: 41.49% Mean: NA	Longitudinal	Generalized Anxiety Disorder 7-Item (GAD-7)	Prevalence of moderate to severe anxiety in the past two weeks: W1 = 11.94% W2 = 12.23%	No significant changes in prevalence between the two waves were found.
Depression										
Betancourt-Ocampo et al. (2022)	*N* = 2,307 W1: Apr 7 and 17, 2020; W2: May 10 and 22, 2020; W3: Sep 28 and Oct 5	Local (State: State of México)	Users of older adults' social programs	Convenience sample (telephone invitation through an official database)	Telephone survey	Men: 38% Mean: 70.69	Longitudinal	Patient Health Questionnaire (PHQ-9)	Prevalence of depression in the past two weeks W1 = 1.3% Prevalence of depression in W2 = 1.7% Prevalence of depression in W3 = 4.6%	Higher scores in the third wave with respect to the previous two. However, the proportion of older adults identified with high scores in depression was lower than that reported in national data.
Cortés-Álvarez et al. (2022)	Pre-pandemic stage: Nov 2019 *N*1 = 1,152; Pandemic stage: (Jun-Jul 2020 and Jun-Jul 2021) N2 = 1,088	National	Preschool and elementary school teachers, participants in COGNOS research project	Census	Pre-pandemic face-to-face Pandemic contacted by mail	Men: 28.77% Mean: NA	Longitudinal	Depression and Anxiety Stress Scale-21 (DASS-21)	Depression prevalence mild, moderate, severe and extremely severe: Pre-pandemic (21.60%, 16.91%, 10.29% and 8%); Pandemic stage Jun-July 2020 (29.50%, 17.92%, 13.97% and 8.55%); Pandemic stage Jun-July 2021(32.08%, 18.66%, 14.98% and 9.28%)	No overall change in depression levels as the pandemic progressed. Female and male teachers experienced moderate levels of depression. As the COVID-19 pandemic progressed a stronger association between burnout syndrome and depression was observed.
Jauregui Renaud et al. (2021)	*N*1 (W1: Apr to Jul 2020) = 109 *N*2 (W2: Dec 2020 to Jan 2021) = extra 29	National	Healthcare workers	Convenience sample (open invitation)	Online survey	Men: 40.5% Mean: 33.7	Longitudinal for 109 participants and cross-sectional for 29 participants in second wave	Hospital Anxiety and Depression Scale (HADS)	Unreported prevalence of depression	The second epidemic wave reported more depression symptoms in association with acute stress, state anxiety, and burnout.
Toledo-Fernández et al. (2021)	*N*1 = 670 (W1: 8-18 Apr 2020) *N*2 = 670 (W2: 11-27 May 2020)	Local (State: State of Mexico)	Adults (18 to 60 years old) from a list of program's beneficiaries	Convenience sample (open invitation)	Email and telephone survey	Men: 41.49% Mean: NA	Longitudinal	Patient Health Questionnaire (PHQ-9)	Prevalence of moderate to severe depression in the past two weeks: W1 = 5.22% W2 = 6.26%	No significant changes between the two waves were found.

Table 1
Summary of longitudinal studies, time-trend, and repeated surveys (continued)

First author and publication year	*Sample size (n)*	*Research scope*	*Target population*	*Sampling method*	*Type of data collection*	*Sample characteristics (sex%, mean age in years)*	*Research design*	*Survey method and assessment tool*	*Mental health*	*Main outcomes*
Cerecero-García et al. (2021)	*N*1 (W1:2019) =108 *N*2 (W2: 2020) = 881 participants in HIV pre-exposure prophylaxis (IMPrEP)	National	Adults participants in HIV pre-exposure prophylaxis demonstration project (ImPrEP)	Census (response rate 29%)	Online	Men: 97.1% (men who have sex with men; 2.9% transgender women) Mean: NA	Cross-sectional for 773 participants and longitudinal for 108	Data from ENSANUT 2018 (CESD-7). SF-36 questionnaire for 2019 and Center for Epidemiological Studies Depression Scale (CES-D-10) for 2020	Prevalence of depression in men from the general population (ENSANUT 2018) during the past week = 10.4% Prevalence of depression IMPrEP (2019) = 8.6% Prevalence of depression during the last week IMPrEP (2020) = 53.3%	High levels of depression were found among gay men and transgender women in Mexico during the COVID-19 pandemic.
Dominguez-González et al. (2022)	*N* = 247 W1: Apr 2020; W2: Dec 2020	Local (City: CDMX)	Medical undergraduate students	Census	Online survey	Men: 31.6% Mean: 20.7	Longitudinal	Beck Depression Inventory (BDI-II)	Prevalence of depression during the past two weeks; W1 = 19.84% (women 23.67% and 11.54% in men) W2 = 40.08% (42.60% in women and 34.62% in men)	The pandemic increased the rate of depression in medical students, and was more severe in women and among those without previous psychiatric treatment.
Rivera-Rivera et al. (2021)	*N* = 466 (pre-pandemic 2018 - 2019) (during the pandemic May - Nov 2020)	Local (City: CDMX)	Pregnant women attending primary care clinics of IMSS CDMX with less than twenty weeks of gestation	Unclear	Face-to-face survey (in hospital facility)	Pregnant women:100% Mean: 39.22	Longitudinal	Edinburgh postnatal Depression Scale (EDS)	Prevalence of DS in the past seven days: W1 = 19.5% W2 = 19.1%	Experiencing higher stress during the pandemic was associated with an increase in depression; higher social support was associated with lower depression.
Suicide										
Borges et al. (2022a)	*N*1 observed from 1st Apr to 31 Dec 2020) = 6,006 suicides *N*2 predicted from 1st Apr to 31 Dec 2020 = 5,813 suicides	National	All	Census	Administrative registry (vital statistics)	Men: NA Mean: NA	Ecological (national mortality data)	Vital statistics - ICD 10	Suicide mortality	Suicide increased slightly (3%) across Mexico during the first nine months of the pandemic. Suicides remained stable in nineteen states, increased in seven states and decreased in six states. Suicide RR at the state level was positively associated with population density in 2020 and state level suicide death rate in 2019.
Borges et al. (2022b)	*N*1 observed from Apr 1 to Dec 31 2020 = 340 suicides *N*2 expected from Jan 2010 to Dec 2020 = 164 suicides	Local (City: CDMX)	All	Census	Administrative registry (vital statistics)	Men: NA Mean: NA	Ecological (CDMX mortality data)	Vital statistics - ICD 10	Suicide mortality	There was an overall increase in suicides during the first nine months of the pandemic. The increase began in the early months of the pandemic and remained stable and high after June 2020. Men and women, younger people (< 45) and older people (> 45) were affected. The increase was especially high among older women.

Table 1
Summary of longitudinal studies, time-trend, and repeated surveys (continued)

First author and publication year	*Sample size (n)*	*Research scope*	*Target population*	*Sampling method*	*Type of data collection*	*Sample characteristics (sex%, mean age in years)*	*Research design*	*Survey method and assessment tool*	*Mental health*	*Main outcomes*
Pirkis et al. (2021)	*N*1 (observed suicides Apr 1 to Jul 31 2020) = 182 *N*2 (expected suicides Jan 1 2019 to Mar 31 2020) = 192	International, (Mexican, Local data -CDMX- reported separately)	All	Census	Administrative registries or official public sector sources	Men: NA Mean: NA	Ecological (CDMX mortality data)	Vital statistics	Suicide mortality. RR = .91 (0.79−1.06)	There was no increase in suicide risk during the early months of the pandemic in CDMX.
Pirkis et al. (2022)	*N* = 34,856	International (Mexican data reported separately)	All	Census	Administrative registries or official public sector sources	Men: NA Mean: NA	Ecological (national mortality data)	Vital statistics	Suicide mortality	There was no significant difference in suicides in either time periods (pre and post COVID-19). Certain groups stand out as being more vulnerable: People of both sexes over sixty years of age (specifically women in this age group.).
Dominguez-González et al. (2022)	*N* = 247 W1: Apr 2020 W2: Dec 2020	Local (City: CDMX)	Medical undergraduate students	Census	Online survey	Men: 31.6% Mean: 20.7	Longitudinal	BDI-II; PSRS	SI in the past three months: W1 = 17.81% W2 = 18.62%	No significant differences were observed in the rate of SI between men and women in either period of time.
Valdez-Santiago et al. (2022)	*N*1 (Jul 2018 to Jun 2019) = 17,925 N2 (Nov 2020) = 4,913	Mexican National Health and Nutrition Surveys	Adolescents (ten to nineteen years old)	Probabilistic, multi-stage	Face-to-face	Men: NA Mean: NA	Cross-sectional (two measurements)	Direct interview in households with two “ad hoc” questions to inquire about SI and SB	SB in the past twelve months: W1 = 1.8% W2 = 2.1%	The prevalence of suicide attempts in the previous year was similar in both surveys. Risk factors are being women, youth in urban localities and individuals living in households where a family member had lost their job as a result of the COVID-19 contingency.
Borges et al. (2023)	*N* = 1,385 W1 pre-COVID19: Sep 2019 - Mar 2020 (N1 = 959) W2 COVID: Mar -Jun 2020 (N2 = 426)	National	College students from five universities	Census (72.8% response rate at baseline)	Online survey	Men: 35.01% Mean: NA	Longitudinal	Questions to inquire about SI and SB in the past twelve months	SI: W1 = 8.82%; W2 = 14.05% SB-plan: W1 = 4.12%; W2 = 5.34% SB-attempt: W1= 1.25%; W2 = 1.66%	There was an increase in the incidence of SI during the COVID-19 period compared to the pre-COVID-19 period. This increase was mostly found among students with heightened sense of vulnerability; poor coping skills and a prior mental disorder. No differences were observed in suicide plans or attempts.

Abbreviations: NA (Not Available); Alcohol Consumption (AC); Wave (W); CDMX (Mexico City); CAGE-Substance Abuse Screening Tool (CAGE-AID); Generalized Anxiety Disorder 7-Item (GAD-7); Depression, Anxiety, and Stress Scales (DASS-21); Hospital Anxiety and Depression Scale (HADS); Patient Health Questionnaire (PHQ); Implementation of HIV Pre-exposure Prophylaxis (ImPrEP); Encuesta Nacional de Salud y Nutrición (ENSANUT); Center for Epidemiological Studies Depression Scale (CESD); Beck Depression Inventory (BDI-II); Instituto Mexicano del Seguro Social (IMSS); Edinburgh Postnatal Depression Scale (EDS); Depressive Symptoms (DS); Rate Ratio (RR); Suicidal Ideation (SI); Plutchik Suicidal Risk Scale (PSRS); International Classification of Diseases, Tenth Revision (ICD-10); Suicide Behavior (SB). All months are abbreviated.

RESULTS

Our search by using common bibliographical databases yielded an initial 2,963 candidates, in addition to thirty-eight references located manually by the three authors. At the end of the process, we identified ninety-five references that included data for Mexico or, in a small number of reports, included Mexico as part of international surveys that only provided overall results. Six studies were published in 2020, thirty-seven in 2021, forty-six in 2022 and six by February 2023. Appendix A2 contains a list of these publications. In Table 1, we present a summary of studies using longitudinal, time-trend or repeated surveys for our six outcomes. In Annex A3-A8, we present detailed information with all studies for each outcome (Figure 1).

We classified these ninety-five papers on mental health issues and COVID-19 exploring the following issues: anxiety (n = 57), depression (n = 58), suicide (n = 19), sleep problems (n = 15), alcohol (n = 12), and gaming (n = 5).Of these papers, some examined a single issues: anxiety (n = 9), depression (n = 9), suicide (n = 10), sleep problems (n = 5), alcohol (n = 4), or gaming (n = 2). Most papers reported more than one issue, with anxiety and depression being the most common combination (n = 32), while thirteen reported three to four combinations (anxiety, depression, and suicide were reported in four publications, while one paper reported anxiety, depression, suicide, and sleep problems) (Figure 2).

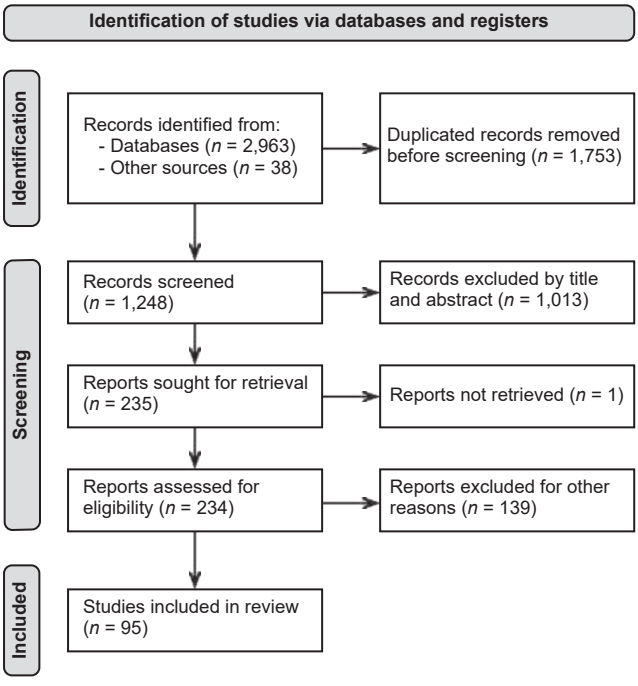

Figure 1. Identification of studies.

Alcohol use

We found twelve studies dealing with alcohol use during the pandemic, with only one also including information on drugs among elderly Facebook users (Pinelo Camacho et al., 2022). Several studies used standard instruments such as the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST), Alcohol Use Disorders Identification Test (AUDIT-C), and CAGE-Substance Abuse Screening Tool (CAGE-AID). Most studies used cross-sectional stand-alone one-time surveys among self-selected populations recruited by website advertising. Some of these surveys included questions on alcohol consumption during the pre-pandemic period that was used as a comparison with current alcohol use.

Two studies have distinctive methodology: a repeated survey of two large-scale national health and nutrition surveys (Encuesta Nacional de Salud y Nutrición, Spanish acronym Ensanut), one in 2018 and another in 2020.

(Barrera-Núñez et al., 2022), N 2018=50,654 and N 2020=10,216 is an exception in methodological terms. According to this report, "Alcohol consumption in women increased from 33.5% in 2018 to 42.5% in 2020. During the same period, the prevalence of excessive alcohol consumption decreased from 11.1% to 5.5% in women and from 36.7% to 18.3% in men," with no changes in alcohol consumption or excessive alcohol consumption being observed between the two periods (2018 to 2020) in adolescents. There was no report of response rates in either of the two surveys.

We found one longitudinal study (Domínguez-González et al., 2022) for a small group of 247 self-selected, under-

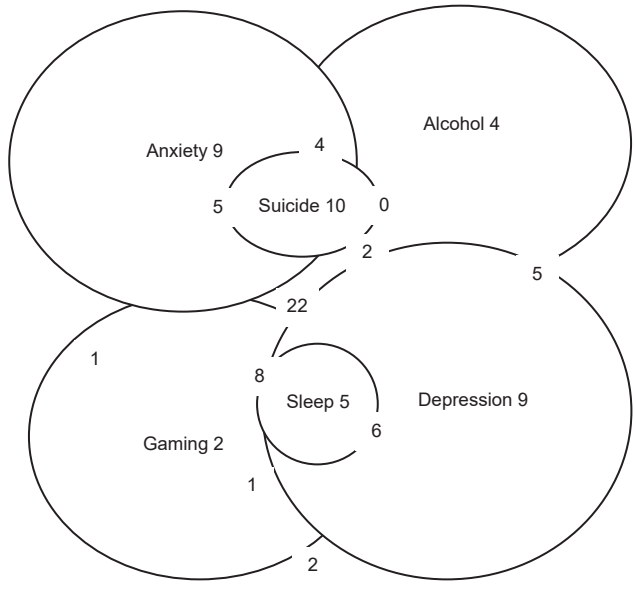

Figure 2. Classification of Studies.

graduate medical students. According to the authors "The prevalence of risky alcohol consumption was 11.74% in April and 13.77% in December ($\chi 2 = .500$)."

The conclusion of both these surveys, regarding the insignificant or null impact of the pandemic on heavy alcohol uses, contrasts with certain reports using one-time surveys among self-selected participants. For example, a small national survey of 866 participants, (Ibarrola-Peña et al., 2022) concluded that, "Participants used alcohol as a substance of choice to minimize the psychological effects of the COVID-19 pandemic. Substance use patterns were affected by the pandemic, with an increase in the number of users and consumption rate…". Other authors, using studies with a similarly limited methodology (Villaseñor-López et al., 2021) concluded, on the other hand, that "During the COVID-19 lockdown, the majority of the population indicated that they had not increased or decreased their consumption of alcoholic beverages."

The only survey including drugs (Pinelo Camacho et al., 2022) reported that in the previous thirty days, non-prescription tranquilizers had been used by 16.05% and marijuana by 7.89% of participants. Use of other illegal drugs did not exceed 2.6% of the population. No data is reported for the pre-COVID-19 period for the elderly population.

Anxiety

A total of fifty-seven reports in Mexico, explored anxiety symptoms during the pandemic. The modal study here is a one-time, cross-sectional survey of anxiety symptoms performed of a group of self-selected volunteers contacted through a website. This can be done locally, nationally or internationally. No study reported any response rates, and only rarely were self-selected samples reported as a possible limitation in the conclusions. Most of these reports used standard instruments for detecting anxiety symptoms. We identified fourteen different instruments used for anxiety (see Table A4 Anxiety, notes). Those instruments are not directly comparable, and some authors used the same instruments but with different cut-off points while others reported means of symptoms and still others reported the prevalence of a certain cut-off point. Time frames for prevalence also varied. Sample size varied widely from thirty-one military ophthalmologists (Mier-Bolio et al., 2020) to a survey with 18,449 respondents (Morales Chainé et al., 2022). A survey of 1,338,320 participants throughout Latin America was also reported (Herrera-Añazco et al., 2022), although no sample size or data are available for each country individually.

Some reports are more methodologically sound because they used a longitudinal design or multiple, repeat and comparable surveys. A study obtained a sample of 2,307 older adults in the State of Mexico, enrolled in social programs for older adults, with the first evaluation conducted between April 7 and 17, 2020 (wave 1- W1); wave 2 was completed the same year between May 10 and 22, and wave 3 was conducted between September 28 and October 5 (Betancourt-Ocampo et al., 2022). The authors concluded that more anxiety symptoms were observed among older adults in the last wave (prevalence of anxiety symptoms at W1 = 3.9%, W2 = 5.1% and W3 = 7.8%). However, the proportion of older adults identified with high scores was lower than that reported in national data, at least for depressive symptoms.

Another study focused on a longitudinal sample of teachers at two stages: pre-pandemic (November 2019, n = 1,152) and during the pandemic (June-July 2020 and June-July 2021, n = 1,088) (Cortés-Álvarez et al., 2022). This is the only study to report pre-pandemic prevalence. Extremely severe anxiety was reported by 9.93% prior to the pandemic, 10.75% in first measurement during the pandemic period and 13.33% in the second pandemic period. They concluded that "As the COVID-19 pandemic progressed, teachers experienced higher prevalence of severe anxiety symptoms, higher mean number of symptoms, especially among women…"

A small study of 109 health care workers (Jáuregui Renaud et al., 2021) was conducted from April to July 2020, with a second measurement being taken from December 2020 to January 2021 during the pandemic, with no pre-pandemic data. They concluded that, "During the first epidemic wave (April 2020), health workers reported acute stress related to COVID-19, which was related to state anxiety. After the first epidemic wave, acute stress decreased, with no increase during the second epidemic wave (December 2020), and further decreased when vaccination started."

Five repeated surveys of a national sample of cellphone respondents was performed (Teruel Belismelis & Pérez Hernández, 2021) on April 2020, n = 833, May 2020, n = 1,688, June 2020, n = 1,674, July 2020 n = 1,584 and August 2020, n = 1,538. Prevalence of anxiety in the previous two weeks, determined through the GAD-7 (see Table A4 of Anxiety, notes), remained stable during the pandemic: April 32.4%, May 31.4%, June 32.5%, July 30.9% and August 32.4%. The authors reported no pre-pandemic prevalence of anxiety for comparison.

Finally, a local longitudinal survey in the State of Mexico was conducted of 670 adult respondents (ages eighteen to sixty), on the list of beneficiaries of a government program interviewed first from April 8 to 18 2020 and subsequently from May 11 to 27 2020 (Toledo-Fernández et al., 2021). Prevalence of moderate to severe anxiety in the previous two weeks was 11.94% in the first measurement and 12.23% in the second. "No significant changes between the two waves" were observed.

Depression

A total of fifty-eight studies focused on depression. As with what was found for studies on anxiety symptoms, most

studies are one-time, cross-sectional surveys with online recruitment with various levels of aggregation (local, national and international). Response rates are not usually provided. Thirteen instruments (see Table A5 Depression) were used to screen for depression symptoms. The different time frames, populations, and age groups surveyed make comparisons difficult. One study reported data for just fourteen adolescents (Fernandes et al., 2020) while another surveyed 1,338,320 participants across Latin America (Herrera-Añazco et al., 2022), but no sample size or data are available for each country individually.

Several of the best reports we have identified for anxiety symptoms also included measurement for depression (see the section on Anxiety for the overall methodology of these studies), namely (Betancourt-Ocampo et al., 2022; Cortés-Álvarez et al., 2022; Jáuregui Renaud et al., 2021; Toledo-Fernández et al., 2021). Betancourt-Ocampo et al. (2022) found higher scores in the third wave with respect to the two previous ones. However, the proportion of older adults with high scores in depression was lower than that reported in national data. Cortés-Álvarez (Cortés-Álvarez et al., 2022) reported a prevalence of extremely severe depression symptoms during the pre-pandemic of 8% and for two periods during the pandemic, of 8.55% from June to July 2020 and of 9.28% from June to July 2021. No significant differences in depression were reported. The study by Jauregui did not report changes in depression symptoms and concluded that "The second epidemic wave reported more symptoms of depression in association with acute stress, state anxiety, and burnout."

Another three longitudinal studies focused on depression symptoms alone. The first was a small study of participants in HIV pre-exposure prophylaxis (IMPrEP), interviewed in 2019 (with a prevalence of 8.6% of depression symptoms according to CED-D in the past week) and again in 2020 (prevalence of 53.3%), compared with a national prevalence of 10.4% reported by the ENSANUT 2018 (Cerecero-Garcia et al., 2021). This is one of the few studies to report response rates (29% of those invited to take part and 67% of participants who completed the survey). The authors concluded that, "Our findings suggest high levels of depression among MSM and TGW in Mexico during the COVID-19 pandemic."

Another longitudinal study of a sample of 247 medical undergraduate students at La Salle University in Mexico City using the Beck Depression Inventory (with no response rate being reported) found that in April 2020, the prevalence of depression during the past two weeks had been 19.84% (23.67% in women and 11.54% in men) whereas in December 2020, it had been 40.08% (42.60% in women and 34.62% in men). They concluded that, "The pandemic has increased the rate of depression in medical students, being more severe in women and those without previous psychiatric treatment."

Finally, a longitudinal study of 466 expectant mothers first interviewed in 2018-2019 and subsequently in May–November 2020 was reported using the Edinburgh Postnatal Depression Scale (Rivera-Rivera et al., 2021). No response rate was provided. Prevalence of depression symptoms in the past seven days was 19.5% at baseline (2018-2019) and 19.1% in 2020. The authors concluded that, "While we did not find significant differences in the prevalence of depression before and during the pandemic, we did find that the direction of the change in depressive symptoms during a global pandemic was predicted by both negative life events and social support."

Gaming

Only five studies reported on gaming or internet use during the pandemic. Given the dearth of studies in Mexico in the past decade, since the definition of internet gaming disorder in the DSM-5, the lack of interest in the topic by researchers is hardly surprising, even though concern was expressed during the pandemic about the increased time spent on online games among youth. Three out the five studies were international efforts that included Mexico and only two were stand-alone surveys in Mexico. One of these international studies (Fernandes et al., 2020) only surveyed 185 self-selected students (including fourteen in Mexico) and a single cross-sectional survey concluded that "adolescents have generally increased their use of social media sites and streaming services." The other studies delved into risk factors for internet use during the pandemic, such as being infected with COVID-19 or fears associated with COVID-19. No clear conclusion is possible from these limited studies.

Sleep problems

A total of fifteen studies included data on sleep problems or quality (SQ) during the pandemic. They were almost all based on convenience samples without pre-COVID-19 data, except for one study of students (Delgadillo-Arteaga et al., 2021). These studies usually only have 25%-35% of male participants, but regardless of this limitation, several studies concluded that women were more affected than men. While some studies were very small (for example, (Arrona-Palacios et al., 2022) $N = 214$, a large study of healthcare workers was also reported (Robles et al., 2021a) $N = 4{,}670$.

This last study was timely, since it was conducted at an early stage of the pandemic (between May 8 and August 18, 2020) and focused on healthcare workers. It used standard instruments, adhered to ethical guidelines, performed rigorous data analyses and was cautious about its conclusions. It also shows the limitations of open platforms for the online recruitment of early studies. According to the authors, "Mexican HCWs were invited to participate in the survey through official media," and "A convenience sample of Mexican

nurses, general practitioners, medical residents and specialists was obtained by inviting healthcare workers dealing with COVID-19 patients to complete an online, cross-sectional survey." Although it stated that, "The study target population includes approximately 315,000 nurses, 270,600 general practitioners, 22,613 medical residents, and 147,910 medical specialists," there was no attempt to calculate or report on response rates by basic demographics or target population. Comparisons were not age/sex standardized. It did not use Mexican data on healthcare workers to compare them with those in this survey, at least for some variables such as depression. The authors concluded that insomnia was "more frequent in frontline healthcare workers and women," which was attributable to their lack of rest time.

Other studies with convenience samples were less cautious about attributing sleep alterations to the pandemic, such as the one by (Rodríguez-Hernández et al., 2021): "The quality and quantity of sleep has been severely affected during the COVID-19 pandemic."

Suicidal thoughts and behaviours

There were four reports on suicide deaths using modern time-trend methodology (Borges et al., 2022a; 2022b; Pirkis et al., 2022; 2021). These reports showed that, depending on the stage of the pandemic and the number of years used for comparison with the COVID-19 period, suicide increased or decreased slightly in Mexico. Suicide remained stable during the first nine months of COVID-19 in nineteen states, decreased in seven, and increased in six. Mixed trends were also reported when Mexico was included in international comparisons, particularly when age/sex groups were examined separately.

Five studies reported on suicide attempts, including a longitudinal study of university students (Borges et al., 2023) and a repeated cross-sectional face-to-face national survey (Valdez-Santiago et al., 2022). Neither surveys observed an increase in suicide attempts during the pandemic. The other three surveys used convenience samples of self-selected internet users and although they explored risk factors for suicide attempts during the pandemic, did not comment on trends.

Studies on suicide ideation were far more common. Comparison of results is difficult because these studies used different instruments, time periods for measuring prevalence and cut-off points for caseness. Most surveys were cross-sectional, using self-selected samples without any controls for suicide ideation prior to the pandemic. The risk factors for suicide ideation in these cross-sectional surveys varied widely, depending on the interest of the authors. A few studies on suicide ideation included a longitudinal comparison (Domínguez-González et al., 2022) of suicide ideation in two comparable surveys (Valdez-Santiago et al., 2022), with neither report finding differences in suicide ideation in the two measurements (pre- and during COVID-19). Another longitudinal study including suicide ideation (Borges et al., 2023) concluded that there had been an increase in the incidence of suicide ideation during the COVID-19 period compared to the pre-COVID-19 period. This increase was mostly found among students with a greater sense of vulnerability, poor coping skills and a previous mental disorder.

DISCUSSION AND CONCLUSION

In Mexico, as elsewhere, the COVID-19 pandemic led to urgent efforts to address its possible mental health consequences. This urgency yielded an initial wave of studies that were mostly cross-sectional and based on self-selected samples of respondents recruited through websites. Prevalences obtained from these samples, including the largest ones, are not representative of the Mexican population or of certain sectors of the population (such as students or the elderly). While several of these cross-sectional surveys included validated instruments for screening for symptoms of mental disorders (anxiety, depression, and alcohol use disorders), the prevalence they reported is not directly comparable with surveys prior to the pandemic period, as recruitment methods varied. Moreover, most surveys fail to provide readers with any Mexican data collected before COVID-19. While some of these prevalences found during COVID-19 are alarming, we have no way of knowing how much they differ from previous estimates. Although Mexico lacks a large stock of national or local surveys of the general population or specific groups to compare with surveys taken during COVID-19, efforts to gather this information are valuable. For example, during COVID-19, a 17.5% prevalence of Depression Symptoms (DS) in the past seven days was reported among pregnant women using the Edinburgh Depression Scale (Medina-Jiménez & Ródenas, 2022). A search of common databases yielded a national study, the Mexican National Health and Nutrition Survey (Instituto Nacional de Salud Pública, 2012) in which DS were measured by CESD-7, showing a prevalence of 21.36% (de Castro et al., 2017). Data were also obtained from the National Addictions Survey (ENA) 2008 on women pregnant at the time of the interview, among whom the prevalence of depressive symptoms was 16.2% (CES-D $\geq$ 16) (Lara-Cantú et al., 2014). These earlier national estimates could shed light on figures reported by cross-sectional studies during the COVID-19 period, with the caveat that some of these pre-COVID-19 studies are not representative of a specific population.

Limited efforts in Mexico to provide pre- and post-COVID-19 estimates were found, together with longitudinal studies, mostly performed at two or more time points of data collection during the pandemic. Some longitudi-

nal or repeated surveys lacked a pre-COVID-19 estimate to compare with the COVID-19 period. It is important to distinguish between two issues explored by longitudinal or repeated surveys. One is whether the prevalence of mental health symptoms increased during COVID-19, compared with the pre-pandemic period. In Mexico this was explored by comparing national surveys prior to and during COVID-19 on alcohol use (Barrera-Núñez et al., 2022), time-trend studies on suicide (Borges et al., 2022a; 2022b), suicide ideation and attempts by cohort (Borges et al., 2023) and repeated surveys (Valdez-Santiago, 2022). A second issue, also addressed by Mexican researchers, is whether the symptoms of mental health problems changed during the initial and subsequent phases of the pandemic, as borne out by studies on alcohol (Domínguez-González et al., 2022), anxiety (Betancour-Ocampo et al., 2022), depression (Toledo-Fernández et al., 2021), suicide ideation (Domínguez-González et al., 2022), and a range of mental health outcomes (Robles et al., 2021a; Robles et al., 2021b). As mentioned earlier, cohort studies and large-scale international time-trend studies have found fewer mental health consequences of the COVID-19 pandemic than cross-sectional studies of the early phase of the pandemic. Accordingly, the results of these fourteen longitudinal datasets in Mexico suggest a more cautious interpretation of the effects of the COVID-19 pandemic on the mental health of Mexicans. This conclusion is in line with recent meta-analyses on the issue (Witteveen et al., 2023; Ahmed et al., 2023). A meta-analysis of longitudinal studies on mental health and COVID-19 even reported that "anxiety and depression symptoms may have decreased from baseline to follow up, while other mental health problems showed no change" (Cénat et al., 2022).

In conclusion, the COVID-19 pandemic resulted in a series of initial quick studies which, while serving as a warning sign, did not necessarily follow standard epidemiological principles. These initial efforts were followed by rigorous epidemiological studies. An earlier review of the international literature on COVID-19 and mental health suggested several areas for improvement for new studies: better definition of outcomes and use of standard instruments, reports on symptom severity, and definition of sample characteristics and response rates, to define and expand the population under study and the use of more longitudinal study designs (Chen et al., 2022). These suggestions for improving results should obviously be implemented in Mexico, to enhance preparedness and offer guidance for future contingencies.

Registration and protocol

This review was not registered, and no protocol is available.

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Conflicts of interest

The authors declare they have no conflicts of interest.

REFERENCES

Ahmed, N., Barnett, P., Greenburgh, A., Pemovska, T., Stefanidou, T., Lyons, N., Ikhtabi, S., Talwar, S., Francis, E. R., Harris, S. M., Shah, P., Machin, K., Jeffreys S., Mitchell, L., Lynch, C., Foye, U., Schlief, M., Appleton, R., Saunders, K. R. K., ... Johnson, S. (2023). Mental health in Europe during the COVID-19 pandemic: a systematic review. *The Lancet Psychiatry*, *10*(7), 537-556. https://doi.org/10.1016/S2215-0366(23)00113-X

Arrona-Palacios, A., Rebolledo-Mendez, G., Escamilla, J., Hosseini, S., & Duffy, J. (2022). Effects of COVID-19 lockdown on sleep duration, sleep quality and burnout in faculty members of higher education in Mexico. *Ciência & Saúde Coletiva*, *27*(8), 2985-2993. https://doi.org/10.1590/1413-81232022278.04322021

Barrera-Núñez, D. A., Rengifo-Reina, H. A., López-Olmedo, N., Barrientos-Gutiérrez, T., & Reynales-Shigematsu, L. M. (2022). Changes inalcohol and tobacco consumption patterns before and during the COVID-19 pandemic. Ensanut 2018 and 2020. *Salud Pública de México*, *64*(2), 137-147. https://doi.org/10.21149/12846

Betancourt-Ocampo, D., Toledo-Fernández, A., & González-González, A. (2022). Mental Health Changes in Older Adults in Response to the COVID-19 Pandemic: A Longitudinal Study in Mexico. *Frontiers in Public Health*, *10*, 848635. https://doi.org/10.3389/FPUBH.2022.848635

Borges, G., Garcia, J. A., Pirkis, J., Spittal, M. J., Gunnell, D., Sinyor, M., & John, A. (2022a). A state level analyses of suicide and the COVID-19 pandemic in Mexico. *BMC Psychiatry*, *22*(1), 460. https://doi.org/10.1186/S12888-022-04095-8

Borges, G., Garcia, J. A., Sinyor, M., Spittal, M. J., Lopez-Arellano, O., & Pirkis, J. (2022b). Suicide after and during the COVID-19 pandemic in Mexico City. *Brazilian Journal of Psychiatry*, *44*(4), 409-415. https://doi.org/10.47626/1516-4446-2022-2501

Borges, G., Orozco, R., Gunnell, D., Gutiérrez-García, R. A., Albor, Y., Quevedo Chávez, G. E., Hernández Uribe, P. C., Cruz Hernández, S., Covarrubias Díaz Couder, M. A., Alonso, J., Medina-Mora, M. E., & Benjet, C. (2023). Suicidal Ideation and Behavior Among Mexican University Students Before and During the COVID-19 Pandemic. *Archives of Suicide Research*, *28*(1), 342-357. https://doi.org/10.1080/13811118.2023.2176270

Bramer, W. M., Giustini, D., de Jonge, G. B., Holland, L., & Bekhuis, T. (2016). De-duplication of database search results for systematic reviews in EndNote. *Journal of the Medical Library Association*, *104*(3), 240-243. https://doi.org/10.3163/1536-5050.104.3.014

Cénat, J. M., Farahi, S. M. M. M., Dalexis, R. D., Darius, W. P., Bekarkhanechi, F. M., Poisson, H., Broussard, C., Ukwu, G., Auguste, E., Nguyen, D. D., Sehabi, G, Furyk, S. E., Gedeon, A. P., Onesi, O., El Aouame, A. M., Khodabocus, S. N., Shah, M. S., & Labelle, P. R. (2022). The global evolution of mental health problems during the COVID-19 pandemic: A systematic review and meta-analysis of longitudinal studies. *Journal of Affective Disorders*, *315*, 70-95. https://doi.org/10.1016/J.JAD.2022.07.011

Cerecero-Garcia, D., Vermandere, H., Bojorquez, I., Gómez-Castro, J., Arturo Sánchez-Ochoa, J., Martínez-Dávalos, A., Huerta-Icelo, I., & Bautista-Arredondo, S. (2021). Profiles of Depressive Symptoms Among Men Who Have Sex With Men and Transgender Women During the COVID-19 Outbreak in Mexico: A Latent Class Analysis. *Frontiers in Public Health*, *9*, 598921. https://doi.org/10.3389/FPUBH.2021.598921

Chen, J., Zhang, S. X., Yin, A., & Yáñez, J. A. (2022). Mental health symptoms during the COVID-19 pandemic in developing countries: A systematic review and meta-analysis. *Journal of Global Health*, *12*, 05011. https://doi.org/10.7189/JOGH.12.05011

Cortés-Álvarez, N. Y., Garduño, A. S., Sánchez-Vidaña, D. I., Marmolejo-Murillo, L. G., & Vuelvas-Olmos, C. R. (2022). A Longitudinal Study of the Psychological State of Teachers Before and During the COVID-19 Outbreak in Mexico. *Psychological Reports*, *126*(6), 2789-2820. https://doi.org/10.1177/00332941221100458

de Castro, F., Place, J. M., Villalobos, A., Rojas, R., Barrientos, T., & Frongillo, E. A. (2017). Poor early childhood outcomes attributable to maternal depression in

Mexican women. *Archives of Women's Mental Health*, *20*(4), 561-568. https://doi.org/10.1007/S00737-017- 0736-7

Delgadillo-Arteaga, B. K., Garduño-García, J. D. J., Camarillo-Romero, M. D. S., Camarillo-Romero, E. D. S., Huitron-Bravo, G. G., & Montenegro Morales, L. P. (2021). Associationbetween sleep quality and eating behavior in university students in the contingencyfor COVID-19. *Revista Española de Nutrición Humana y Dietética*, *25*, 1361. https://doi.org/10.14306/RENHYD.25.S2.1361

Domínguez-González, A. D., Guzmán-Valdivia, G., Ángeles-Téllez, F. S., Manjarrez-Ángeles, M. A., & Secín-Diep, R. (2022). Depression and suicidal ideation in Mexican medical students during COVID-19 outbreak. A longitudinal study. *Heliyon*, *8*(2), e08851. https://doi.org/10.1016/j.heliyon.2022.e08851

Fernandes, B., Biswas, U. N., Tan-Mansukhani, R., Vallejo, A., & Essau, C. A. (2020). The impact of COVID-19 lockdown on internet use and escapism in adolescents. *Revista de Psicología Clínica con Niños y Adolescentes*, *7*(3), 59-65. https://doi.org/10.21134/RPCNA.2020.MON.2056

GBD-COVID-19 Mental Disorders Collaborators. (2021). Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID- 19 pandemic. *The Lancet*, *398*(10312), 1700-1712. https://doi.org/10.1016/S0140-6736(21)02143-7

Hernández-Díaz, Y., Genis-Mendoza, A., Ramos-Méndez, M., Juárez-Rojo, I., Tovilla-Zárate, C., González-Castro, T., López-Narváez, M. L., & Nicolini, H. (2022). Mental Health Impact of the COVID-19 Pandemic on Mexican Population: A Systematic Review. *International Journal of Environmental Research and Public Health*, *19*(11), 6953. https://doi.org/10.3390/ijerph19116953

Herrera-Añazco, P., Urrunaga-Pastor, D., Benites-Zapata, V. A., Bendezu-Quispe, G., Toro- Huamanchumo, C. J., & Hernandez, A. V. (2022). Gender Differences in Depressive and Anxiety Symptoms During the First Stage of the COVID-19 Pandemic: A Cross-Sectional Study in Latin America and the Caribbean. *Frontiers in Psychiatry*, *13*, 727034. https://doi.org/10.3389/FPSYT.2022.727034

Ibarrola-Peña, J. C., Cueto-Valadez, T. A., Chejfec-Ciociano, J. M., Cifuentes-Andrade, L. R., Cueto-Valadez, A. E., Castillo-Cardiel, G., Cervantes-Cardona, G. A., Cervantes-Pérez, E., Cervantes-Guevara, G., Guzmán-Ruvalcaba, M. J., Sapién-Fernández, J. H., Guzmán-Barba, J. A., Esparza-Estrada, I., Flores-Becerril, P., Brancaccio-Pérez, I. V., Guzmán-Ramírez, B. G., Álvarez-Villaseñor, A. S., Barbosa-Camacho, F. J., Reyes-Elizalde, E. A., ... González- Ojeda, A. (2022). Substance Use and Psychological Distress in Mexican Adults during COVID-19 Pandemic: A Cross-Sectional Study. *International Journal of Environmental Research and Public Health*, *20*(1), 716. https://doi.org/10.3390/IJERPH20010716

Instituto Nacional de Salud Pública. (2012). *Encuesta Nacional de Salud y Nutrición*. Retrieved from https://ensanut.insp.mx/encuestas/ensanut2012/informes.php - September 9, 2023.

Jáuregui Renaud, K., Cooper-Bribiesca, D., Martínez-Pichardo, E., Miguel Puga, J. A., Rascón-Martínez, D. M., Sánchez Hurtado, L. A., Colin Martínez, T., Espinosa-Poblano, E., Anda-Garay, J. C., González Diaz, J. I., Cardeña, E., & Avelar Garnica, F. (2021). Acute Stress in Health Workers during Two Consecutive Epidemic Waves of COVID-19. *International Journal of Environmental Research and Public Health*, *19*(1), 206. https://doi.org/10.3390/IJERPH19010206

Kunzler, A. M., Röthke, N., Günthner, L., Stoffers-Winterling, J., Tüscher, O., Coenen, M., Rehfuess, E., Schwarzer, G., Binder, H., Schmucker, C., Meerpohl, J. J., & Lieb, K. (2021). Mental burden and its risk and protective factors during the early phase of the SARS-CoV-2 pandemic: systematic review and meta-analyses. *Globalization and Health*, *17*(1), 34. https://doi.org/10.1186/S12992-021-00670-Y

Lara Cantú, M. A., Natera-Rey, G., Berenzon Gorn, S., Juárez-García, F., Villatoro-Velázquez, J., Nieto García, L., & Medina-Mora, M. E. (2014). Violencia de pareja y sintomatología depresiva en mujeres embarazadas mexicanas: resultados de una encuesta nacional. *Revista de Investigación Clínica*, *66*(5), 431-438.

Ma, L., Mazidi, M., Li, K., Li, Y., Chen, S., Kirwan, R., Zhou, H., Yan, N., Rahman, A., Wang, W., & Wang, Y. (2021). Prevalence of mental health problems among children and adolescents during the COVID-19 pandemic: A systematic review and meta-analysis. *Journal of Affective Disorders*, *293*, 78-89. https://doi.org/10.1016/J.JAD.2021.06.021

Medina-Jiménez, S., & Ródenas, L. (2022). La ansiedad en deportistas universitarios durante la cuarentena por COVID-19. *Cuadernos de Psicología del Deporte*, *22*(2), 33-46. https://doi.org/10.6018/cpd.430721

Mier-Bolio, J. R., Arroyo-González, J., Baques-Guillén, E., Valdez-Lopez, J. F., Torre-García, À. J., Rodríguez-Rodríguez, O. E., & Rivera-Arroyo, G. (2020). COVID-19 y ansiedad en oftalmólogos. *Revista Mexicana de Oftalmología*, *94*(6), 247-251. https://doi.org/10.24875/RMO.M20000130

Morales Chainé, S., Robles García, R., Bosch, A., & Treviño Santa Cruz, C. L. (2022). Depressive, Anxious, and Post-Traumatic Stress Symptoms Related to Violence during the COVID-19 Pandemic, by Sex, COVID-19 Status, and Intervention-Seeking Conditions among the General Population. *International Journal of Environmental Research and Public Health*, *19*(19), 12559. https://doi.org/10.3390/IJERPH191912559

Pierce, M., McManus, S., Jessop, C., John, A., Hotopf, M., Ford, T., Hatch, S., Wessely, S., & Abel, K. M. (2020). Says who? The significance of sampling in mental health surveys during COVID-19. *The Lancet. Psychiatry*, *7*(7), 567-568. https://doi.org/10.1016/S2215- 0366(20)30237-6

Pinelo Camacho, K. E., Pavón-León, P., Salas-Garcia, B., De San Jorge-Cárdenas, X., Beverido Sustaeta, P., & Mejorada-Fernandez, J. S. (2022). Consumptionof legaland illegal drugs and depressive symptoms in older adults during the SARS-CoV-2 pandemic in Mexico. *Revista Española de Geriatría y Gerontología*, *57*(5), 273-277. https://doi.org/10.1016/J.REGG.2022.07.002

Pirkis, J., Gunnell, D., Shin, S., Del Pozo-Banos, M., Arya, V., Aguilar, P. A., Appleby, L., Yasir Arafat, S. M., Arensman, E., Ayuso-Mateos, J. L., Singh Balhara, Y. P., Bantjes, J., Baran, A., Behera, C., Bertolote, J., Borges, G., Bray, M., Brečić, P., Caine, E., ... Spittal, M. (2022). Suicide numbers during the first 9-15 months of the COVID-19 pandemic compared with pre-existing trends: An interrupted time series analysis in 33 countries. *EClinicalMedicine*, *51*, 101573. https://doi.org/10.1016/j.eclinm.2022.101573

Pirkis, J., John, A., Shin, S., Del Pozo-Banos, M., Arya, V., Analuisa-Aguilar, P., Appleby, Arensman, E., Bantjes, J., Baran, A., Bertolote, J. M., Borges, G., Brečić, P., Caine, E., Castelpietra, G., Chang, S.-S., Colchester, D., Crompton, D., Curkovic, M., ... Spittal, M. J. (2021). Suicide trends in the early months of the COVID-19 pandemic: an interrupted time- series analysis of preliminary data from 21 countries. *The Lancet Psychiatry*, *8*(7), 579-588. https://doi.org/10.1016/S2215-0366(21)00091-2

Prati, G., & Mancini, A. D. (2021). The psychological impact of COVID-19 pandemic lockdowns: a review and meta-analysis of longitudinal studies and natural experiments. *Psychological Medicine*, *51*(2), 201-211. https://doi.org/10.1017/S0033291721000015

Rivera Rivera, N. Y., McGuinn, L., Osorio-Valencia, E., Martinez-Medina, S., Schnaas, L., Wright, R. J., Téllez-Rojo, M. M., Wright, R. O., Tamayo-Ortiz, M., & Rosa, M. J. (2021). Changes in Depressive Symptoms, Stress and Social Support in Mexican Women during the COVID-19 Pandemic. *International Journal of Environmental Research and Public Health*, *18*(16), 8775. https://doi.org/10.3390/IJERPH18168775

Robles, R., Morales-Chainé, S., Bosch, A., Astudillo-García, C., Feria, M., Infante, S., Alcocer-Castillejos, N., Ascencio, L., Real-Ramírez, J., Díaz, D., Gómez-Estrada, H. F., Becerra, C., Escamilla, R., López-Montoya, A., Beristain-Aguirre, A., Vega, H., Álvarez-Icaza, D., Rodríguez, E., Durand, S., ... Madrigal de León, E. A. (2021a). Mental Health Problems among COVID-19 Frontline Healthcare Workers and the Other Country-Level Epidemics: The Case of Mexico. *International Journal of Environmental Research and Public Health*, *19*(1), 421. https://doi.org/10.3390/IJERPH19010421

Robles, R., Rodríguez, E., Vega-Ramírez, H., Álvarez-Icaza, D., Madrigal, E., Durand, S., Morales-Chainé, S., Astudillo, C., Real-Ramírez, J., Medina-Mora, M. E., Becerra, C., Escamilla, R., Alcocer-Castillejos, N., Ascencio, L., Díaz, D., González, H., Barrón-Velázquez, E., Fresán, A., Rodríguez-Bores, L., ... Reyes-Terán, G. (2021b). Mental health problems among healthcare workers involved with the COVID-19 outbreak. *Brazilian Journal of Psychiatry*, *43*(5), 494-503. https://doi.org/10.1590/1516-4446-2020-1346

Rodríguez-Hernández, C., Medrano-Espinosa, O., & Hernández-Sánchez, A. (2021). Mental health of the Mexican population during the COVID-19 pandemic. *Gaceta Médica de México*, *157*(3), 220-224. https://doi.org/10.24875/GMM.M21000549

Santomauro, D. F., Mantilla Herrera, A. M., Shadid, J., Zheng, P., Ashbaugh, C., Pigott, D. M., Abbafati, C., Adolph, C., Amlag, J. O., Aravkin, A. Y., Bang-Jensen, B. L., Bertolacci, G. J., Bloom, S. S., Castellano, R., Castro, E., Chakrabarti, S., Chattopadhyay, J., Cogen, R. M., Collins, J. K., … Ferrari, A. J. (2021). Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. *The Lancet*, *398*(10312), 1700-1712. https://doi.org/10.1016/S0140-6736(21)02143-7

Teruel Belismelis, G., & Pérez Hernández, V. H. (2021). Estudiando el bienestar durante la pandemia de Covid-19: la Encovid-19. *Revista Mexicana de Sociología*, *83*, 125-167. https://doi.org/10.22201/IIS.01882503P.2021.0.60071

Toledo-Fernández, A., Betancourt-Ocampo, D., & González-González, A. (2021). Distress, Depression, Anxiety, and Concerns and Behaviors Related to COVID-19 during the First Two Months of the Pandemic: A Longitudinal Study in Adult MEXICANS. *Behavioral Sciences*, *11*(5), 76. https://doi.org/10.3390/BS11050076

Valdez-Santiago, R., Villalobos, A., Arenas-Monreal, L., González-Forteza, C., Hermosillo-de- la-Torre, A. E., Benjet, C., & Wagner, F. A. (2022). Comparison of suicide attempts among nationally representative samples of Mexican adolescents 12 months before and after the outbreak of the COVID-19 pandemic. *Journal of Affective Disorders*, *298*, 65-68. https://doi.org/10.1016/J.JAD.2021.10.111

Villaseñor Lopez, K., Jimenez Garduño, A. M., Ortega Regules, A. E., Islas Romero, L. M., Gonzalez Martinez, O. A., & Silva Pereira, T. S. (2021). Cambios en el estilo de vida y nutrición durante el confinamiento por SARS-CoV-2 (COVID-19) en México: un estudio observacional. *Revista Española de Nutrición Humana y Dietética*, *25*(Supp 2), e1099. https://doi.org/10.14306/renhyd.25.S2.1099

Witteveen, A. B., Young, S. Y., Cuijpers, P., Ayuso-Mateos, J. L., Barbui, C., Bertolini, F., Cabello, M., Cadorin, C., Downes, N., Franzoi, D., Gasior, M., Gray, B., Melchior, M., van Ommeren, M., Palantza, C., Purgato, M., van der Waerden, J., Wang, S., & Sijbrandij, M. (2023). COVID-19 and common mental health symptoms in the early phase of the pandemic: An umbrella review of the evidence. *PLoS Medicine*, *20*(4), e1004206. https://doi.org/10.1371/JOURNAL.PMED.1004206

World Health Organization [WHO]. (2022). *Mental Health and COVID-19: Early evidence of the pandemic's impact: Scientific brief*, 2 March 2022. WHO.

Worldometer. (2023). *Worldometer. COVID-19 data. Coronavirus Cases in Mexico*. Worldometer. Retrieved from https://www. worldometers.info/coronavirus/country/mexico/ - September 9, 2023.

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REVIEW ARTICLE
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Suicidal Behavior in Graduate Students in the Context of the Covid-19 Pandemic: Scoping Review

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ABSTRACT

Background. Graduate students experienced mental distress during the pandemic. This was perceived through the narration of students' frustrations and the emergence of new situations to which both students and advisors were forced to adapt. **Objective.** To map evidence of suicidal behavior in graduate students in the context of the COVID-19 pandemic. **Method.** This is a scoping review. The eligibility criteria were: Participants—graduate students. Concept—suicidal behavior. Context—COVID-19 pandemic. The search strategy was applied to MEDLINE®/PubMed® and adapted for the following databases: EMBASE® (Elsevier), CINAHL®/EBSCO, LILACS®/BVS, PsycINFO®, and Web of Science. The review considered primary research studies with quantitative and qualitative designs. Although there were no language restrictions, there was a limit regarding the start of the new coronavirus in December 2019. **Results.** Eleven articles were included in the analysis of this review. It was found that the majority of studies were published in 2022. Master's students were more frequently investigated for the presence of suicidal ideation, while doctoral students were studied for the presence of suicidal ideation, suicide plan, suicide attempt, and suicide. The presence of suicidal ideation ranged from 6.87% to 40%. The PHQ-9 questionnaire was the most commonly used instrument to assess suicidal ideation. **Discussion and conclusion.** The findings provide support for institutional strategies to prevent suicidal behavior in graduate students.

Keywords: Self-destructive behavior, graduate education, mental health, COVID-19.

RESUMEN

Antecedentes. Los estudiantes de posgrado experimentaron un proceso de angustia mental en el escenario de la pandemia. Esto se percibió a través de la narración de las frustraciones de los estudiantes y la aparición de nuevas situaciones que necesitaban ser adaptadas tanto por los estudiantes como por los asesores. **Objetivo.** Mapear evidencias de comportamiento suicida en estudiantes de posgrado en el contexto de la pandemia de COVID-19. **Método.** En esta revisión de alcance, los criterios de elegibilidad fueron: aplicar la estrategia de búsqueda en MEDLINE®/PubMed® que se adaptó en las bases de datos: EMBASE® (Elsevier), CINAHL®/EBSCO, LILACS®/BVS, PsycINFO® y Web of Science. La revisión consideró estudios de investigación primaria, con diseños cuantitativos y cualitativos. No hubo limitaciones en cuanto al idioma. Se estableció una limitación en relación con la fecha de aparición del nuevo coronavirus, en diciembre de 2019. **Resultados.** En esta revisión, se analizaron once artículos, la mayoría de ellos publicados en 2022. Los estudiantes de maestría fueron investigados con mayor frecuencia en relación con la presencia de ideación suicida, mientras que los estudiantes de doctorado fueron estudiados en relación con la presencia de ideación suicida, planificación de suicidio, intento de suicidio y suicidio consumado. La presencia de ideación suicida varió entre el 6.87% y el 40%. **Discusión y conclusión.** Los hallazgos proporcionan apoyo para estrategias institucionales de prevención del comportamiento suicida en estudiantes de posgrado.

Palabras clave: Comportamiento autodestructivo, educación de posgrado, salud mental, COVID-19.

INTRODUCTION

Suicidal behavior encompasses a desire to hasten death, indirect self-destructive behavior, parasuicide, deliberate self-harm, suicide attempt, self-mutilation, and suicide (Goodfellow et al., 2019; 2018). According to the World Health Organization [WHO] (2021), suicide is considered a global public health issue, with further studies being required on this phenomenon.

Health emergencies influence mental health. Situations or environments of social isolation to contain the rapid progression of severe acute respiratory syndromes contribute to increased concern about the short- and long-term impacts on mental health (MRC Centre for Global Infectious Disease Analysis, 2020). On December 31, 2019, the World Health Organization (WHO) was alerted to several cases of pneumonia in the city of Wuhan, Hubei province, in China. The virus was officially named SARS-CoV-2, while the disease was called COVID-19 (Liu et al., 2020). On January 30, 2020, WHO declared that the outbreak of the new coronavirus constituted a public health emergency of international concern. On March 11, 2020, COVID-19 was characterized by WHO as a pandemic (Pan American Health Organization [PAHO], 2022). On May 5, 2023, the end of the public health emergency of international concern related to COVID-19 was declared (PAHO, 2023).

COVID-19 spread rapidly across the world. Epidemiological data demonstrated that the SARS-CoV-2 virus was transmitted by droplets, resulting in a swift increase in new cases and a global outbreak. On March 11, 2020, the World Health Organization declared the SARS-CoV-2 outbreak a global pandemic (Bordallo et al., 2020; Silveira et al., 2020).

The COVID-19 pandemic has impacted the everyday lives of people worldwide. Measures were required to address the infection. Changes in social behavior occurred as a result of the implementation of lockdown as a means of containing mass infection in certain countries, causing psychological, environmental, political, and economic effects worldwide (Barcelos et al., 2021). Homes became the setting for online classes, changing from merely residences to schools and workplaces (Mascaro, 2020).

In this scenario, the Pan American Health Organization (PAHO) warned that the COVID-19 pandemic had exacerbated risk factors associated with suicidal behaviors (PAHO, 2021; 2022). Although having a mental disorder is already a risk factor for suicidal behavior, this was exacerbated by the COVID-19 pandemic. Nevertheless, scope review indicates that studies exploring the correlation between suicidal behavior and the outbreak of the pandemic remain controversial (Barlattani et al., 2023).

Due to the changes it caused, the pandemic has led to the emergence of stress-related anxiety and depressive symptoms that can persist for long periods. These symptoms give rise to risky behavior linked to a sense of hopelessness about the near future (Giamattey et al., 2022). Moreover, it has been observed that the COVID-19 pandemic has increased suicide risk factors, such as job loss and economic hardship, trauma, abuse, and mental disorders, as well as creating barriers to accessing healthcare (PAHO, 2021).

Within the context of the COVID-19 pandemic, graduate students warrant attention due to their vulnerability to mental health issues. These issues may be linked to the exploitation of academics class and the lack of research grants or the limited funding for research in recent years (Silva, 2022). This scenario may be forcing graduate students to find new ways of funding their scientific research.

Moreover, the learning environment in which students are immersed is often characterized by internal institutional competition geared towards the private interests of universities, with the potential to become a distressing, hostile atmosphere. The extraction of scientific output in the organic process may also be linked to mental health issues. These situations are intensified for graduate students as emphasis is placed on the assessments of quantitative indicators for each graduate program (Cesar et al., 2018).

The production of scientific research and the development of new technologies, both soft and hard, are primarily driven by graduate programs. The lack of resources for funding these research projects negatively impacts the lives and health of students, as it may jeopardize the development of their projects, potentially leading to frustration, mental distress, and suicidal behavior (Anjos & Rodrigues, 2019; Santos et al., 2020).

During the COVID-19 pandemic, the above aspects may have been exacerbated by social distancing, combined with intense demands for scientific production, exhausting work schedules, unemployment, or reliance on a scholarship requiring exclusive dedication, since it is the sole source of income for these researchers (Silva & Barbosa, 2019; Silva et al., 2019).

A study of 565 graduate students conducted between August and September 2019 (prior to the onset of the COVID-19 pandemic) identified a high prevalence of current suicide risk among graduates and a significant association of this risk with demographic, socioeconomic, academic, and health variables (Abreu et al., 2021). According to the Pan American Health Organization, the pandemic has increased suicide risk factors, such as job loss and economic hardship, trauma and abuse, mental disorders, and barriers to healthcare access (PAHO, 2021). However, it is important to note that, while Pirkis et al. (2021) emphasize the need to act quickly to prevent the long-term adverse effects of the pandemic on suicide, our study seeks to provide additional insights into suicidal behavior in the context of the pandemic. The literature search conducted complements and extends the conclusions of Pirkis et al. (2021), emphasizing the importance of assertive measures, such as

strengthening mental health services and mitigating the risk of suicide after the pandemic.

The decision to use scoping review arose from the need to map studies on suicidal behavior among graduate students during the pandemic. The scoping review aims to provide a critical assessment of the methodological quality and significance of the results. It therefore makes it possible to visualize all the studies identified without excluding them, even in the case of studies with lower methodological quality. The scoping review is a method created by the Joanna Briggs Institute (JBI) to map scientific evidence in a specific area of knowledge, and to identify knowledge gaps for discussion and inform future research (Tricco et al., 2018; Peters et al., 2020).

A preliminary search was conducted in January 2023 in the JBI Evidence Synthesis, Open Science Framework (OSF), Cochrane Library, The International Prospective Register of Systematic Reviews (PROSPERO), and the Medical Literature Analysis and Retrieval System Online (MEDLINE/PubMed). No completed or ongoing systematic review or scoping review was found.

METHOD

This scoping review followed the methodological recommendations of the JBI Manual, based on the theoretical framework of Peters et al. (2020). To ensure transparency, a preliminary protocol was developed and registered on April 17, 2023, in the Open Science Framework (OSF) (Leite et al., 2023). The protocol outlines the objectives, research questions, and eligibility criteria for studies, and the methodological steps planned for the review.

The guidelines outlined in the Preferred Reporting Items for Systematic reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) checklist were followed (Page et al., 2021) to ensure the quality and transparency of the writing of this article.

Review Question

The research question was guided by the PCC strategy (P: population, C: concept, and C: context) following the JBI Manual (Peters et al., 2020), with "P" being graduate students, "C" being suicidal behavior, and "C" being the COVID-19 pandemic.

The review question is what is the scientific evidence of suicidal behavior in graduate students in the context of the COVID-19 pandemic?

Eligibility criteria

Participants

The review considered studies that included graduate students. Graduate programs encompass master's and doctoral programs open to candidates with undergraduate degrees who meet the requirements of educational institutions and the selection criteria outlined in announcements for student applications (Ministério da Educação, 1996).

Concept

This review included documents reporting suicidal behavior in graduate students. Suicidal behavior encompasses a desire to hasten death, indirect self-destructive behavior, parasuicide, deliberate self-harm, suicide attempt, self-mutilation, and suicide (Goodfellow et al., 2019; Goodfellow et al., 2018).

Context

On December 31, 2019, the World Health Organization (WHO) warned of a new coronavirus responsible for causing the COVID-19 disease, which subsequently became a public health emergency of international concern (PAHO, 2022).

Types of sources

The review considered primary research studies with quantitative or qualitative designs. Abstracts of presentations and conferences, systematic reviews, and literature reviews were excluded.

The database search was conducted in English, because most international scientific journals require an English version of the abstract and keywords, ensuring that articles in other languages can be selected through this search. There was a limitation on publication dates, with articles considered from December 31, 2019, due to the onset of the COVID-19 spread.

Search strategy

The search was initially conducted in MEDLINE®/PubMed® and BVS, and subsequently adapted to other databases (Table 1). After defining the search strategy, it was adapted to the MEDLINE® (Medical Literature Analysis and Retrieval System Online/PubMed), EMBASE® (Elsevier), CINAHL® (Cumulative Index to Nursing and Allied Health Literature/EBSCO), LILACS® (Scientific and Technical Literature of Latin America and the Caribbean/BVS—Virtual Health Library), PsycINFO®, and Web of Science databases. The six foundations were chosen because they form the basis of the healthcare field. The descriptors were selected from MeSH, DECS, Emtree, and the APA Thesaurus.

A search for additional studies was conducted in the reference lists of all the primary publications included in this review. To access the largest range of available literature, a search was performed for gray literature in the Capes Theses and Dissertations Database and Google Scholar®.

Table 1
Search Strategy implemented on April 13, 2023, in the Medline/PUBMED database

	Search Strategy	Total
#1	Search: "education, graduate"[MeSH Terms] OR ("Graduate"[All Fields] OR "graduate's"[All Fields] OR "graduated"[All Fields] OR "graduates"[All Fields] OR "graduating"[All Fields] OR "graduation"[All Fields] OR "graduations"[All Fields]) OR "graduate education*"[All Fields] OR "graduate student*"[All Fields] OR "Post Graduate"[All Fields] OR "postgraduate education*"[All Fields] OR "phd student*"[All Fields] OR (("universit*"[All Fields] OR "college"[All Fields] OR "college s"[All Fields] OR "colleges"[All Fields]) AND ("student*"[All Fields] OR "Students"[MeSH Terms])) OR "education graduate"[All Fields] OR "graduate education"[All Fields] OR (("educability"[All Fields] OR "educable"[All Fields] OR "educates"[All Fields] OR "Education"[MeSH Subheading] OR "Education"[All Fields] OR "educational status"[MeSH Terms] OR ("educational"[All Fields] AND "status"[All Fields]) OR "educational status"[All Fields] OR "Education"[MeSH Terms] OR "educations"[All Fields] OR "educational"[All Fields] OR "educative"[All Fields] OR "educator"[All Fields] OR "educator s"[All Fields] OR "educators"[All Fields] OR "teaching"[MeSH Terms] OR "teaching"[All Fields] OR "educate"[All Fields] OR "educated"[All Fields] OR "educating"[All Fields] OR "Educations"[All Fields]) AND "Graduate"[Title/Abstract]) OR "research personnel"[MeSH Terms] OR "research personnel"[All Fields] OR "personnel research"[All Fields] OR "Researchers"[All Fields] OR "Researcher"[All Fields] OR "Investigators"[All Fields] OR "Investigator"[All Fields] OR "masters education*"[All Fields] OR "master education*"[All Fields] OR "doctoral education*"[All Fields] OR "Doctoral Student*" OR Postdoctoral	1,544.263
#2	Search: "suicide"[MeSH Terms] OR "suicide*"[All Fields] OR "self injurious behavior"[MeSH Terms] OR "automutilation"[All Fields] OR "suicidal ideation"[MeSH Terms] OR "suicide"[All Fields] OR "self injurious behavior"[All Fields] OR "self injurious behavior"[All Fields] OR "Self Mutilation"[All Fields] OR "suicidal behavior*"[All Fields] OR "suicid"[All Fields] OR ("suicidal"[All Fields] AND "ideation"[All Fields]) OR "suicidal ideation"[All Fields] OR "suicidality"[All Fields] OR "suicidal"[All Fields] OR "suicidally"[All Fields] OR "suicidals"[All Fields] OR "suicides"[All Fields] OR "suicide's"[All Fields] OR "suicided"[All Fields] OR "suiciders"[All Fields] OR "suicidal ideation*"[All Fields] OR "parasuicide*"[All Fields] OR "suicidal attempt"[All Fields] OR "parasuicidal"[All Fields] OR "parasuicidality"[All Fields] OR "suicide, attempted"[MeSH Terms] OR ("suicide"[All Fields] AND "attempted"[All Fields]) OR "attempted suicide"[All Fields] OR "parasuicides"[All Fields]	123.119
#3	Search: "COVID-19"[MeSH Terms] OR "SARS-CoV-2"[MeSH Terms] OR "Coronavirus Infections"[MeSH Terms] OR "COVID-19"[All Fields] OR "COVID-19"[All Fields] OR "COVID-19"[All Fields] OR "covid19"[All Fields] OR "SARS-CoV-2"[All Fields] OR "covid"[All Fields] OR "sars cov2"[All Fields] OR "sarscov 2"[All Fields] OR "sarscov2"[All Fields] OR "coronavirus*"[All Fields] OR "nCoV"[All Fields] OR "2019 ncov"[All Fields] OR "2019 ncov"[All Fields] OR "nCoV-2019"[All Fields] OR "sarscov"[All Fields]	370.701
#4	**Search: (#1 AND #2 AND #3)**	**398**

Study selection

The retrieved results were imported into EndNote v.X9 (Clarivate Analytics, PA, USA), and duplicates were removed.

Study selection was performed based on titles and abstracts according to the eligibility criteria described above. The selection was conducted blindly by two independent reviewers, and disagreements were resolved through discussions between the two reviewers to confirm the eligibility of a specific publication.

An online platform for systematic reviews, Rayyan QCRI20, was used for the study selection. Rayyan was specifically developed to streamline the initial screening of abstracts and titles using a semi-automated process (Ouzzani et al., 2016).

The selected articles were submitted to data extraction and subsequently assessed for eligibility for the scoping review. Full-text studies that failed to meet the inclusion criteria were excluded.

Data extraction

Data were extracted using the extraction tool in the scoping review approach by JBI (Peters et al., 2020), adapted to meet the objectives of the scoping review (Table 2).

Extracted data included specific details about the study (Title, Year, Author, Country, Objectives/purpose, Study type, Data collection method), Participants/population (graduate students, profile—age/gender, sample, knowledge area, and degree), concept (suicidal behavior), context of the COVID-19 pandemic, and key findings relevant to the review question. An additional pilot was initially conducted on the first ten articles to determine whether the data extracted answered the review question. The extraction was performed by two reviewers.

Table 2
Characteristics and results of the extraction instrument, according to JBI recommendation

Characterization of studies: Title, year, author, country, objectives/purpose, type of study, collection method.
Participants/population: graduate students, profile - age/sex, number, sample, area of knowledge, degree.
Concept (suicidal behavior)
Context (COVID-19 pandemic)
Findings relevant to the review question

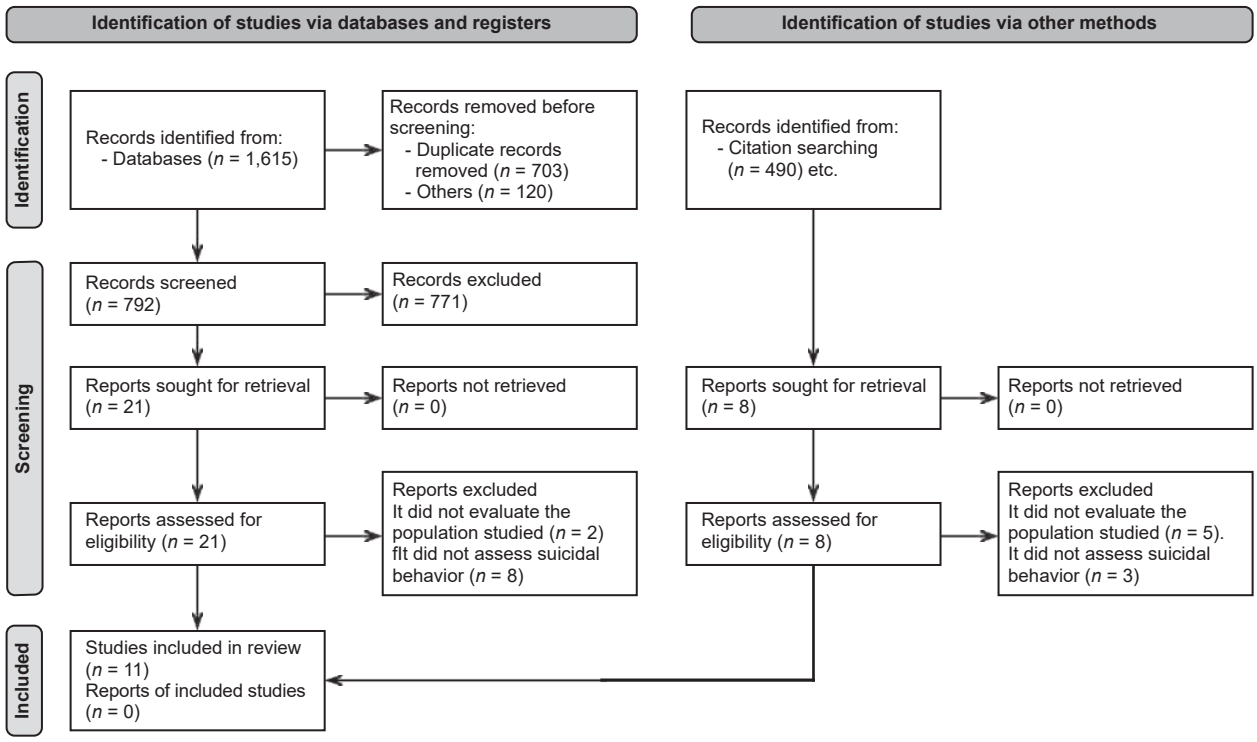

Figure 1. Flowchart according to the PRISMA Extension for Scoping Reviews (PRISMA-ScR), 2023.

RESULTS

General characteristics of the studies

The search strategy located 1,615 studies, of which 703 duplicate articles and 120 articles published before December 2019 were excluded, leaving 792 studies for title and abstract screening. Twenty-nine studies were subsequently selected for full-text review, with eleven articles being included in this research. Seven articles were excluded because they did not include the graduate student population, and eleven were excluded because they did not address suicidal behavior. The results of the search, inclusion, and exclusion process are presented in the PRISMA flow diagram—Extension for Scoping Reviews (Tricco et al., 2018) (Figure 1).

During the reading of the articles, it was observed that many studies stated in their objectives that the sample consisted of university students but also included graduate students in their results. All studies concerning university students that did not specify whether they were undergraduates or graduates in their abstracts were included for full-text review to avoid any loss of articles in this review. Some studies that appeared to focus solely on university students in their objectives were therefore included in this review because they discussed graduate students in their results (Essadek et al., 2022; Schad et al., 2022; Sljivo et al., 2022; Sun, et al., 2021; Tang et al., 2023; Wang et al., 2020; Wathelet et al., 2022a; 2022b; Muneeb & Hassan, 2022) (Table 3).

The studies with graduate students analyzed master's (Essadek et al., 2022; Sljivo et al., 2022; Sun et al., 2021; Tang et al., 2023; Wang et al., 2020; Wathelet et al., 2022a; 2022b; Muneeb & Hassan, 2022) and doctoral students (Daniel et al., 2022; Essadek et al., 2022; Schad et al., 2022; Sljivo et al., 2022; Sun et al., 2021; Tang et al., 2023; Wang et al., 2020; Wathelet et al., 2022a; 2022b; Muneeb & Hassan, 2022). Only one article exclusively analyzed stricto sensu graduate students (Daniel et al., 2022), with a sample exclusively composed of doctoral students. One study reported that it involved graduate students but did not examine the sample separately (Marutani et al., 2021) (Table 3).

An examination of the findings of the twelve articles showed that the majority involved quantitative research (ten cross-sectional studies and one epidemiological profile) while one was a qualitative article (experience report). It was found that 58.3% (N = 07) had been published in 2022 (Table 3). Furthermore, there is a predominance of studies in the Americas (Daniel et al., 2022; Schad et al., 2022; Tang et al, 2023; Wang et al., 2020), Europe (Essadek et al., 2022; Sljivo et al., 2022; Wathelet et al., 2022a; 2022b), and Asia (Marutani et al., 2021; Sun et al., 2021; Muneeb & Hassan, 2022) (Table 3). The studies with the largest number of participants included master's students

Table 3
Characterization of Studies Selected in this Review, 2023

Authors	*Locality*	*Objective*	*Study type*	*Study sample*	*Data collection method*	*Main results*
Daniel et al. (2022)	United States	Graduate students in health service psychology experienced adverse mental health outcomes during COVID-19.	Cross-sectional quantitative	Me - Dr. 485 N 485	Questionnaire	8.71% reported suicidal ideation (SI) in the two months preceding the first wave of the study, and 6.87% reported SI in the two months preceding the second wave. 1.03% planned suicide in the two months preceding the first wave of the study, and 0.64% planned suicide in the two months preceding the second wave. 0.41% attempted suicide in the two months preceding the first wave of the study, and no one attempted suicide in the two months preceding the second wave.
Essadek et al. (2022)	France	To assess the prevalence of psychological distress in a student population during the first two lockdowns related to the COVID-19 pandemic and stratify them by subgroup.	Cross-sectional quantitative	Me 5341 Dr. 210 Est 13599 N 19150	Questionnaire	There was a significant increase in suicidal ideation (aOR = 1.59; CI: 1.45–1.73) between the first and second lockdown. The most severely affected group were doctoral students, with a significant increase (aOR = 4.37; CI: 1.41–13.54).
Marutani et al (2021)	China	Conduct an urgent inquiry into the status of suicide in the 2020 academic year.	Quantitative, epidemiological profile	Me - Dr. - PG 20 N 149820	Questionnaire	Twenty students died by suicide, of whom thirteen were twenty-five years old or younger. The reasons included career concerns, personal relationships with friends/professors, life difficulties, isolation/loneliness, concern over/effects of illness, and unknown reasons. Associations with COVID-19 were indirect, involving only three male students.
Schad et al. (2022)	United States	To investigate comparisons between historically excluded (HE) and non-historically excluded (NHE) groups in science, focusing on race/ethnicity, gender, and sexual orientation among medical and biomedical students during the intersection of the COVID-19 pandemic and a period of ongoing racial injustice assessment.	Cross-sectional quantitative	Me - Dr. 309 Est 622 N 931	Questionnaire	Results indicated significant differences for rates of depression, anxiety, and suicidal ideation, with biomedical doctoral students showing a higher incidence than medical students.
Sljivo et al. (2022)	Bosnia and Herzegovina	To analyze substance abuse, suicidal ideation, and mental health status among university students during the COVID-19 outbreak in Bosnia and Herzegovina.	Cross-sectional quantitative	Me 120 Dr. 14 Est 693 N 827	Questionnaire	Suicidal ideation was present in seventy-one subjects, with eleven attempting suicide. Sedative or alcohol use, unemployment and depressive symptoms were independent predictors of developing suicidal ideation. Suicidal ideation was more common in younger students than in master's and doctoral students.
Sun et al. (2021)	China	To investigate psychiatric symptoms (anxiety, depression, and traumatic stress) during the state-imposed quarantine among university students in China.	Cross-sectional quantitative	Me 139 Dr. 17 Est 1756 N 1912	Questionnaire	One in five (19.56%) graduate students reported some degree of suicidal ideation in the past two weeks.
Tang et al. (2023)	United States	To describe the prevalence of driving after marijuana use among US college students who both drive and report recent marijuana use.	Quantitative, descriptive, and cross-sectional	Me 2285 Dr. 1601 Est 12349 N 16531	Questionnaire	38.3% tested positive for suicide risk. Respondents who screened positively for suicide were more likely to report driving after marijuana use than those who had screened negatively for suicide (35.8% *vs.* 26.3%).
Wang et al. (2020)	United States	Examines the mental health status and severity of depression and anxiety among university students in a large university system in the United States during the COVID-19 pandemic.	Cross-sectional quantitative	Me 294 Dr. 326 Est 1405 N 2031	Questionnaire	18.04% (*n* = 366) had suicidal thoughts.
Wathelet et al. (2022b)	France	To assess the evolution of students' mental health and identify factors associated with mental health outcomes one month after the lifting of lockdown.	Cross-sectional quantitative	Me 1296 Dr. 198 Est 4852 N 6346	Questionnaire	The prevalence rate of suicidal thoughts increased from 11.4% one month after lockdown to 13.2% during lockdown.
Wathelet et al. (2022a)	France	To measure the prevalence of mental health symptoms among university students in France fifteen months after the first lockdown (T3) and identify factors associated with the outcomes.	Cross-sectional quantitative	Me 7144 Dr. 866 Est 36147 N 44157	Questionnaire	Standardized prevalence rates of suicidal thoughts was 13.8% (95%CI, 13.5%-14.2%). The prevalence of suicidal ideation continued to increase from T1 (10.6%) to T3 (13.8%).
Muneeb & Hassan (2022)	Pakista	To analyze the relationship between suicidal ideation (SI), rumination, and depression among young adults.	Cross-sectional quantitative	Me 104 Dr. 5 Est 263 N 372	Questionnaire	Brooding is related to suicidal thoughts but may not necessarily predict suicidal thoughts, in the absence of psychological strain.

Note: Me: Number of samples surveyed among master's graduate students; Dr: Number of samples surveyed among doctoral graduate students; Est: Undergraduate student; N: Total sample size. T1: first wave of SARS-CoV-2 pandemic; T2: second wave of SARS-CoV-2 pandemic infection; T3: third wave of SARS-CoV-2 pandemic.

Table 4
Characterization of Suicidal Behavior in Graduate Students by Pandemic Periods, 2023

		Characterization of suicidal behavior			
Authors	*Instruments used*	*Suicidal behavior*	*General*	*Master's degree*	*Doctorate*
Daniel et al. (2022)	-Demographic Information; -Epidemics and Pandemics Impact Inventory (EPII); -Composite International Diagnostic Interview (CIDI).	Ideation		-	8,71% (T1) 6,87 (T2)
		Plan		-	1,03% (T1) 0,64% (T2)
		Attempt		-	0,41% (T1)
Essadek et al. (2022)	-Sociodemographic data; Patient Health Questionnaire (PHQ-9); -Generalized Anxiety Disorder (GAD-7); -Impact of Event Scale - Revised (IES-R).	Ideation	14,2% (T1) 14,9% (T2) 20,9% (T3)	3.6% (T1) 4,2% (T2) 4,3% (T3)	0,1% (T1) 0,2 % (T2) 0,2% (T3)
		Plan		-	-
		Attempt		-	-
Marutani et al. (2021)	Did not use an instrument as it is an epidemiological profile analysis.	Ideation	-	-	-
		Plan	-	-	-
		Attempt	-	-	-
		Suicide	13.3/100,000 habitants (17.1 for men and 4.5 for women)		
Schad et al. (2022)	-Demographic Information; -Patient Health Questionnaire (PHQ-9); -Generalized Anxiety Disorder Assessment (GAD-7); -Alcohol Use Disorder Identification Test (AUDIT); -Drug Abuse Screening Test 10 (DAST-10).	Ideation	-	-	35% (T1) 40% (T2)
		Plan		-	-
		Attempt		-	-
		Suicide	-	-	-
Sljivo et al. (2022)	-Demographic Information; -Patient Health Questionnaire 4 (PHQ-4); -Impact of Event Scale 6 (IES-6). Impact of Event Scale 5 (IES-5).	Ideation	8,5%	-	-
		Plan	-	-	-
		Attempt	1,33%	-	-
		Suicide	-	-	-
Sun et al. (2021)	-Demographic Information; -7-item Generalized Anxiety Disorder Scale (GAD-7); -Patient Health Questionnaire-9 (PHQ-9); -Impact of Events Scale (IES); -Mindful Attention Awareness Scale (MAAS); -Adapted version of the Multidimensional Scale of Perceived Social Support (MSPSS); -SARS Empathic Response Scale; -Prosociality Scale; -Adapted version for COVID-19 of the Perceived External Stigma Subscale from the Ebola-Related Stigma Questionnaire derived from the Berger HIV Stigma Scale.	Ideation	19,56%	-	-
		Plan	-	-	-
		Attempt	-	-	-
		Suicide	-	-	-
Tang et al. (2023)	-Demographic Information; -Suicide Behaviors Questionnaire-Revised (SBQ-R); -Questions from the ACHA-NCHA III.	Ideation	-	-	
		Plan	-	-	-
		Attempt	-	-	-
		Suicide	-	-	-
Wang et al. (2020)	-Demographic Information; -Patient Health Questionnaire (PHQ-9); -Generalized Anxiety Disorder Tracker (GAD-7).	Ideation	18,04%	-	-
		Plan	-	-	-
		Attempt	-	-	-
		Suicide	-	-	-
Wathelet et al. (2022b)	-Demographic Information; -State-Trait Anxiety Inventory (STAI Y-2); -13-item Beck Depression Inventory (BDI-13); -Perceived Stress Scale (PSS-10).	Ideation	12,5% (T1) 38,2% (T2)	9,1% (T1- Masc) 10,4% (T1-Fem) 11,1% (T2- Masc) 12,2% (T2- Fem)	11,9% (T1- Masc) 9,8% (T1- Fem) 8,0% (T2- Masc) 11,1% (T2- Fem)
		Plan	-		
		Attempt	-		
		Suicide	-		
Wathelet et al. (2022a)	-Demographic Information; -PTSD Checklist for the Diagnostic and Statistical Manual of Mental Disorders; -Perceived Stress Scale; -State-Trait Anxiety Inventory; -Beck Depression Inventory.	Ideation	10,6% (T1) 12,3% (T2) 13,8% (T3)	12,6% (Masc) 14,7 (Fem)	9,2% (Masc) 11% (Fem)
		Plan	-	-	-
		Attempt	-	-	-
		Suicide	-	-	-
Muneeb & Hassan (2022)	-Psychological Stress Scale (PSS-40); -Suicidal Ideation Scale (Rudd, 1989); -Ruminative Responses Scale; -Beck Depression Inventory.	Ideation	-	22,25%	-
		Plan	-	-	-
		Attempt	-	-	-
		Suicide	-	-	-

Note: T1: first wave of SARS-CoV-2 pandemic; T2: second wave of SARS-CoV-2 pandemic; T3: third wave of SARS-CoV-2 pandemic. Masc: Male; Fem: Female.

(n = 16,723), ranging from 104 (Muneeb & Hassan, 2022) to 7,144 (Wathelet, 2022b) individuals. Studies were conducted with 4,031 doctoral students, with samples ranging from five (Muneeb & Hassan, 2022) to 1601 (Tang et al., 2023) subjects.

Characteristics of suicidal behavior in graduate students

A variety of screening instruments were identified for assessing suicidal behavior, with the Patient Health Questionnaire (PHQ-9) being the most commonly used one to assess suicidal ideation (Essadek et al., 2022; Schad et al., 2022; Sun et al., 2021; Wang et al., 2020) (Table 4).

Suicidal ideation was studied by most of the articles selected (Daniel et al., 2022; Essadek et al., 2022; Schad et al., 2022; Sljivo et al., 2022; Sun et al., 2021; Tang et al., 2023; Wang et al., 2020; Wathelet et al., 2022a; 2022b; Muneeb & Hassan, 2022), followed by suicide attempts (Daniel et al., 2022; Sljivo et al., 2022) and completed suicide (Marutani et al., 2021) (Table 4).

These studies show that during the pandemic, the presence of suicidal ideation in this population varied from 6.87% to 40% (Table 4). In the first wave, it ranged from 8.71% to 35%, in the second, it varied between 6.87% and 40%, and in the third, it oscillated from 8.5% to 38%. Only five studies separately described the frequency of suicidal behavior in master's and doctoral students (Daniel et al., 2022; Essadek et al., 2022; Schad et al., 2022; Wathelet et al., 2022a; 2022b), while the others showed the overall frequency of the sample surveyed (Table 4).

Master's students were analyzed for the presence of suicidal ideation (Essadek et al., 2022; Sljivo et al., 2022; Sun et al., 2021; Tang et al., 2023; Wang et al., 2020; Wathelet et al., 2022a; 2022b; Muneeb & Hassan, 2022), while doctoral students were analyzed for the presence of suicidal ideation (Daniel et al., 2022; Esadek et al., 2022; Schad et al., 2022; Sljivo et al., 2022; Sun et al., 2021; Tang et al., 2023; Wang et al., 2020; Wathelet et al., 2022a; 2022b; Muneeb & Hassan, 2022), suicide plans (Daniel et al., 2022) and suicide attempts (Daniel et al., 2022; Sljivo et al., 2022) (Table 4).

DISCUSSION AND CONCLUSION

A small number of scientific publications on suicidal behavior in graduate students in the context of COVID-19 were identified. Discussions and debates on suicidal behavior in society are often permeated by prejudice. Fear of social reprisals indirectly prevents researchers from conducting suicide-related research, leading to gaps in the scientific literature on the subject (Barrigón & Baca-García, 2018). One study observed the dearth of studies of graduate students in the literature, while the few existing studies usually focus on the teaching-learning process (Abreu et al., 2021).

In the pandemic scenario, graduate programs experienced a process of mental distress perceived through students' reports of frustrations and the emergence of new situations to both students and supervisors had to adapted to (Filho & Minayo, 2021). These frustrations are linked to the difficulty with conducting research due to social isolation, challenges in securing funding, lack of financial support through grants, and the overload of activities within the graduate scenario. In addition, there is a gap regarding the nature of the professional activity of graduates (Barros et al., 2021). The presence of a mental disorder diagnosis, coupled with these factors, can exacerbate mental distress among students. Furthermore, studies such as the one by Barlattani et al. (2023) highlight the fact that mental disorders constitute a risk factor for suicidal behavior. This underscores the importance of investigating the prevalence of mental illness in this population and, consequently, the risk of suicide.

The COVID-19 pandemic hampered the face-to-face social interaction of graduate students, making it challenging to establish interpersonal connections in the process of constructing new knowledge in the training of graduate students (Fontolan et al., 2022). The consequences of the COVID-19 crisis on mental health, including suicidal behavior, will persist for a long time and peak later than the pandemic itself (Sher, 2020).

The occurrence of accidents or disasters intensifies emoticons, which can trigger the onset of mental distress, increasing the risk of suicidal behavior de Castilho Sá (de Castilho Sá, 2020). This has been observed in major catastrophes, such as the attack on the Twin Towers in the United States. This tragedy resulted in an increase in cases of post-traumatic stress disorders, heightening the risk of suicidal behavior (Silva et al., 2019). Environmental disasters, such as the dam break in Brumadinho, Minas Gerais, also increased the suicide mortality rate (Malta et al., 2023).

A study conducted in the United States showed that there was a significant increase in overall observed versus expected youth suicides during the COVID-19 pandemic among those ages eighteen to twenty-four (RR = 1.05, 95% CI = 1.02–1.08) (Bridge et al., 2023). A study conducted in Brazil found that, despite the overall decrease in the suicide rate at the beginning of the COVID-19 pandemic, there was a substantial excess of suicides across different age groups and genders in the north and northeast regions of the country (Orellana & de Souza, 2022). This suggests that suicide continued to follow its temporal trend, while suicidal behavior may have increased during the pandemic.

A study conducted on graduate students from a medical college in China before the COVID-19 pandemic identified the presence of lifetime suicidal ideation in 825 (25.7%) participants, lifetime suicidal plans in fifty-two (1.6%), and

lifetime suicide attempts in thirty-four participants (1.1%) (Zeng et al., 2018). In this review, it was observed that suicidal ideation ranged from 6.87% to 40%. These figures are lower than what is found in a study conducted before the pandemic that revealed a prevalence of 40.18% in current suicide risk among graduate students (Abreu et al., 2021). This suggests that the risk of suicide in graduate students was lower than before the pandemic.

A study conducted of the male population living in Australia identified several protective factors against suicidal behavior during COVID-19. These included the presence of relationships, remaining employed during the pandemic, and higher self-reported resilience, which protected against suicidal ideation and planning. Those who reported receiving greater social support from friends also had a lower risk of suicidal ideation. At the same time, individuals with lower problem-solving abilities, especially those with an emotion-focused, avoidant approach, reported a lower likelihood of suicidal ideation (Seidler et al., 2023).

Another study found that greater resilience, positive feelings towards lockdown and confinement measures, friendships, and faith in a supreme being were associated with lower odds of suicidal ideation (Papadopoulou et al., 2021). Additionally, greater access to healthcare services, state financial support, and increased mobility may have contributed to the lack of an increase in suicidal ideation (Gournellis & Efstathiou, 2021). These studies highlight certain protective factors that may have contributed to a lower risk of suicide among graduate students during COVID-19.

This underscores the relevance of this study, as it will be useful for future comparison with studies conducted in the post-COVID-19 pandemic era. Additionally, as there are few studies addressing graduate students, it is recommended that further research be conducted to assess suicidal behavior in this population, particularly in the context of the pandemic. This could contribute to more consistent findings for subsequent mapping of this issue.

Although not the focus of this review, it was discovered that certain studies addressed suicidal behavior in graduate students according to the waves of COVID-19 (Daniel et al., 2022; Essadek et al., 2022; Schad et al., 2022; Wathelet et al., 2022b; 2022a). Some studies on the general population (Gournellis & Efstathiou, 2021; Killgore et al., 2020) also presented the frequency of suicidal ideation based on the waves of COVID-19, but since these waves did not occur at the same time worldwide, it was not possible to explore this issue further.

A study conducted in Greece showed that individuals who completed the questionnaire during the last two weeks of the first lockdown reported higher suicidal ideation, depression, and anxiety than those who had completed it in the previous two weeks. The presence of suicidal ideation in the second wave was not significantly different from that of the first lockdown (Gournellis & Efstathiou, 2021). A similar result was identified in a study conducted in the United States, where the number of respondents with suicidal ideation increased every month of the pandemic for those under lockdown yet remained stable for those not under lockdown (Killgore et al., 2020).

Furthermore, some countries saw a higher number of COVID-19 cases, which may have influenced the elevated rate of suicidal behavior among graduate students there. One study showed that the United States had the highest number of COVID-19 cases, while France was the country with the fourth highest number. France had a lethality rate of 23.91, while the United States had a lethality rate of 9.23 for COVID-19 (WHO, 2021).

The risk of suicide among graduates is associated with demographic, socioeconomic, academic, and health variables (Abreu et al., 2021). It is also important to assess the level of satisfaction of students at being graduates since academic satisfaction also reduces the presence of suicidal thoughts (Fontolan et al., 2022).

The current review identified the presence of studies addressing mental disorders and suicidal behavior. Certain mental disorders are commonly associated with suicidal ideation, such as mood and personality disorders (Matias et al., 2023). Santos et al. (2020) and Oliveira (2019) argue that when combined with a family history and certain life experiences, traumatic experiences with the diagnosis of certain mental disorders, specifically depression, anxiety, and substance use disorders, contribute to an increase in ideation and suicide among health scholars and graduates. A study conducted by Barros et al. (2021) reports that master's and doctoral students displayed depression symptoms (31%).

Other studies highlight the relationship between suicidal behavior and the presence of certain mental disorders (Daniel et al., 2022; Esadek et al., 2022; Marutani et al., 2021; Schad et al., 2022; Sljivo et al., 2022; Sun et al., 2021; Tang et al., 2023; Wang et al., 2020; Wathelet et al., 2022a; 2022b; Muneeb & Hassan, 2022). The most commonly studied ones were depressive disorders (Daniel et al., 2022; Essadek et al., 2022; Schad et al., 2022; Sljivo et al., 2022; Sun et al., 2021; Tang et al., 2023; Wang et al., 2020; Wathelet et al., 2022a; 2022b; Muneeb & Hassan, 2022), anxiety disorders (Daniel et al., 2022; Essadek et al., 2022; Schad et al., 2022; Sljivo et al., 2022; Sun et al., 2021; Tang et al., 2023; Wang et al., 2020; Wathelet et al., 2022a; 2022b), substance use disorders (Schad et al., 2022; Sljivo et al., 2022; Sun et al., 2021; Tang et al., 2023), and trauma- and stressor-related disorders (Sun et al., 2021; Wang et al., 2020; Wathelet et al., 2022a; 2022b.

Indeed, due to the relationship between the presence of mental disorders and suicidal behavior, it is crucial to consider care strategies tailored to graduate students. The literature includes certain interventions that have been identified for the prevention of suicidal behavior. These include

psychological support for students, considering the academic environment (Essadek et al., 2022; Marutani, et al., 2021; Schad et al., 2022; Sun et al., 2021; Tang et al., 2023; Wang et al., 2020; Wathelet, 2022b; Muneeb & Hassan, 2022), identifying the need for more research on suicidal behavior within the academic community of graduates (Schad et al., 2022; Sun et al., 2021; Wang et al., 2020; Wathelet et al., 2022a; 2022b), developing support groups in institutions (Daniel et al., 2022; Essadek et al., 2022; Sun et al., 2021; Muneeb & Hassan, 2022), providing social support (Daniel et al., 2022; Sun et al., 2021; Wathelet et al., 2022a; Muneeb & Hassan, 2022), creating institutional systems to alleviate stress, offer crisis intervention, conduct continuous evaluative practices (Daniel et al., 2022), and increasing funding for students (Sun et al., 2021).

Prevention interventions for suicidal behavior are related to specific actions and services to be implemented in institutions. These actions should involve the development of new assertive policies to support students in creating a more harmonious environment based on the biopsychosocial understanding and connection of the student. Along these same lines, it is essential to view the student as a whole, which requires the construction of a network of emotional and psychological support, social support, and conducting further research on social and gender diversities, as well as specific health determinants and conditions. Santos et al. (2021) emphasizes the need for the presence of a psychopedagogical support network, the expansion of research grants as a strategy that can be adopted to reduce feelings of stress, and the implementation of care strategies when there is an outbreak of suicidal behavior.

Limitations and Strengths

This review highlights the importance of further studies investigating the frequency and identification of factors contributing to the development of suicidal behavior in graduate students, to prevent harm to their mental health. The literature reviewed also indicates that there are few studies related to this topic and that it is necessary to undertake quantitative-qualitative research on suicidal behavior in graduates.

It is therefore suggested that studies address both personal (such as age, gender, presence of mental disorders, and relational conflicts) and academic risk factors (such as the volume of academic workload in research, lack of funding, reduced funding sources, self-competitiveness, and productivity focused on quantitative indicators in graduate programs) for suicidal behavior. These studies should also explore the consequences of suicidal behavior, such as a decline in the quality of work produced by graduate students, and its impact on the university environment, including dropout rates and delays in completing master's or doctoral degrees. Moreover, institutional intervention methods, such as focus groups, psychotherapeutic support, and self-help groups, should be examined as responses to this situation.

Although the scope review is an important type of review that has followed all the stages recommended by the JBI manual, it has limitations regarding the critical evaluation of the studies included. Although this review does not assess the methodological quality of available evidence, it maps the extent of a particular issue, to fill knowledge gaps and provide information to support the development of care strategies.

This review made it possible to map the presence of suicidal behavior in graduate students within the context of the COVID-19 pandemic, providing information that could support institutional strategies for the prevention and care of this behavior in graduate students.

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Conflicts of interest

The authors declare they have no conflicts of interest.

REFERENCES

Abreu, E. K. D. N., Marcon, S. R., Espinosa, M. M., Kogien, M., Valim, M. D., & Nascimento, F.C.D.S. (2021). Factors associated to suicide risk in stricto sensu graduate students: a cross-sectional study. *Revista Latino-Americana de Enfermagem*, *29*, e3460. https://doi.org/10.1590/1518-8345.4590.3460

Anjos, F. A., & Rodrigues, G. J. M. (2019). Bolsa CNPq Produtividade em Pesquisa: perfil dos pesquisadores na área de Turismo. *Rosa dos Ventos – Turismo e Hospitalidade*, *11*(1), 194-210. http://dx.doi.org/10.18226/21789061.v11i1p194

Barcelos, T. N., Muniz, L. N., Dantas, D. M., Junior, D. F. C., Cavalcante, J. R., & Faerstein, E. (2021). Análise de fake news veiculadas durante a pandemia de COVID-19 no Brasil. *Revista Panamericana de Salud Pública*, *45*, e65. https://doi.org/10.26633/RPSP.2021.65

Barlattani, T., D'Amelio, C., Capelli, F., Mantenuto, S., Rossi, R., Socci, V., Stratta, P., Di Stefano, R., Rossi, A., & Pacitti, F. (2023). Suicide and COVID-19: a rapid scoping review. *Annals of General Psychiatry*, *22*(1), 10. https://doi.org/10.1186/s12991-023- 00441-6

Barrigón, M. L., & Baca-García, E. (2018). Current challenges in research in suicide. *Revista de Psiquiatría y Salud Mental*, *11*(1), 1-3. https://doi.org/10.1016/j.rpsm.2017.10.001

Barros, L. de O., Ambiel, R. A. M., & Baptista, M. N. (2021). Sintomatologia depressiva em estudantes brasileiros de pós-graduação stricto sensu. *Psico*, *52*(4), e36161. https://doi.org/10.15448/1980-8623.2021.4.36161

Bordallo, B., Bellas, M., Cortez, A.F., Vieira, M. & Pinheiro, M. (2020). Severe COVID-19: what have we learned with the immunopathogenesis? *Advances in Rheumatology*, *60*(50). https://doi.org/10.1186/s42358-020-00151-7

Bridge, J. A., Ruch, D. A., Sheftall, A. H., Hahm, H. C., O'Keefe, V. M., Fontanella, C. A., Brock, G., Campo, J. V., & Horowitz, L. M. (2023). Youth Suicide During the First Year of theCOVID-19 Pandemic. *Pediatrics*, *151*(3), e2022058375. https://doi.org/10.1542/peds.2022-058375

Cesar, F., Sousa, E., Ribeiro, L., & Oliveira, L. (2018). Estressores da pós-graduação. Revisão Integrativada Literatura. *Cogitare Enfermagem*, *23*(4), e57460. http://doi.org/10.5380/ce.v23i4.57460

Daniel, K. E., Szkody, E., Aggarwal, P., Peterman, A. H., Washburn, J. J., & Selby, E. A. (2022). Characterizing changes in mental health-related outcomes for health service psychology graduate students during the first year of the COVID-19

pandemic. *Journal of Clinical Psychology*, *78*(11), 2281-2298. https://doi.org/10.1002/jclp.23392

de Castilho Sá, M., Miranda, L., & de Magalhães, F. C. (2020). Pandemia covid-19: catástrofe sanitária e psicossocial. *Caderno de Administração*, *28*, 27-36. https://doi.org/10.4025/cadadm.v28i0.53596

Essadek, A., Gressier, F., Krebs, T., Corruble, E., Falissard, B., & Rabeyron, T. (2022). Assessment of mental health of university students faced with different lockdowns during the coronavirus pandemic, a repeated cross-sectional study. *European Journal of Psychotraumatology*, *13*(2), 2141510. http://dx.doi.org/10.1080/20008066.2022.2141510

Filho, S. C. O., & Minayo, M. C. S. (2021). Triplo tabu: sobre o suicídio na infância e na adolescência. *Ciência & Saúde Coletiva*, *26*(7), 2693-2698. https://doi.org/10.1590/1413-81232021267.07302021

Fontolan, M. V., Peres, K. de O., Soares, S. C., & Ahlert, A. (2022). Docência Online: Percepções de Estudantes Stricto sensu em Tempo de Pandemia. *Revista Científica em Educação a Distância*, *12*(1). https://doi.org/10.18264/eadf.v12i1.1602

Giamattey, M. E. P., Frutuoso, J. T., Bellaguarda, M. L. R., & Luna, I. J. (2022). Rituais fúnebres na pandemia de COVID-19 e luto: possíveis reverberações. *Escola Anna Nery - Revista de Enfermagem*, *26*(spe)e20210208. https://doi.org/10.1590/2177-9465-EAN- 2021-0208

Goodfellow, B., Kõlves, K., & de Leo, D. (2018). Contemporary Nomenclatures of Suicidal Behaviors: A Systematic Literature Review. *Suicide & Life-threatening Behavior*, *48*(3), 353-366. https://doi.org/10.1111/sltb.12354

Goodfellow, B., Kõlves, K., & de Leo, D. (2019). Contemporary Definitions of Suicidal Behavior: A Systematic Literature Review. *Suicide & Life-threatening Behavior*, *49*, 488-504. https://doi.org/10.1111/sltb.12457

Gournellis, R., & Efstathiou, V. (2021). The impact of the COVID-19 Pandemic on the Greek population: Suicidal ideation during the first and second lockdown. *Psychiatrike = Psychiatriki*, *32*(4), 267-270. https://doi.org/10.22365/jpsych.2021.041

Killgore, W. D. S., Cloonan, S. A., Taylor, E. C., Allbright, M. C., & Dailey. N. S. (2020). Tendências na ideação suicidadurante os primeiros três meses de bloqueios da COVID- 19. *Psiquiatria*, *293*, 113390. https://doi.org/10.1016/j.psychres.2020.113390

Leite, J. K. S., Alves, V. M., Molina, N. P. F. M., & Miasso, A. I. (2023). Suicidal behavior in graduate students in the context of the COVID-19 pandemic: Scope Review Protocol. *Open Science Framework*. https://doi.org/10.17605/OSF.IO/DCXM7

Liu, Y., Ning, Z., Chen, Y., Guo, M., Liu, Y., Gali, N. K., Sun, L., Duan, Y., Cai, J., Westerdahl, D., Liu, X., Xu, K., Ho, K. F., Kan, H., Fu, Q., & Lan, K. (2020). Aerodynamic analysis of SARS-CoV-2 in two Wuhan hospitals. *Nature*, *582*(7813), 557-560. https://doi.org/10.1038/s41586-020-2271-3

Malta, D. C., dos Reis, G. M., Veloso, G. A., Cardoso, L. S. M., Hartz, Z. M. A., Cunningham, M., & Naghavi, M. (2023). Mortality patterns in municipalities of a mining region before the Brumadinho dam failure, state of Minas Gerais, Brazil. *Revista Brasileira de Epidemiologia*, *26*(Suppl 1). https://doi.org/10.1590/1980-549720230010.supl.1

Marutani, T., Fuse-Nagase, Y., Tachikawa, H., Iwami, T., Yamamoto, Y., Moriyama, T., & Yasumi, K. (2021). Has COVID-19 affected suicides among graduate students in Japan? *Asian Journal of Psychiatry*, *65*, 102803. https://doi.org/10.1016/j.ajp.2021.102803

Mascaro, A. L. (2020). *Crise e pandemia. Boitempo Editorial, 42*. Retrieved from https://www.boitempoeditorial.com.br/produto/crise-e-pandemia-1050

Matias, C. C., Reis, G. T., & Besson, J. C. F. (2023). Transtorno de Personalidade Borderline e os fatores que influenciam seu desenvolvimento: uma relação entre o comportamento autodestrutivo, relações familiares, traumas infantis e alterações fisiopatológicas. *Brazilian Journal of Development*, *9*(05), 15952-15972. https://doi.org/10.34117/bjdv9n5-100

Ministério da Educação. (1996). *Lei de Diretrizes e Bases da Educação Nacional, LDB. 9394/1996. Brasil*. Brasília: Ministério da Educação. Retrieved from http://portal.mec.gov.br/seesp/arquivos/pdf/lei9394_ldbn1.pdf

Muneeb, N. U. A., & Hassan, S. M. U. (2022). Psychological strain and suicidal ideation in young university students during Covid-19 outbreak: the mediating roles of rumination and depression. *Current Psychology*, *42*, 23731-23742. https://doi.org/10.1007/s12144- 022-03551-8

MRC Centre for Global Infectious Disease Analysis (2020). *Report 3 - Transmissibility of 2019-nCoV. WHO Collaborating Centre for Infectious Disease Modelling; MRC Centre for Global Infectious Disease Analysis; Abdul Latif Jameel Institute for Disease and Emergency Analytics; Imperial College London, UK*. Available at: https://www.imperial.ac.uk/mrc-global-infectious-disease-analysis/disease-areas/covid-19/report-3-transmissibility-of-covid-19/

Oliveira, C. A. (2019). *Ansiedade, depressão e estresse, uso de álcool e outras drogas e a satisfação de discentes de pós-graduação stricto sensu. 112 f*, [Dissertação - Mestrado em Ciências da Saúde]. Universidade Federal do Amapá, Macapá. Retrieved from http://repositorio.unifap.br:80/jspui/handle/123456789/106

Orellana, J. D. Y., & de Souza, M. L. P. (2022). Excess suicides in Brazil: Inequalities according to age groups and regions during the COVID-19 pandemic. *The International Journal of Social Psychiatry*, *68*(5), 997-1009. https://doi.org/10.1177/00207640221097826

Ouzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan — a web and mobile app for systematic reviews. *Systematic Reviews*, *5*, 210. https://doi.org/10.1186/s13643-016-0384-4

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *The BMJ*, *372*, 71. Retrieved from https://www.bmj.com/content/372/bmj.n71

Pan American Health Organization [PAHO]. (2021). *18 meses de pandemia de COVID- 19, OPAS pede prioridade para prevenção ao suicídio*. Retrieved from https://www.paho.org/pt/noticias/9-9-2021-apos-18-meses-pandemia-covid-19-opas-pede-prioridade-para-prevencao-ao-suicidio

Pan American Health Organization [PAHO]. (2022). *Histórico da pandemia de COVID-19*. Retrieved from https://www.paho.org/pt/covid19/historico-da-pandemia-covid-19

Pan American Health Organization [PAHO]. (2023). *OMS declara fim da Emergência de Saúde Pública de Importância Internacional referente à COVID-19*. Retrieved from https://www.paho.org/pt/noticias/5-5-2023-oms-declara-fim-da-emergencia-saude-publica-importancia-internacional-referente

Papadopoulou, A., Efstathiou, V., Yotsidi, V., Pomini, V., Michopoulos, I., Markopoulou, E., Papadopoulou, M., Tsigkaropoulou, E., Kalemi, G., Tournikioti, K., Douzenis, A., & Gournellis, R. (2021). Suicidal ideation during COVID-19 lockdown in Greece: Prevalence in the community, risk and protective factors. *Psychiatry Research*, *297*, 113713. https://doi.org/10.1016/j.psychres.2021.113713

Peters, M. D. J., Godfrey, C., McInerney, P., Munn, Z., Tricco, A. C., & Khalil, H. (2020). Chapter 11: Scoping Reviews (2020 version). In: Aromataris E, Munn Z (Editors). *Joanna Briggs Institute Manual for Evidence Synthesis*. Retrieved from https://jbi- global-wiki.refined.site/space/MANUAL/4687342/Chapter+11%3A+Scoping+reviews

Pirkis, J., John, A., Shin, S., DelPozo-Banos, M., Arya, V., Analuisa-Aguilar, P., Appleby, L., Arensman, E., Bantjes, J., Baran, A., Bertolote, J. M., Borges, G., Brečić, P., Caine, E., Castelpietra, G., Chang, S. S., Colchester, D., Crompton, D., Curkovic, M., … Spittal, M. J. (2021). Suicide trends in the early months of the COVID-19 pandemic: an interrupted time-series analysis of preliminary data from 21 countries. *The Lancet Psychiatry*, *8*(7), 579-588. https://doi.org/10.1016/S2215-0366(21)00091-2

Santos, M. M. S., Sampaio, J. M. F., Júnior, F. E. B., Júnior, J. C. C. L., Santos, S. M. S., Silva S. M., de Macêdo, L. R., Pereira, T. da C., Duarte, I. G. T., Siebra, F. L., Pereira G. F., & Pereira, D. F. (2020). Evaluation of stress levels and social profile of postgraduate healthcare students. *Research, Society and Development*, *9*(8), e276985776. https://doi.org/10.33448/rsd-v9i8.5776

Santos, N. M., Faustino, M. V. S., Santana, M. S., Fernandes, F. E. C. V., Diniz, L. P. M., & Santos, R. L. P. (2021). Prevalência de ideação suicida em acadêmicos da área de saúde. *Revista Eletrônica Acervo Saúde*, *13*(4), e6447. https://doi.org/10.25248/reas.e6447.2021

Schad, A., Layton, R. L., Ragland, D., & Cook, J. G. (2022). Equity, Diversity and Inclusion: Mental health in medical and biomedical doctoral students during the 2020 COVID-19 pandemic and racial protests. *eLife*, *11*, e69960. https://doi.org/10.7554/eLife.69960

Seidler, Z. E., Wilson, M. J., Oliffe, J. L., Fisher, K., O'Connor, R., Pirkis, J., & Rice, S. M. (2023). Suicidal ideation in men during COVID-19: an examination of protective factors. *BMC Psychiatry*, *23*, 46. https://doi.org/10.1186/s12888-023-04539-9

Sher, L. (2020). The impact of the COVID-19 pandemic on suicide rates. *An International Journal of Medicine*, *113*(10), 707-712. https://doi.org/10.1093/qjmed/hcaa202

Silva, J. A., & Barbosa, C. A. N. (2019). O suicídio na visão da doutrina espírita e das ciências: revisão de literatura. *Psicologia e Saúde em Debate*, *5*(2), 96-111. https://doi.org/10.22289/2446-922X.V5N2A7

Silva, L. C., Gaspar, M. A., Magalhães, F. L. F., Garcia, R. D. R., Aihara, C. H., & Mauro, M. H. (2019). Perfil dos programas de pós-graduação Stricto sensu em Gestão do Conhecimento no Brasil e seu panorama da produção científica. *Avaliação (Campinas)*, *24*(1), 328-351. https://doi.org/10.1590/s1414-407720190001000017

Silva, M. G. (2022). Capitalismo, pós-graduação e adoecimento mental. *Revista Metodologias e Aprendizado*, *5*, 1-14. https://doi.org/10.21166/metapre.v5i.2378

Silveira, M. R., Junior, F. N. F., Cocco, R. G., Felácio, R. M. & Rodrigues, L. A. (2020). Novo coronavírus (Sars-CoV-2): difusão espacial e outro patamar para a socialização dos investimentos no Brasil. *Revista Brasileira De Estudos Urbanos Regionais*, *22*. https://doi.org/10.22296/2317-1529.rbeur.202024pt

Sljivo, A., Smailbegovic, F., Mulać, A., Dadic, I., Kubat, A., & Sirucic, I. (2022). Mental Health and Substance Abuse Among the Bosnia and Herzegovina Student Population During the COVID-19 Outbreak. *Mater Sociomed*, *34*(1), 8-13. https://doi.org/10.5455/msm.2022.33.8-13

Sun, S., Goldberg, S. B., Lin, D., Qiao, S., & Operario, D. (2021). Psychiatric symptoms, risk, and protective factors among university students in quarantine during the COVID-19 pandemic in China. *Globalization and Health*, *17*, 15. https://doi.org/10.1186/s12992-021-00663-x

Tang, Y., Abildso, C. G., Lilly, C. L., Winstanley, E. L., & Rudisill, T. M. (2023). Risk Factors Associated with Driving After Marijuana Use Among US College Students During the COVID-19 Pandemic. *The Journal of Adolescent Health*, *72*(4), 544-552. https://doi.org/10.1016/j.jadohealth.2022.10.027

Tricco A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., Moher, D., Peters, M. D. J., Horsley, T., Semanas, L., Hempel, S., Akl, E. A., Chang, C., McGowan, J., Stewart, L., Hartling, L., Aldcroft, A., Wilson, M. G., Garritty, C., ... Straus, S. E. (2018). PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Annals of Internal Medicine*, *169*(7), 467-473. https://doi.org/10.7326/M18-0850

Wang, X., Hegde, S., Son, C., Keller, B., Smith, A., & Sasangohar, F. (2020). Investigating Mental Health of US College Students During the COVID-19 Pandemic: Cross-Sectional Survey Study. *Journal of Medical Internet Research*, *22*(9), e22817. https://doi.org/10.2196/22817

Wathelet, M., Horn, M., Creupelandt, C., Fovet, T., Baubet, T., Habran, E., Martignène, N., Vaiva, G., & D'Hondt, F. (2022a). Mental Health Symptoms of University Students 15 Months After the Onset of the COVID-19 Pandemic in France. *JAMA Network Open*, *5*(12), e2249342. https://doi.org/10.1001/jamanetworkopen.2022.49342

Wathelet, M., Vincent, C., Fovet, T., Notredame, C. E., Habran, E., Martignène, N., Baubet, T., Vaiva, G., & D'Hondt, F. (2022b). Evolution in French University Students' Mental Health One Month After the First COVID-19 Related Quarantine: Results from the COSAMe Survey. *Frontiers in Psychiatry*, *13*, 868369. https://doi.org/10.3389/fpsyt.2022.868369

World Health Organization [WHO]. (2021). *Uma em cada 100 mortes ocorre por suicídio, revelam estatísticas da OMS*. Geneva. Retrieved from https://www.paho.org/pt/noticias/17-6-2021-uma-em-cada-100-mortes-ocorre-por-suicidio-revelam-estatisticas-da-oms

Zeng, B., Zhao, J., Zou, L., Yang, X., Zhang, X., Wang, W., Zhao, J., & Chen, J. (2018). Depressive symptoms, post-traumatic stress symptoms and suicide risk among graduate students: The mediating influence of emotional regulatory self-efficacy. *Psychiatry Research*, *264*, 224-230. https://doi.org/10.1016/j.psychres.2018.03.022

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   - **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 http://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* (http://www.trend-statement.org).
     - 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://academic.oup.com/intqhc/article/19/6/349/1791966/Consolidated-criteria-for-reporting-qualitative).

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 www.revistasaludmental.gob.mx

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 (See ethical guidelines for publication. Add link)

     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 http://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