**UNIVERSIDADE FEDERAL DE CIÊNCIAS DA SAÚDE DE PORTO ALEGRE**

**PROGRAMA DE PÓS-GRADUAÇÃO EM CIÊNCIAS DA REABILITAÇÃO**

**Kellen Greff Ballejos**

# Avaliação da Autocompaixão, Qualidade do Sono e Dor Lombar em Adultos

Porto Alegre

2023

Catalogação na Publicação

Ballejos, Kellen Greff
Avaliação da autocompaixão, qualidade do sono e dor lombar em adultos / Kellen Greff Ballejos. -- 2024.
141 p. : il., tab. ; 30 cm.

Tese (doutorado) -- Universidade Federal de Ciências da Saúde de Porto Alegre, Programa de Pós-Graduação em Ciências da Reabilitação, 2024.

Orientador(a): Profª. Drª. Caroline Tozzi Reppold ; coorientador(a): Profª. Drª. Prisla Ücker Calvetti.

1. Autocompaixão. 2. Dor lombar. I. Título.

Sistema de Geração de Ficha Catalográfica da UFCSPA com os dados fornecidos pelo(a) autor(a).

**Kellen Greff Ballejos**

# Avaliação da Autocompaixão, Qualidade do Sono e Dor Lombar em Adultos

Tese submetida ao Programa de Pós-Graduação em Ciências da Reabilitação da Universidade Federal de Ciências da Saúde de Porto Alegre como requisito para a obtenção do grau de Doutora.

Orientadora: Profª. Drª. Caroline Tozzi Reppold

Coorientadora: Drª. Prisla Ücker Calvetti

Porto Alegre

2023

# Avaliação da Autocompaixão, Qualidade do Sono e Dor Lombar em Adultos

**BANCA AVALIADORA**

Dra. Ana Paula Porto Noronha

Pontifícia Universidade Católica de Campinas

Dra. Daniela Sacramento Zanini

Pontifícia Universidade Católica de Goiás

Dr. Luis Henrique Telles da Rosa

Universidade Federal de Ciências da Saúde de Porto Alegre

Porto Alegre

2023

**Dedicatória**

Dedico este estudo e esta conquista a Deus, minha família, amigos, clientes, colegas, professores e orientadores por todo apoio, força, incentivo e amizade. Sem a ajuda, de inúmeras formas, de todos vocês, nada disso seria possível.

## AGRADECIMENTOS

Nestes anos de doutorado e de muito estudo, gostaria de agradecer algumas pessoas que foram especiais e essenciais para essa conquista. Minha gratidão está direcionada especialmente a Deus pela saúde e pela força em todo andamento desse estudo.

Um agradecimento especial à minha família. Marido (Thiago) que sempre me incentivou e me acompanhou, meu irmão (Josias), cunhada (Alessandra), sobrinho e afilhado (William) e amigos (Karla, Maiara, Suélen e Bruno), que sempre se fizeram presentes, mesmo distantes algumas vezes, trazendo leveza, diversão e força em vários momentos.

Aos meus amados pets (Alemão, Jake, Kika, Bolota e Belinha – *in memoriam*, e gatinha), que me deram tanta alegria e foram companhias incansáveis em longas noites de estudo desde a graduação, mestrado e agora doutorado.

Aos meus pacientes que acompanharam a longa trajetória, à Estatística Cristiane Bündchen, aos colegas Bruno Schaab e Nicolas de Oliveira Cardoso por toda dedicação e disponibilidade e aos colegas do Laboratório de Avaliação Psicológica da UFCSPA.

Não poderia deixar de mencionar e agradecer as minhas orientadoras Caroline Reppold e Prisla Calvetti por todos os ensinamentos e, por fim, os professores da banca pela honra de aceitarem o convite.

A vida nos traz desafios em meio a tantos objetivos, mas com coragem tudo se torna possível. Não foi fácil até aqui, estudar praticamente a vida inteira sem pausas e em meio a tantos desafios, mas hoje concluo esta etapa com a sensação de dever cumprido.

**Epígrafe**

“Acredite que tudo vai dar certo, por mais que os objetivos estejam distantes, sempre acredite que você está a um passo de alcançá-los.”

(Peterson Knowles)

## RESUMO

A dor lombar é uma das causas de incapacidade mais prevalentes no mundo, gerando problemas de saúde pública, impactos psicossociais negativos e altos custos para a sociedade através de demandas médicas. Existe também, uma alta prevalência de dor lombar no contexto universitário, considerando que os estudantes passam períodos prolongados em postura inadequada e sofrem interferências no sono. Nesse sentido, torna-se relevante aprofundar os fatores relacionados à dor lombar, medidas preventivas e tratamentos alternativos para o público adulto. Portanto, a presente tese é constituída por dois estudos. **Artigo 1**: Foi realizada uma revisão sistemática que objetivou investigar os benefícios das intervenções baseadas em autocompaixão na dor lombar e saúde mental de adultos. O protocolo de revisão foi registrado no PROSPERO (CRD42022376341) e o método foi realizado de acordo com as diretrizes do PRISMA. As pesquisas foram realizadas utilizando as palavras-chave "autocompaixão" e "lombalgia" em português, inglês e espanhol nas seguintes bases de dados: PubMed, LILACS, SciELO, PePSIC, PsycINFO, Embase, Scopus, Web of Science e Cochrane. Foram também realizadas buscas adicionais nas referências dos estudos incluídos. Trinta e três artigos foram identificados e analisados por dois revisores independentes utilizando o Rayyan, quatro destes estudos foram inclusos. O sistema RoB 2 foi utilizado para análise do risco de viés. Os principais achados sugerem que as intervenções de meditação por autocompaixão demonstram benefícios no tratamento da dor lombar, na redução da intensidade da dor e na melhoria da aceitação da dor. **Artigo 2:** Um estudo transversal foi conduzido com o objetivo de investigar o efeito da autocompaixão na qualidade do sono e dor lombar em universitários. A amostra de 134 universitários respondeu questões sociodemográficas e escalas psicométricas, entre elas, a Depression Anxiety and Stress Scales (DASS 21), Pain Catastrophizing Scale (PCS), Pittsburgh Sleep Quality Index (PSQI) e Self-Compassion Scale (SCS). Os resultados demonstraram que a autocompaixão mediou aproximadamente 16.8% da relação de PSQ e nível de dor lombar. As análises sugerem que componentes da autocompaixão podem contribuir para o tratamento em intervenções clínicas e psicossociais para a prevenção e tratamento da dor lombar.



**Palavras-chave:** Autocompaixão; Compaixão; Lombalgia; Dor lombar; Universitários.

## ABSTRACT

Low back pain stands out as one of the most prevalent causes of disability worldwide, giving rise to public health problems, negative psychosocial impacts, and imposing high costs on society through increased medical demands. Moreover, there is a notable prevalence of low back pain within the university context, considering that students often endure prolonged periods in inadequate postures, leading to sleep interference. In this context, it is crucial to delve deeper into factors related to low back pain, as well as explore preventive measures and alternative treatments for adults. Therefore, this thesis comprises two studies. **Article 1:** A systematic review was conducted to investigate the benefits of interventions based on self-compassion for low back pain and mental health in adults. The review protocol was registered with PROSPERO (CRD42022376341), and the methodology was carried out in accordance with PRISMA guidelines. Searches were conducted using the keywords "self-compassion" and "low back pain" in Portuguese, English, and Spanish across various databases: PubMed, LILACS, SciELO, PePSIC, PsycINFO, Embase, Scopus, Web of Science, and Cochrane. Additional searches were also performed in the references of included studies. Thirty-three articles were identified and analyzed by two independent reviewers using Rayyan; four of these studies were included. The RoB 2 system was utilized to analyze the risk of bias. Key findings suggest that interventions involving self-compassion meditation demonstrate benefits in treating low back pain, reducing pain intensity, and improving pain acceptance. **Article 2:** A cross-sectional study was conducted with the aim of investigating the effect of self-compassion on sleep quality and low back pain in university students. A sample of 134 university students answered sociodemographic questions and psychometric scales, including the Depression Anxiety and Stress Scales (DASS 21), Pain Catastrophizing Scale (PCS), Pittsburgh Sleep Quality Index (PSQI), and Self-Compassion Scale (SCS). The results demonstrated that self-compassion mediated approximately 16.8% of the relationship between PSQI and the level of low back pain. Analyses suggest that components of self-compassion may contribute to clinical and psychosocial interventions for the prevention and treatment of low back pain.



**Keywords:** Self-compassion; Compassion; Low back pain; University students.

# LISTA DE FIGURAS

## ARTIGO 1

Figura 1 - Search and identification process for included studies 29

Figura 2 - Risk of bias assessment 31

## ARTIGO 2

Figura 1 - Effect of Self-Compassion Mediation on the Relationship Between Sleep Quality and Low Back Pain 46

# LISTA DE TABELAS

## ARTIGO 1

Tabela 1 - Search strategies 28
Tabela 2 - Studies and sample characteristics 30

## ARTIGO 2

Tabela 1 - Descriptive Analysis of Biopsychosocial Aspects 38
Tabela 2 - Descriptive and Comparative Analysis of Biopsychosocial Aspects, Low Back Pain, and Self-Compassion 43
Tabela 3 - Correlation between Psychological Aspects, Sleep, Low Back Pain, and Self-Compassion 44
Tabela 4 - Linear Regression Model Explaining 31.6% of Low Back Pain Variability 45
Tabela 5 - Linear Regression Model Explaining 37.2% of Self-Compassion Variability 45

## LISTA DE ABREVIATURAS E SIGLAS

| | |
|---|---|
| ANOVA | Análise da variância |
| APA | American Psychiatric Association |
| BPI | Brief Pain Inventory |
| BSI | Brief Symptom Inventory |
| CEQ | Questionário de Credibilidade/Expectativa |
| CFT | Terapia Focada na Compaixão |
| CNS | Conselho Nacional de Saúde |
| CPAQ | Questionário de Aceitação Crônica da Dor |
| DASS 21 | Depression Anxiety and Stress Scales |
| DeCS | Descritores de Ciências da Saúde |
| DL | Dor Lombar |
| DP | Desvio Padrão |
| DSM-5 | Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition |
| ESC | Ensino Superior Completo |
| ESI | Ensino Superior Incompleto |
| GAD-7 | Generalized Anxiety Disorder Scale Seven Item Version |
| IASP | Associação Internacional para o Estudo da Dor |
| IC | Intervalo de Confiança |
| ICPs | Práticas Integrativas e Complementares de Saúde |
| MAIA | Avaliação Multidimensional da Consciência Interoceptiva |
| MPQ | Questionário de Dor McGill |
| NRS | Escala de Classificação Numérica |
| OMS | Organização Mundial da Saúde |
| PCS | Pain Catastrophizing Scale |
| PHQ-9 | Questionário de Saúde do Paciente |
| PRISMA | Preferred Reporting Items for Systematic Reviews e Meta-Analyses |
| PROMIS | Sistema de Informação de Medição de Resultados de Pacientes Reportados |
| PROSPERO | Prospective Register of Systematic Reviews |
| PSEQ | Questionário de Auto-Eficácia da Dor |

| | |
|---|---|
| PSQI | Pittsburgh Sleep Quality Index |
| RCT | Ensaio Clínico Randomizado |
| RMQ | Questionário de Deficiência Roland-Morris |
| SCS | Self-Compassion Scale |
| SM | Salário Mínimo |
| SPSS | Statistical Package for the Social Science |
| STAXI-II | State-Trait Anger Expression Inventory |
| TCLE | Termo de Consentimento Livre e Esclarecido |
| UE | União Estável |
| UFCSPA | Universidade Federal de Ciências da Saúde de Porto Alegre |

## NORMATIVA

Essa tese de doutorado segue o formato proposto pelo programa de Pós-Graduação em Ciências da Reabilitação da Universidade Federal de Ciências da Saúde de Porto Alegre. Está apresentada a partir de uma contextualização suscinta sobre o tema através de dois artigos, seguidos da conclusão geral.

## SUMÁRIO

**1. CONTEXTUALIZAÇÃO** **17**
**2. OBJETIVOS** **26**
2.1 OBJETIVO GERAL 26
2.2 OBJTIVOS ESPECÍFICOS 26
**3. ARTIGO 1** **27**
**4. ARTIGO 2** **37**
**5. CONCLUSÃO GERAL** **59**
**6. IMPACTOS DO TRABALHO** **61**
**APÊNDICES** **62**
APÊNDICE A – Questionário Biopsicossocial 63
APÊNDICE B – Termo de Consentimento Livre e Esclarecido 78
**ANEXOS** **79**
ANEXO A - Depression Anxiety and Stress Scales (DASS-21) 79
ANEXO B - Pain Catastrophizing Scale (PCS) 81
ANEXO C - Pittsburgh Sleep Quality Index (PSQI-BR) 82
ANEXO D - Self-Compassion Scale (SCS) 86
ANEXO E - Normas de Submissão - Current Psychology 88
ANEXO F - Termo de Compromisso de Utilização de Dados (TCDU) 135
ANEXO G - Termo de Compromisso para Entrega de Relatórios 136
ANEXO H - Parecer do Comitê de Ética em Pesquisa (CEP) 137

# APRESENTAÇÃO

Essa tese iniciou com o propósito de investigar as relações entre a autocompaixão e fatores biopsicossociais preditores para a dor lombar em adultos, considerando a alta prevalência e as dificuldades envolvidas no contexto da dor lombar. Esses temas têm sido abordados em pesquisas, porém de forma escassa.

Entre os estudos encontrados na literatura, poucos abordam a relação entre a dor lombar e a autocompaixão, um deles associou a diminuição da dor física através da autocompaixão (Kilic et al., 2021). Já outro, evidenciou as intervenções biopsicossociais e mutidisciplinares para a dor lombar crônica, mas não através da autocompaixão (Kamper et al., 2015). Não foram encontrados estudos recentes que abordassem a relação entre a população universitária, dor lombar crônica, sono e autocompaixão. O estudo de Carson et al. (2005), apresentou redução da dor e da ansiedade, enquanto o estudo de Chapin et al. (2014), apontou a diminuição da dor e aumento da aceitação. Contudo, existe uma lacuna na literatura, considerando que os estudos citados, não ressaltam o tratamento com intervenções alternativas e não farmacológicas voltado à dor lombar crônica através da autocompaixão especificamente.

Portanto, torna-se relevante aprofundar os fatores relacionados à dor lombar através de estudos que contribuam para medidas preventivas e tratamentos alternativos que viabilizem a criação de estratégias e condições favoráveis à regulação emocional e consequentemente, a melhora da dor lombar, além do desenvolvimento de recursos complementares às terapias tradicionais. Desta maneira, contribui-se para o bem-estar de indivíduos que sofrem com a dor lombar crônica e, com a redução do sofrimento.

Desta forma, o objetivo do presente estudo foi investigar os benefícios das intervenções baseadas em autocompaixão na dor lombar e fatores biopsicossociais preditivos relacionados à saúde mental de adultos. Foram desenvolvidos dois artigos, uma revisão sistemática envolvendo os benefícios da autocompaixão para a dor lombar em adultos e um estudo transversal abordando a autocompaixão, a qualidade do sono e a dor lombar em contexto universitário.

# 1. CONTEXTUALIZAÇÃO

## 1.1 Dor lombar

Conforme a Organização Mundial da Saúde (OMS, 2013), a dor lombar crônica acomete uma grande parte da população mundial, sendo atualmente, uma importante causa de incapacidade no mundo, impactando negativamente a sociedade. A alta prevalência de dor lombar também está descrita em alguns estudos recentes (Moreno et al., 2022; Moura et al., 2022; Saltychev et al., 2023). Anatomicamente, a dor lombar está localizada na última vértebra torácica, e é considerada crônica num período igual ou superior a três meses, sendo específica ou inespecífica (Souza et al., 2016). A Associação Internacional para o Estudo da Dor (IASP, 2019), descreve a dor crônica como uma experiência incômoda, baseada em um modelo biopsicossocial.

Alguns estudos apontam que a dor lombar é considerada muldimensional e tem origem biopsicossocial, devendo ser avaliada de forma multisciplinar e subjetiva (Desconsi et al., 2019). Além dos fatores biopsicossociais, um bom prognóstico para a dor lombar também está pautado na subjetividade (Lutz et al., 2020; Mozhi & Arumugam, 2021) e estratégias combinadas (Cargnin et al., 2018).

## 1.2 Relação da dor com o sono

Existe uma relação bidirecional entre a qualidade do sono e a dor crônica. Nesse sentido, pessoas com baixa qualidade do sono apresentam níveis mais altos de dor (Bascour-Sandoval et al., 2021; Silva et al., 2020), principalmente entre a população jovem, que muitas vezes, tem rotinas exaustivas (Bascour-Sandoval et al., 2021) e posturas inadequadas por períodos prolongados (Reis et al., 2020; Tsai et al., 2023).

Distúrbios do sono envolvem interferências na qualidade, tempo e quantidade do sono que resultam em comprometimento funcional, como é o caso da dor crônica, além de interferir negativamente na qualidade de vida (Oliveira et al., 2023). Intervenções baseadas em autocompaixão aplicadas em universitários produzem efeitos significativos de proteção contra os distúrbios do sono (Pereira & Silva, 2021). Cabe ressaltar que a dor lombar se intensifica no período noturno, após haver o relaxamento do corpo, o que acaba atrapalhando a qualidade e quantidade de sono (Reis et al., 2020).

### 1.3 Relação da autocompaixão com a dor

Entre as abordagens terapêuticas não farmacológicas, as habilidades autocompassivas se destacam, considerando que o indivíduo passa a enfrentar melhor a dor através delas (Curtis & Pirie, 2018). Portanto, pessoas com níveis mais baixos de autocompaixão e dificuldades na regulação emocional sofrem de níveis mais elevados de dor (Vasconcelos et al., 2020).

Cabe destacar que a autocompaixão está associada à melhora de doenças crônicas, considerando que um indivíduo com mais autocompaixão tem melhor capacidade de viver com qualidade apesar da dor e suas crenças negativas (Boselie et al., 2018). O estudo de Penlington (2019) apresentou que intervenções baseadas na compaixão foram promissoras no gerenciamento da dor.

A autocompaixão é definida como a capacidade compassiva voltada ao próprio indivíduo. Ela envolve três principais componentes: a) bondade consigo - o indivíduo tende a ser menos autocrítico; b) senso de humanidade - aceitação de falhas; c) *mindfulness* - aceitação dos pensamentos (Neff, 2003a, 2003b, 2011).

### 1.4 Terapia Focada na Compaixão (CFT)

A dor lombar pode ser também amenizada através da Terapia Focada na Compaixão (CFT) de Gilbert (2009), que baseia-se na psicologia evolucionista e também em princípios budistas. É uma abordagem voltada à compreensão e ao alívio do sofrimento, encorajando o indivíduo a enfrentar a dor utilizando habilidades de compaixão aprendidas. Atua principalmente na flexibilização do autocriticismo, construindo a autocompaixão, reduzindo o sentimento de vergonha e aliviando os sintomas de depressão e ansiedade através de três sistemas: a) Sistema de alerta para ameaças e ativação de estratégias defensivas; b) Sistema de informação sobre a disponibilidade de recursos e recompensas e; c) Sistema de informações sobre segurança e abertura. Vale destacar que a autocrítica é um dos fatores presentes no contexto de dor lombar (Lutz et al., 2020; Mozhi & Arumugam, 2021).

### 1.5 Psicoeducação voltada à dor lombar

O modelo de Psicoeducação surgiu em 1970, através da compreensão dos aspectos envolvidos diante do adoecimento (Wood et al., 1999). Entre as abordagens não farmacológicas, a psicoeducação tem sido bem relatada para o tratamento da dor

crônica, através do autoconhecimento, treinamento de habilidades, exercícios de respiração e relaxamento (Jepegnanam et al., 2020). Portanto, a psicoeducação para a dor crônica gera uma experiência positiva por meio da aceitação e, consequentemente, à promoção da autocompaixão (Curtis & Pirie, 2018; Luo et al., 2020).

Nesse sentido, a psicoeducação voltada à autoconsciência corporal reduz as queixas de dor (Araújo et al., 2021). Vale ressaltar que, a psicoeducação é amplamente estimulada e definida pela *American Psychiatric Association* (DSM-5, 2022), como um processo de educação e orientação do paciente em relação ao enfrentamento de aspectos negativos subjetivos (Oliveira & Benincá, 2020). Ela contribui também para a adesão de tratamentos, proporcionando a diminuição de sintomas (Oliveira et al., 2023) e para o aconselhamento, baseada no modelo de crenças em saúde (Cargnin et al., 2018) e higiene do sono, principalmente entre os jovens, como prevenção da dor na fase adulta (Bascour-Sandoval et al., 2021).

### 1.6 Dor e autocompaixão em contexto universitário

A prevalência de dor lombar entre os universitários é alta, principalmente entre as mulheres e em geral, está relacionada ao sedentarismo, excesso de peso, postura inadequada por longos períodos (Nazar et al., 2022; Nery et al., 2022; Melo & Cotrim, 2020; Pereira & Silva, 2021; Sant´Anna et al., 2022; Santos et al., 2021; Tsai et al., 2023), geralmente acima de nove horas (Tsai et al., 2023) e, fatores psicológicos (Nazar et al., 2022; Nery et al., 2022; Melo & Cotrim, 2020; Pereira & Silva, 2021; Sant´Anna et al., 2022; Santos et al., 2021). Além disso, a dor lombar envolve consequências físicas, psicossociais, econômicas, no convívio com os demais, no trabalho, através do pouco tempo de descanso e na qualidade de vida, fatores que contribuem também, para a ansiedade e o estresse (Melo & Cotrim, 2020). Portanto, é considerada uma população vulnerável em termos psicológicos, sendo importante a adoção de medidas que promovam a saúde mental (Tobar et al., 2022).

Em um estudo realizado na Bahia, 62% dos universitários relataram dor lombar persistente (Barbosa et al., 2020). O contexto universitário envolve diversos fatores que contribuem para a persistência da dor lombar, entre eles a sobrecarga de estudo, distância da família, falta de suporte e dificuldades financeiras, além de altos índices de absenteísmo por períodos de dor lombar acima de 3 meses, sendo preocupante

esses aspectos em relação à futura força de trabalho relativamente jovem de um país (Nery et al., 2022).

Em geral, os universitários apresentam comportamentos de risco, como o uso de álcool, drogas, tabaco, alimentação e sono inadequados e, nesse contexto a autocompaixão se mostra eficaz e contribui como fator protetivo à saúde mental (Nazar et al., 2022; Pereira & Silva, 2021). Portanto, a autocompaixão apresenta benefícios através de um tratamento complementar para a dor lombar em universitários (Basilio et al., 2023).

**Referências**

American Psychiatric Association (2022). Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. DSM-5-TR. Washington: American Psychiatric Publishing.

Araújo, W. S., Gonçalves, I. B. de M., & Moreira, M. R. C. (2021). Body self-awareness and pain complaints in university music students. *ABCS Health Sci.* 47:e022224. https://doi.org/10.7322/abcshs.2020227.1679

Barbosa, R. M., de Moura, R. F., de Sousa, R. V. L., Silva, B. S., Petto, J., & dos Santos, A. C. N. (2020). Prevalência De Dor Crônica Em Acadêmicos De Uma Instituição De Ensino Superior Privada. *Saúde (Santa Maria)*, *46*(2). https://doi.org/10.5902/2236583442752

Bascour-Sandoval, C., Norambuena-Noches, Y., Monrroy-Uarac, M., Flández-Valderrama, J., Gálvez-Garcá, G., & Gajardo-Burgos, R. (2021). Association between sleep quality and pain in young amateur athletes / Asociación entre calidad del sueño y dolor en jóvenes atletas amateurs. *Rev. bras. med. esporte ; 27(2), 165-169.* https://doi.org/10.1590/1517-8692202127022019_0008

Basilio, L. C., Santos , M. E. P., Taube, O. S., Ferreira, B. . & Fabrin, S. (2023). "Ventosaterapia reduz a dor lombar de jovens universitários quando aplicada de forma estática em pontos gatilhos". *Revista Eletrônica Multidisciplinar de Investigação Científica*, *2*(1). https://doi.org/10.56166/remici.2023.2.v2n1.1.2.

Boselie, J. J. L. M., Vancleef, L. M. G., & Peters, M. L. (2018). Enchendo o copo: efeitos de uma intervenção psicológica positiva no desempenho de tarefas executivas em pacientes com dor crônica. *Eur J Pain, 22*(7), 1268-1280. https://doi.org/10.1002/ ejp.1214.

Cargnin, Z. A., Schneider, D. G., Vargas, M. A. de O, & Schneider, I. J. C. (2018). Incapacidade funcional e intensidade da dor na lombalgia crônica inespecíficaem trabalhadores de enfermagem. *Cogitare enferm. 24*:e65058. https://doi.org/10.5380/ce.v24i0.65058

Carson, J. W., Keefe, F. J., Lynch, T. R., Carson, K. M., Goli, V., Fras, A. M., and Thorp, S. R. (2005). Loving-Kindness Meditation for Chronic Low Back Pain: Results From a Pilot Trial. *J. Holist. Nurs.* 23, 287–304. doi: 10.1177/0898010105277651

Chapin, H. L., Darnall, B. D., Seppala, E. M., Doty, J. R., Hah, J. M., and Mackey, S.

C.(2014). Pilot study of a compassion meditation intervention in chronic pain. *J. Compassionate Health* Care 1, 1-12. doi: 10.1186/s40639- 014-0004-x

Curtis, S. A., & Pirie, K. I. (2018). Dor crônica, perda e o futuro - Desenvolvimento e avaliação de uma ferramenta inovadora e interativa de educação sobre a dor. *Br J Pain, 12*(3), 136-144. https://doi.org/10.1177 / 2049463717728809.

Desconsi, M. B., Bartz, P. T., Fiegenbaum, T. R., Candotti, C. T., & Vieira, A. (2019). Tratamento de pacientes com dor lombar crônica inespecífica por fisioterapeutas: um estudo transversal. *Fisioter. Pesqui. 26*, 15-21. https://doi:10.1590/1809-2950/17003626012019

Gilbert, P. (2009). *The compassionate Mind: How to us compassion to develop happiness, self-acceptance and well being London: Constable and Robinson Ltd.*

International Association forthe Study of Pain (2019). Chronic Pain has arrived in the ICD-11. Retrieved from: https://www. iasp-pain.org/PublicationsNews/NewsDetail.aspx?ItemNumber=8340andnavItemNumbe=643

Jepegnanam, C., Bull, E., Bansal, S., McCarthy, D., Booth, M., Purser, E., Makaka, T., Shapley, G., Cooper, J., Probert, J. & Malpus, Z. (2020). The role of the psychologist in the inpatient pain service: development and initial outcomes. *British Journal of Pain*, p.2049463720926212.

Luo, X., Liu, J., & Che, X. (2020). Investigando a influência e um mecanismo potencial de autocompaixão na dor experimental: evidências de um protocolo de autoconfiança compassiva e variação da frequência cardíaca. *J Pain, 21*(7-8): 790-797. https://doi: 10.1016 / j.jpain.2019.11.006.

Lutz, J., Berry, M. P., Napadow, V., Germer, C., Pollak, S., Gardiner, P., Edwards, R. R., Desbordes, G., & Schuman-Olivier, Z. (2020). Ativações neurais durante o processamento autorrelacionado em pacientes com dor crônica e os efeitos de um breve treinamento de autocompaixão - Um estudo piloto. *Psychiatry Res Neuroimaging, 304*: 111155. https://doi.org/10.1016 / j.pscychresns.2020.111155.

Melo, G. de P., M., & Cotrim, T. P. (2020). A dor lombar como indicador de alteração na qualidade de vida no trabalho de docentes universitários: Uma revisão da literatura. *Brazilian Journal of Development. 6*. 74905-74921. https://doi.org/10.34117/bjdv6n10-061.

Moreno, L. S., Marques, W. S., Ribeiro, S. B., & Wagmacker, D. S. (2022). Avaliação de prevalência de lombalgia em participantes de feiras de saúde em municípios do Recôncavo Baiano: um estudo transversal. *Revista Científica Multidisciplinar, 3*(5), e351456. https://doi.org/10.47820/recima21.v3i5.1456

Moura, C. C., Nogueira, D. A., Chaves, É. C. L., Lunes, D. H., Corrêa, H. P., & Chianca, T. C. M. (2022). Physical and emotional factors associated with the severity of chronic back pain in adults: a cross-sectional study. *Texto e Contexto Enferm. 31,* e20200525. https://doi.org/10.1590/1980-265x- tce-2020-0525

Mozhi, A., & Arumugam, N. (2021). Efeitos da terapia cognitivo-comportamental em pacientes com fibromialgia: um único estudo cego, randomizado e controlado. *Rev Pesqui Fisioter. 11*(1), 40-49. http://doi.org/10.17267/2238-2704rpf.v11i1.3309

Nazar, G., Arteaga-Marín, M. J., Irrázabal-Medina, B., Martínez-Matamala, S., Oñate-Salinas, V., Pinot-Aravena, D., Schade-Villagrán, C. & Bustos, C. (2022). Autorregulación y autocompasión en conductas promotoras de salud y de riesgo em estudiantes universitários. *Ciencia y Enfermería, 28*. https://doi.org/10.29393/CE28-1AAGC80001.

Neff, K. (2003a). The development and validation of scale to measure self-compassion. *Self and Identity*, 2, 223-250.

Neff, K. (2003b). Self-compassion: An alternative conceptualization of healthy attitude toward oneself. Self and Identity, 2, 85-101.

Neff, K. D. (2011). Self-compassion, self-esteem, and well-being. Social and Personality Compass, *5*(1), 1-12.

Nery, C., Santos, J., Teixeira, B., Santos, A., Veras, T., Carvalho, L., & Hazime, F. (2022). Dor crônica em universitários: parte 1: prevalência e fatores associados. *Revista Brasileira de Qualidade de Vida*. *14*. https://doi.org/10.3895/rbqv.v14n0.15763

Oliveira, C. T., & Dias, A. C. G. (2023). Como a psicoeducação pode ajudar no tratamento de transtornos mentais? *Estudos De Psicologia*, *40*.

Oliveira, M., & Benincá, C. R. S. (2020). Intervenção de psicoeducação com cuidadores familiares de pacientes submetidos à cirurgia cardíaca*. Rev. SBPH, 23*(2), 149-159.

Penlington, C. (2019). Exploring a compassion-focused intervention for persistent pain

in a group setting. *British Journal of Pain*, *13*(1), 59-66.

Pereira, M. D., & Silva, J. P. da. (2021). Self-Compassion in University Students: An Integrative Literature Review. In *SciELO Preprints*. https://doi.org/10.1590/SciELOPreprints.2521

Reis, L. P., Sanches, J. C. C., & Alves, H. E. M. (2020). Perfil de lombalgia em acadêmicos de fisioterapia: relação com colchão e decúbito durante o sono. *Disciplinarum Scientia. Série: Ciências da Saúde, 21*(1), 107-118. https://doi.org/10.37777/dscs.v21n1-010

Saltychev, M., Hellgren, H., & Juhola, J. (2023). Fatores que afetam a associação entre intensidade de dor e atividade física entre pessoas com dor lombar. *International Journal of Rehabilitation Research, 46*(3), 293-296. https://doi.org/ 10.1097/MRR.0000000000000591

Sant'Anna, P. C. F., Morimoto, T. M., Miranda, F. de S., & Garcez, A. da S. (2022). Dor lombar em estudantes universitários: qual o impacto da pandemia de COVID-19?. *Fisioterapia E Pesquisa*, *29*(3), 284-290. https://doi.org/10.1590/1809-2950/220109100922PT

Santos, F., Silva, K., & Indiara, A. (2021). A prevalência de lombalgia em universitários: revisão de literatura. *Research, Society and Development. 10*. e353101321347. https://doi.org/10.33448/rsd-v10i13.21347.

Silva, F. L. B. da, Melo, G. A. A., Santos, R. C. dos, Silva, R. A., Aguiar, L. L., & Caetano, J. Á. (2020). Avaliação da dor em pacientes com insuficiência renal crônica em hemodiálise. *Rev Rene*, *21*, e43685. Recuperado de: https://doi.org/10.15253/2175-6783.20202143685

Souza, L. K. de, & Hutz, C. H. (2016). Adaptation of the Self-Compassion Scale for Use in Brazil: Evidences of Construct Validity. *Trends in Psychology*/*Temas em Psicologia, 24*(1), 159-172. https://doi.org/10.9788/TP2016.1-11.

Tobar, C. F., Michels, M., & Franco, S. C. (2022). Autocompaixão e afetos positivos e negativos de estudantes de medicina durante a pandemia de COVID-19. *Journal of Human Growth and Development*, *32*(2), 339-350. https://doi.org/10.36311/jhgd.v32.11909

Tsai, M. C., Chu, E. T., & Lee, C. R. (2023). An Automated Sitting Posture Recognition System Utilizing Pressure Sensors. *Sensors (Basel, Switzerland)*, *23*(13), 5894. https://doi.org/10.3390/s23135894

Vasconcelos, P., Oliveira, C., & Nobre, P. (2020). Autocompaixão, regulação emocional e dor sexual feminina: uma análise exploratória comparativa. J Sex Med*, 17*(2), 289-299. https://doi.org/10.1016 / j.jsxm.2019.11.266.

Wood, M. M., Brendro, L. K., Fecser, F. A., & Nichols, P. (1999). *Psychoeducation: An Idea Whose Time Has Come*. Richmond, VA: The Council for Children with Behavioral Disorders.

World Health Organization. (2013). Health topics. Noncommunicable diseases. Geneva: World Health Organization.

# 2. OBJETIVOS

## 2.1 OBJETIVO GERAL

**a) Revisão Sistemática (Artigo 1)**

- Investigar os benefícios das intervenções baseadas em autocompaixão na dor lombar e saúde mental de adultos.

**b) Estudo Transversal (Artigo 2)**

- Investigar o efeito da autocompaixão na qualidade do sono e dor lombar em universitários.

## 2.2 OBJETIVOS ESPECÍFICOS

**a) Revisão Sistemática (Artigo 1)**

- Avaliar a associação entre dor lombar, autocompaixão e aspectos biopsicossociais;
- Identificar as características das amostras investigadas nos estudos;
- Investigar os tipos de intervenções e instrumentos utilizados nos estudos revisados;
- Apresentar os desenhos dos estudos incluídos na revisão.

**b) Estudo Transversal (Artigo 2)**

- Avaliar a relação entre autocompaixão, qualidade do sono e dor lombar em universitários;
- Investigar fatores biopsicossociais e psicológicos preditivos da autocompaixão e da dor lombar em universitários.

## 3. ARTIGO 1

(Publicado no periódico *Frontiers in Psychology*, Fator de impacto 4.232)

frontiers | Frontiers in Psychology

TYPE Systematic Review
PUBLISHED 06 November 2023
DOI 10.3389/fpsyg.2023.1270287



OPEN ACCESS

EDITED BY
Jeremy Dale,
University of Warwick, United Kingdom

REVIEWED BY
Dominik Mischkowski,
Ohio University, United States
Shyam Balasubramanian,
University Hospitals Coventry and Warwickshire NHS Trust, United Kingdom

*CORRESPONDENCE
Kellen Greff Ballejos
kellenufcspa@gmail.com

RECEIVED 31 July 2023
ACCEPTED 19 October 2023
PUBLISHED 06 November 2023

CITATION
Greff Ballejos K, Calvetti PÜ, Schaab BL and Reppold CT (2023) What are the benefits of cultivating self-compassion in adults with low back pain? A systematic review.
*Front. Psychol.* 14:1270287.
doi: 10.3389/fpsyg.2023.1270287



# What are the benefits of cultivating self-compassion in adults with low back pain? A systematic review

Kellen Greff Ballejos[1]*, Prisla Ücker Calvetti[2], Bruno Luis Schaab[2] and Caroline Tozzi Reppold[1]

[1]Psychological Assessment Laboratory, Department of Rehabilitation Sciences, Federal University of Health Sciences of Porto Alegre (UFCSPA), Porto Alegre, Brazil, [2]Psychological Assessment Laboratory, Health Sciences Program, Federal University of Health Sciences of Porto Alegre (UFCSPA), Porto Alegre, Brazil

**Introduction:** Low back pain is one of the most prevalent public health problems in the world, generating psychosocial impacts on quality of life and a high demand for medical care. Self-compassion may be beneficial for low back pain control, however, studies in the area are scarce. Therefore, this systematic review aimed to investigate the benefits of self-compassion-related interventions on low back pain and mental health in adults.

**Methods:** The review protocol was registered in PROSPERO and the method was performed according to the PRISMA guidelines. Searches were conducted using the keywords "self-compassion" and "low back pain" in Portuguese, English, and Spanish in the following databases: PubMed, LILACS, SciELO, PePSIC, PsycInfo, Embase, Scopus, Web of Science, and Cochrane. Additional searches were also conducted through the references of the included studies.

**Results:** Thirty-three articles were identified and analyzed by two independent reviewers using Rayyan. Four of these studies were included. RoB 2 was used to assess the risk of bias of each study. The main findings suggest that self-compassion-related interventions demonstrate benefits in the treatment of low back pain, as well as reduction in pain intensity, psychological stress, and improvement of pain acceptance.

**Discussion:** However, these positive data must be analyzed carefully, as only two studies presented a low risk of bias. Despite growing interest in this field, more research self-compassion-related interventions for low back pain are suggested, since biopsychosocial aspects associated with low back pain can impact the outcome of treatment.

**Systematic review registration**: https://www.crd.york.ac.uk/prospero/, identifier (CRD42022376341).

KEYWORDS

**self-compassion, low back pain, Lumbago, compassion, meditation**

## 1. Introduction

The cause of chronic low back pain is multidimensional, and its origin involves several factors, including physical, cognitive, psychological, and psychosocial aspects (Malta et al., 2017). In this sense, low back pain has become one of the most prevalent public health issues in the world, generating impacts on the quality of life of individuals affected by this condition and on society through a high demand for medical care (Shipton, 2018; Levenig et al., 2020; Riley et al., 2020; Ünal et al., 2020) and physiotherapeutic care (Pirovano et al., 2023). According to

the World Health Organization (WHO) (2003), low back pain affects 80% of the world's population at some point in their lives. It is the third cause of disability retirement and one of the main causes of absence from work for more than 7 days, being a disease with great impact on productivity and economy. For these reasons, it is among the top 10 causes of medical consultations (Bassols et al., 2003; Refshauge and Maher, 2008).

As described by International Association for the Study of Pain (2019), chronic pain is an unpleasant sensory and emotional experience, based on a biopsychosocial model. On the other hand, low back pain is located above the gluteal fold and below the twelfth rib and is considered chronic in a period equal to or greater than 3 months (de Souza et al., 2016). Chronic low back pain (CLBP) is related to biopsychosocial aspects that interfere with the individual's quality of life, such as functional disability (Garbi et al., 2014; de Souza et al., 2016; Cargnin et al., 2019; Desconsi et al., 2019), absenteeism, early retirement (Garbi et al., 2014; de Souza et al., 2016), sick leave, depression, suffering (Cargnin et al., 2019), fear (Cargnin et al., 2019; Desconsi et al., 2019), stress, anxiety (Malta et al., 2022), and high treatment costs, with social and financial impacts (Garbi et al., 2014; de Souza et al., 2016).

From the perspective of the biopsychosocial model of treatment, pain should be observed integrally, as it involves subjective beliefs (Desconsi et al., 2019), such as self-perception (Fraga et al., 2019), through which the individual may self-evaluate in a critical and negative way (Pereira and Lourenço, 2012). Thus, non-pharmacological interventions, such as those based on self-compassion, may contribute to pain management and improved mental health. Therefore, the use of self-compassionate attitudes has been increasingly studied to manage subjective negative emotions involved in pain (Neff, 2003a,b, 2011; Nonnenmacher and Pureza, 2019).

Self-compassion pertains to an individual's capacity to address their own suffering and failures with the intention of alleviating them, much like what we would do for a dear friend (Neff, 2003a,b; Neff and Germer, 2013). Additionally, self-compassion entails treating oneself with care, compassion, and kindness. It is noteworthy that there is a positive association between self-compassion and mental health related to chronic pain. Furthermore, self-compassion may reduce chronic pain (Luo et al., 2020; Vasconcelos et al., 2020).

Despite this, self-compassion is recent in the West, appearing in the literature and in clinical psychology less than 2 decades ago (Gilbert and Procter, 2006; Jazaieri et al., 2013; Neff and Germer, 2013). Self-compassion has Buddhist origins (Greater Good, 2004) and involves self-centered compassionate attributes, allowing self-acceptance in the face of human imperfection, minimizing isolation and self-criticism (Neff, 2003a,b, 2011).

The self-compassion comprises three aspects: (a) kindness and understanding—the individual tends to be kind and understanding toward himself or herself (i.e., less self-critical); (b) sense of common humanity—acceptance and recognition of flaws and defects without isolation; and (c) mindfulness—ability to keep the mind stick in present, aware, and focused on the environment through acceptance (Neff, 2003a,b, 2011; Savieto et al., 2019). These aspects can be measured through the self-compassion scale, which assess the scores of the three components of self-compassion (Neff et al., 2019).

Usually, self-compassion is addressed through two main therapeutic approaches: Compassion-Focused Therapy (Gilbert, 2014) and Mindful Self-Compassion (Germer and Neff, 2019). Despite structural differences, both approaches aim to develop self-compassionate skills (Ferrari et al., 2019). Self-compassion-related interventions encompass exercises that can address the dimensions of self-kindness, common humanity, and mindfulness either individually or in combination, depending on the specific technique (Neff, 2003a,b; Neff and Germer, 2013). For example, practices like loving-kindness meditation simultaneously teach patients how to cultivate both self-kindness and mindfulness (Neff, 2003a,b; Neff and Germer, 2013). There are numerous other techniques available for nurturing self-compassion, including composing self-compassionate letters, visualizing a compassionate self, using self-compassion mantras, and adopting the mindset of treating oneself as one would treat a friend (Neff and Germer, 2013).

Regarding the self-compassionate attitudes, the Compassion-Focused Therapy (Gilbert, 2010, 2015; Gilbert and Choden, 2014), suggests that patients with high self-compassion tend to present better mental health (Neff, 2003b; Neff et al., 2005, 2007; Lantyer et al., 2016; Nonnenmacher and Pureza, 2019; Van Niekerk et al., 2022), less pain catastrophizing (Pulvers and Hood, 2013; Hanssen et al., 2014), and suffering compared to patients with less self-compassion (Lantyer et al., 2016; Nonnenmacher and Pureza, 2019; Van Niekerk et al., 2022). In addition, self-compassion is associated with mechanisms that regulate pain, such as heart rate variability, the oxytocin and endorphin regulation systems (Lanzaro et al., 2021).

Self-compassion also works as emotion regulation strategy that can collaborate to the decrease of subjective negative states (Neff, 2003a,b; Neff et al., 2005, 2007; Cunha et al., 2013). Therefore, self-compassion is benefical in managing of chronic pain (Finan and Garland, 2015; Ong et al., 2015; Peters et al., 2017; Torrijos-Zarcero et al., 2021), including chronic low back pain (Cherkin et al., 2016; Michalsen et al., 2016; Zgierska et al., 2016; Reiner et al., 2019; Polaski et al., 2021). However, while more conscious attitudes help in the management of chronic pain, fear and emotional avoidance can harm mental health and treatment (Gilbert et al., 2014). The practice of conscious awareness through mindfulness is fundamental to ease suffering through self-compassion (Gilbert and Choden, 2014).

A prior systematic review highlighted the health benefits of self-compassion-related interventions among individuals with chronic physical health problems (Kilic et al., 2021). Compiled evidence suggests that self-compassion is associated with a decrease in physical pain, psychological distress, and improved parameters of positive mental health, such as positive affect (Kilic et al., 2021). Despite these studies, to the best of our knowledge, only one previous systematic review has evaluated the effectiveness of self-compassion-based interventions in chronic pain (Lanzaro et al., 2021). However, it selected articles from up to 2020, considering observational design articles.

Using the acronym PICO (population, intervention, comparator, and outcome), we formulated the following research question that guided the systematic review: what are the benefits of self-compassion interventions on the physical and mental health of adults with chronic low back pain? Adults refers to population, self-compassion, intervention, pain, and mental health to outcomes. Comparators were the studies' own control groups.

## 2. Methods

### 2.1. Databases and search strategy

We conducted a systematic literature review according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses

TABLE 1 Search strategies.

| Database | Search strategy |
|---|---|
| LILACS and PePSIC | (mh:(Self-Compassion) OR tw:(Autoperdão OR Autoperdón)) AND (mh:(Low Back Pain) OR tw:(Lumbago OR Lumbalgia OR lombalgia)) |
| SciELO | subject:(Self-Compassion OR Autoperdão OR Autoperdón) AND subject:(Low Back Pain OR Lumbago OR Lumbalgia OR lombalgia) |
| Embase | ("Self Compassion"/exp. OR "Self-Compassion":ti,ab,kw OR "Self-Forgiveness":ti,ab,kw OR "Self Forgiveness":ti,ab,kw) AND ("Low Back Pain"/exp. OR "Low Back Pain*":ti,ab,kw OR "Low Back Ache":ti,ab,kw OR "Low Backache":ti,ab,kw OR "Lower Back Pain*":ti,ab,kw OR Lumbago:ti,ab,kw OR "Mechanical Low Back Pain*":ti,ab,kw OR "Postural Low Back Pain*":ti,ab,kw OR "Recurrent Low Back Pain*":ti,ab,kw) |
| Scopus | TITLE-ABS-KEY("Self-Compassion" OR "Self Compassion" OR "Self-Forgiveness" OR "Self Forgiveness") AND TITLE-ABS-KEY("Low Back Pain" OR "Low Back Pain*" OR "Low Back Ache" OR "Low Backache" OR "Lower Back Pain*" OR "Lumbago" OR "Mechanical Low Back Pain*" OR "Postural Low Back Pain*"OR "Recurrent Low Back Pain*") |
| Web of Science | TS = ("Self-Compassion" OR "Self Compassion" OR "Self-Forgiveness" OR "Self Forgiveness")<br>AND TS = ("Low Back Pain" OR "Low Back Pain*" OR "Low Back Ache" OR "Low Backache" OR "Lower Back Pain*" OR "Lumbago" OR "Mechanical Low Back Pain*" OR "Postural Low Back Pain*"OR "Recurrent Low Back Pain*") |
| PsycINFO | ((IndexTermsFilt: ("Self-Compassion")) OR (Keywords: ("Self Compassion") OR Keywords: ("Self-Forgiveness") OR Keywords: ("Self Forgiveness")) OR (abstract: ("Self Compassion") OR abstract: ("Self-Forgiveness") OR abstract: ("Self Forgiveness")) OR (title: ("Self Compassion") OR title: ("Self-Forgiveness") OR title: ("Self Forgiveness"))) AND ((Keywords: ("Low Back Pain*") OR Keywords: ("Low Back Ache") OR Keywords: ("Low Backache") OR Keywords: ("Lower Back Pain*") OR Keywords: ("Lumbago") OR Keywords: ("Mechanical Low Back Pain*") OR Keywords: ("Postural Low Back Pain*") OR Keywords: ("Recurrent Low Back Pain*")) OR (title: ("Low Back Pain*") OR title: ("Low Back Ache") OR title: ("Low Backache") OR title: ("Lower Back Pain*") OR title: ("Lumbago") OR title: ("Mechanical Low Back Pain*") OR title: ("Postural Low Back Pain*") OR title: ("Recurrent Low Back Pain*")) OR (abstract: ("Low Back Pain*") OR abstract: ("Low Back Ache") OR abstract: ("Low Backache") OR abstract: ("Lower Back Pain*") OR abstract: ("Lumbago") OR abstract: ("Mechanical Low Back Pain*") OR abstract: ("Postural Low Back Pain*") OR abstract: ("Recurrent Low Back Pain*"))) |
| Cochrane Trials | ID Search Hits |
| | #1 MeSH descriptor: [Self-Compassion] explode all trees 12 |
| | #2 "Self Compassion" OR "Self-Forgiveness" OR "Self Forgiveness" 870 |
| | #3 #1 OR #2870 |
| | #4 MeSH descriptor: [Low Back Pain] explode all trees 4,577 |
| | #5 "Low Back Pain*" OR "Low Back Ache" OR "Low Backache" OR "Lower Back Pain*" OR "Lumbago" OR "Mechanical Low Back Pain*" OR "Postural Low Back Pain*"OR "Recurrent Low Back Pain*" 12,840 |
| | #6 #4 OR #512840 |
| | #7 #3 AND #6 3 |
| PubMed | (Self-Compassion[mh] OR Self Compassion[tiab] OR Self-Forgiveness[tiab] OR Self Forgiveness[tiab]) |
| | AND |
| | (Low Back Pain[mh] OR Low Back Pain*[tiab] OR Low Back Ache[tiab] OR) |
| | Low Backache[tiab] OR Lower Back Pain*[tiab] OR Lumbago[tiab] OR |
| | (Mechanical Low Back Pain*[tiab] OR Postural Low Back Pain*[tiab] OR Recurrent Low Back Pain*[tiab]) |

(PRISMA) guidelines (Moher et al., 2009; Galvão et al., 2015; Page et al., 2021). The review protocol was registered in The International Prospective Register of Systematic Reviews (PROSPERO—Free et al., 2010) and is accessible under the ID number CRD42022376341. Since there are no guidelines on how databases should be chosen when conducting a systematic review, we chose them with the assistance of a librarian with full technical knowledge of the databases PubMed, LILACS, SciELO, PePSIC, PsycINFO, Embase, Scopus, Web of Science, and Cochrane. Table 1 presents the search terms used in combination with Boolean search methods. The terms are based on the Health Science Descriptors (DeCS/MeSH). All the searches were performed between November and December 2022. The language filter used in databases was English, Spanish, and Brazilian Portuguese (Brazil), no restrictions concerning publication date were applied.

## 2.2. Eligibility criteria

The inclusion criteria used to select papers were: randomized, longitudinal clinical trial studies that used the self-compassion construct in association with low back pain in adult patients. The exclusion criteria were: gray literature data, such as book chapters, dissertations, theses, review studies, abstracts of scientific events, and incomplete or unpublished studies, in addition to studies that

addressed people with physical disabilities, cancer pain, fibromyalgia, rheumatic diseases, spinal fractures, individuals who had less than 5 years of schooling, less than 3 months of low back pain, and pregnant women.

Publications retrieved from databases were imported to the Rayyan (Ouzzani et al., 2016). Two independent reviewers analyzed the titles and abstracts of the articles according to the eligibility criteria. All studies that met the inclusion criteria were pre-selected for full-text reading and data were extracted from the included papers according to relevance.

## 2.3. Analysis of studies risk of bias and effect size

Studies risk of bias was assessed using The Risk of Bias 2 (RoB 2; Sterne et al., 2019). RoB 2 assesses the risk of bias across five domains: randomization process (D1), deviations from intended interventions (D2), missing outcome data (D3), measurement of outcomes (D4), and selection of reported results (D5), in addition to providing an overall assessment. Each of these domains, as well as the overall result, can be categorized as either low risk of bias, some concerns, or high risk of bias.

The interventions efficacy was analyzed based on Cohen *d* statistic reported in the studies. Two of the included articles did not present this measure as a result. In these cases, the Cohen *d* was calculated based on other reported statistics (e.g., Mean, standard deviation, and standard error) as suggested by the Cochrane manual (Higgins et al., 2022).

# 3. Results

The initial search identified 33 studies, after duplicates were removed 15 records remained for title and abstract screening phase. In this phase, eight papers were selected for full text review. Six studies were excluded during the full text review based on the inclusion/exclusion criteria. After full text reading, a manual search was performed in the reference lists of the two remaining studies. Two more articles were included after reading the reference lists. Therefore, four articles were included in this systematic review. Of these, two were extracted from the PubMed database and two by searching the references lists. The Figure 1 show the steps of studies selection according with the PRISMA flowchart (Page et al., 2021).

Through the analysis of the included studies, it was possible to evaluate the effects and the relationship between self-compassion, low back pain, and associated biopsychosocial aspects. Table 2 shows the main publication characteristics of the four included studies, their samples, study design, intervention types, instruments, and results.

The articles were published between 2005 and 2022, and all assessed low back pain. The measurement instruments used were: Brief Pain Inventory (BPI—Daut et al., 1983), Patient-Reported Outcomes Measurement Information System (PROMIS—Craig et al., 2014), Pain Catastrophizing Scale (PCS—Sullivan et al., 1995), Multidimensional Assessment of Interoceptive Awareness (MAIA—Mehling et al., 2012), Roland-Morris Low Back Pain and Disability Questionnaire (RMQ—Roland and Morris, 1983), Self-Compassion Scale (SCS—Neff, 2003b), Credibility/Expectancy Questionnaire (CEQ—Devilly and Borkovec, 2000), Numerical Rating Scale (NRS—Herr et al., 2004), Generalized Anxiety Disorder Seven Item Version

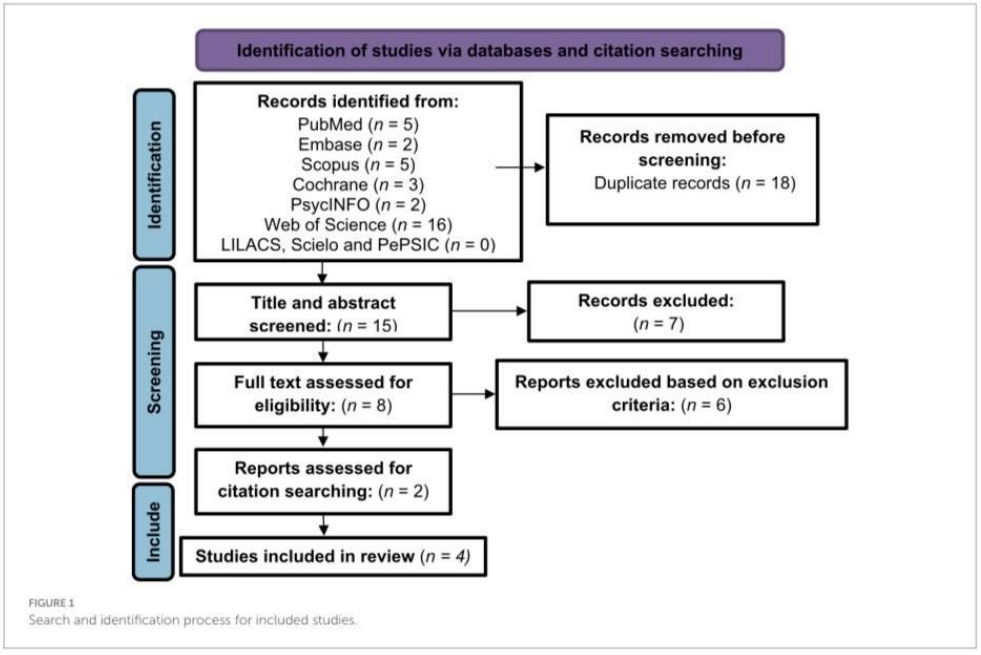



FIGURE 1
Search and identification process for included studies.

TABLE 2 Studies and sample characteristics.

| Reference | Instrument | Sample | Study Design/ Intervention Duration | Intervention Name/Techniques/ Trained Instructors | Results |
|---|---|---|---|---|---|
| Berry et al. (2020) | MAIA<br>PCS<br>PROMIS<br>RMQ<br>SCS<br>CEQ | $n = 20$, Ma = 40.15 ($SD = 12.56$), 65% women, United States | Longitudinal clinical trial (2 weeks: 6 and 4 h). 1 week follow-up | Self-Compassion Training/ Self-Compassion Psychoeducation and Loving-Kindness Meditation/Yes | Reduction in intensity (PROMIS) $d = -0.55$ ($p = 0.001$) and low back pain disability (RMQ) $d = -0.63$ ($p = 0.001$).<br>Increased self-compassion trait (SCS) $d = 0.44$ ($p = 0.020$) and Interoceptive awareness (MAIA) $d = 0.46$ ($p = 0.04$) |
| Zheng et al. (2022) | NRS<br>GAD-7<br>PHQ-9<br>PCS<br>PSEQ<br>RMQ | $n = 37$, Ma = 35.2 ($SD = 11.1$), 75.7% women, China | RCT (4 weeks: 2 h). 16 weeks follow-up | Self-Compassion Training with Core Stability Exercise/ Self-Compassion Psychoeducation and Loving-Kindness Meditation/Yes | Anxiety reduction (GAD-7) $d = -0,47$ ($p = 0.030$). Although there was no significant difference, participants quickly improved pain disability, intensity, and catastrophizing |
| Chapin et al. (2014) | PROMIS<br>BPI<br>CPAQ | $n = 12$, Ma = 48.33 ($SD = 10.80$), 83.3% women, United States | RCT (9 weeks: 2 h). 9 weeks follow-up | Compassion Cultivanting Training/Self-Compassion Psychoeducation and Loving-Kindness Meditation/Yes | Reduction in pain intensity (BPI) $d = -0.82$ ($p = 0.003$) and anger (PROMIS) $d = -0.68$ ($p = 0.01$).<br>Increase in pain acceptance $d = 0.93$ ($p = 0.01$) |
| Carson et al. (2005) | MPQ<br>BPI<br>STAXI-II<br>BSI | $n = 43$, Ma = 51.1 ($SD =$ not reported), 61% women, United States | RCT (8 weeks: 90 min). 3 months follow-up | Loving-Kindness Meditation Program/Self-Compassion Psychoeducation and Loving-Kindness Meditation/Yes | Reduction in pain intensity $d = -0.42$ ($p = 0.03$), usual pain $d = -0.42$ ($p = 0.04$) and psychological aspects (i.e., psychological distress, anxiety, anger, and tension) $d = -0.51$ |

MAIA, Multidimensional assessment of interoceptive awareness; PCS, Pain catastrophizing scale; PROMIS, Patient-reported outcomes measurement information system; RMQ, Roland-Morris disability questionnaire; SCS, Self-compassion scale; CEQ, Credibility/Expectancy questionnaire; NRS, Numerical rating scale; GAD-7, Generalized anxiety disorder scale seven item version; PHQ-9, Patient health questionnaire; PSEQ, Pain self-efficacy questionnaire; BPI, Brief pain inventory; CPAQ, Chronic pain acceptance questionnaire; MPQ, McGill pain questionnaire; STAXI-II, State–trait anger expression inventory; BSI, Brief symptom inventory; SD, Standard deviation; Ma, Mean age; RCT, Randomized clinical trial; d, Cohen's effect size; $p$ value, 95% significance level.

(GAD-7—Zhang et al., 2021), Patient Health Questionnaire (PHQ-9—Wang et al., 2014), Pain Self-Efficacy Questionnaire (PSEQ—Yang et al., 2019), Chronic Pain Acceptance Questionnaire (McCracken et al., 2004), McGill Pain Questionnaire (MPQ—Melzack, 1975), State-Trait Anger Expression Inventory (STAXI-II—Spielberger, 1999), and Brief Symptom Inventory (BSI—Derogatis and Melisaratos, 1983).

Regarding the studies design, three studies were randomized clinical trials (RCTs) and one was a longitudinal clinical trial. The population was predominantly adult women. In two of the four studies, participants had no experience with meditation. During studies interventions, all participants experienced some type of self-compassion meditation intervention. The interventions lasted between 2 and 9 weeks, with sessions ranging from one and a half to 6 h and involved self-compassion training through loving-kindness meditation in the four studies.

Self-compassion-related interventions exhibited efficacy in improving both mental health and pain parameters among adults with CLBP. In all the studies, statistically significant improvements were observed in mental health parameters, including anxiety, self-compassion, and anger. Regarding pain, all four interventions successfully mitigated its intensity, with three studies yielding statistically significant outcomes.

Lastly, a summary of the possible biases in the selected studies is presented in Figure 2. Two studies exhibited a low risk of bias (Carson et al., 2005; Zheng et al., 2022), while two studies exhibited a high risk of bias (Chapin et al., 2014; Berry et al., 2020). The primary contributing factors to the high risk of bias were deficiencies in the participant randomization process (D1) and the application of measurement procedures (D4). Missing outcome data (D3) was the sole domain in which all studies demonstrated equally satisfactory performance.

## 4. Discussion

The present study aimed to assess the benefits of self-compassion-related interventions on biopsychosocial outcomes in adults dealing with CLBP. While previous systematic reviews have examined the relationship between self-compassion, pain, and mental health (Kilic et al., 2021; Lanzaro et al., 2021), to our knowledge, our systematic review is the first to exclusively focus on individuals with CLBP. A

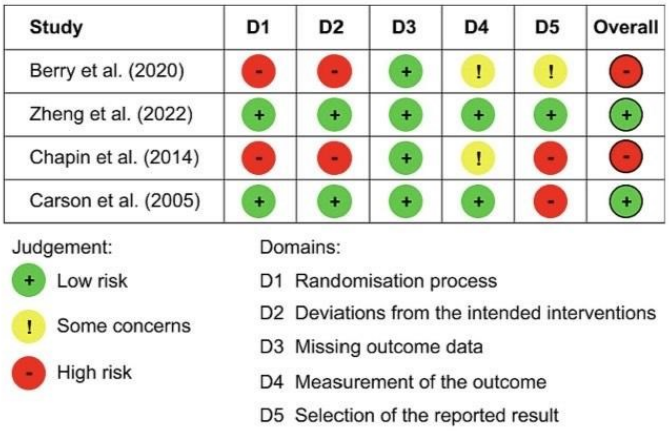



FIGURE 2
Risk of bias assessment.

notable strength of this study lies in its exclusive inclusion of RCTs and longitudinal clinical trials, designed to provide more robust evidence regarding the potential of self-compassion-related interventions. In general, the findings suggest that such interventions hold promise for enhancing the mental health and decrease pain of adults with CLBP.

A statistically significant improvement in pain intensity was observed in three of the four studies. The effect sizes suggest that this improvement was of medium magnitude in the studies by Berry et al. (2020) and Carson et al. (2005), and of large magnitude in the study by Chapin et al. (2014) (Field, 2017). These results align with evidence from previous systematic reviews that have assessed the benefits of self-compassion interventions in chronic pain across various patient populations (Misurya et al., 2020; Kilic et al., 2021; Lanzaro et al., 2021). A possible explanation is that the practice of self-compassion activates brain regions associated with pain relief, in addition to releasing neurotransmitters that can also mitigate its effects (Lanzaro et al., 2021). However, it is important to note that the precise mechanism linking pain relief and self-compassion still requires further investigation for a more comprehensive understanding. Cultivating self-compassion also helps improve self-care and disease management, as more self-compassionate individuals start to treat themselves with more care and kindness (Misurya et al., 2020).

Regarding mental health, the results also highlighted the benefits of the self-compassion-related interventions. All interventions demonstrated improvement in at least one mental health parameter. The effect sizes suggest a moderate decrease in anxiety scores in the study conducted by Zheng et al. (2022), a moderate increase in self-compassion scores as shown by Berry et al. (2020), a moderate decrease in anger scores as observed in the study of Chapin et al. (2014), and a moderate decrease in psychological aspects (which encompasses emotional distress, anxiety, and anger scores) reported by Carson et al. (2005). These findings affirm the potential of self-compassion-related interventions in enhancing mental health and are corroborated by other evidence. Previous studies suggested that self-compassion may contribute to the reduction of anger, helplessness, catastrophizing, anxiety, fear, increased acceptance, and changes pain beliefs in individuals with low back pain (Sirois et al., 2015; Torrijos-Zarcero et al., 2021; Ashar et al., 2022). Furthermore, it is through the awareness of suffering gained through mindfulness (one of the components of self-compassion), that relief can come to the individual (Gilbert and Choden, 2014).

The self-compassion training through loving-kindness meditation (Neff, 2003a; Neff and Germer, 2013) and the self-compassion psychoeducation are the main intervention analyzed in this review. Self-compassion training is a favorable resource in unpleasant situations and can improve chronic pain through embracing and accepting suffering (Carvalho et al., 2018). The psychoeducation in self-compassion is based on cognitive therapy (American Psychiatric Association, 2013), and guides the individual to coping with chronic pain through the acceptance of one's own feelings (Curtis and Pirie, 2018). From this perspective and according to the findings, psychological factors can complement non-pharmacological treatments in patients with low back pain (Smit et al., 2023). It is noteworthy that the most common, psychological factors in the literature are conscious self-compassion (Torrijos-Zarcero et al., 2021), and acceptance of chronic pain through meditation-based interventions (Garland et al., 2017; Dindo et al., 2018).

The self-compassion-related interventions were distributed between 2 and 9 weeks, with sessions lasting from one and a half to 6 h and involved the training of self-compassion through loving-kindness meditation in the four analyzed studies. This finding is supported by recent research that used meditation-based therapies for pain intensity reduction and observe treatment benefits after between 4 and 8 weeks (Cherkin et al., 2016; Michalsen et al., 2016; Zgierska et al., 2016; Reiner et al., 2019; Polaski et al., 2021). However, as with the results of this review, the literature suggests that individuals who have practiced meditation show better levels of well-being and self-compassion (Weiss et al., 2016; Camillo et al., 2022). Therefore, regardless of the

degree of exposure, self-compassion contributes to mental health, psychological and physical well-being, and eases the suffering involved in low back pain (Almeida et al., 2021; Camillo et al., 2022).

On the other hand, owing to the limited number of studies and the considerable diversity among the study populations, it is challenging to definitively determine which intervention proved to be superior. Nevertheless, the study conducted by Chapin et al. (2014) demonstrated the most substantial effect size concerning chronic pain intensity. One plausible hypothesis is the intervention's duration of 9 weeks, which was the lengthiest among all the included studies. Existing evidence suggests that intervention length may correlate with effect size in health interventions (Wakelin et al., 2021).

All the results found in this review are corroborated by the theoretical model on which it is based. Especially the reduction in pain intensity after interventions with meditation-based therapies. Therefore, meditation-based interventions, especially self-compassion meditation with psychoeducation in self-compassion, consider the context of the individual and are favorable non-pharmacological treatment options for low back pain (Camillo et al., 2022; Lin et al., 2022).

In comparison to the systematic review conducted by Lanzaro et al. (2021), this study presents some differences. Firstly, it is important to emphasize the inclusion of two newly published articles from 2020 to 2022. Additionally, a distinct feature of the present review lies in its deliberate exclusion of observational studies. This criterion enhances the precision of evidence regarding the causality between self-compassion interventions and biopsychosocial outcomes in individuals with CLBP.

### 4.1. Limitations

All studies employed meditation as the primary technique, with a particular focus on loving-kindness meditation. Loving-kindness meditation involves a specific type of breathing exercise that simultaneously encompasses the experience of self-kindness and the practice of mindfulness itself. Consequently, it may partially overlap with conventional mindfulness techniques. Therefore, a plausible hypothesis is that the observed results may stem from the mindfulness experience itself. On the other hand, it is crucial to emphasize that during the meditation practice, individuals are encouraged to extend self-kindness to themselves, which fundamentally distinguishes it from other mindfulness techniques. The overlapping nature of these constructs had been previously noted in a prior review (Wakelin et al., 2021).

Still regarding self-compassion techniques, none of the four studies presented in detail the names of the techniques used, with the exception of loving-kindness meditation and psychoeducation. Therefore, it is not possible to be sure which mechanism may have effectively contributed to the reduction in pain and improved mental health parameters. It is important that future studies test other resources of self-compassion-related interventions, such as the self-compassion letter, imagination of the compassionate self, self-compassion mantra, gratitude chart, and other widely used techniques (Neff and Germer, 2013).

Only one study assessed self-compassion as an outcome, representing a limitation. The remaining three studies should have assessed whether there were enhancements in self-compassion, with the intention of gaining a deeper insight into the connection between the suggested intervention and outcomes related to pain and mental health. It is imperative that forthcoming studies investigate whether there is an amelioration in self-compassion, as this would provide greater clarity regarding the key elements of the intervention. Additionally, the self-compassion scale enables us to evaluate which of its components were most influenced by the intervention, such as self-compassion, common humanity, or mindfulness (Neff et al., 2019).

The limited number of articles represents a constraint in this systematic review, hindering the generalization of results. Moreover, the studies featured small sample sizes, primarily comprising female participants from the United States and China. It is plausible that the language restriction to English, Spanish, and Portuguese may have resulted in the omission of potentially relevant articles. Conversely, it is crucial to underscore that one of the inclusion criteria was exclusively RCTs, which are the gold standard for establishing causal relationships (Hariton and Locascio, 2018), and longitudinal clinical trials. However, this stringent criterion may have restricted the retrieval of articles.

Finally, it is important to highlight that only two studies exhibited an overall low risk of bias as determined by the RoB 2 assessment (Carson et al., 2005; Zheng et al., 2022). Consequently, one should approach the results with caution, given that the remaining two studies (Chapin et al., 2014; Berry et al., 2020) are associated with an overall high risk of bias. It is imperative that forthcoming studies adopt more rigorous methodologies, including randomization and blinding, and pre-publish their research protocols.

## 5. Conclusion

Overall, the analyzed data demonstrated that self-compassion-related interventions improve the biopsychosocial factors involved in chronic low back pain, as pain and mental health parameters. Average meditation time was positively associated with increased self-compassion and acceptance. It was also associated with significant reductions in low back pain and its related biopsychosocial aspects (e.g., pain intensity, pain-generated disability, anxiety, anger, tension, and quickly pain relief). Therefore, self-compassion may be favorable and contribute to the non-pharmacological psychotherapeutic treatment related to low back pain, as a complementary and safe approach for patients with this condition. We further observed that the prescription of self-compassion exercises (i.e., loving-kindness meditation) is reproducible with training alone. In general, participants who try the meditation treatments through self-compassion training may experience relief of low back pain intensity and disability more quickly than those who try conventional treatment. Thus, it is suggested the adoption of therapeutic interventions based on self-compassion in the care of the individual with chronic pain, both to reduce stress and to manage pain.

Furthermore, this review findings suggest that there are few studies that specifically address the relationship between self-compassion, low back pain, and associated biopsychosocial factors, being one of the main gaps in the literature. However, research has been increasing in this direction, and the inclusion of follow-up is needed for knowledge about how long the benefits of the self-compassion component practices last. Considering the limited

number of clinical trials assessing the benefits of self-compassion interventions for individuals with chronic low back pain, we are optimistic that the positive evidence uncovered in this review will serve as an incentive for additional research. Expanding the scope of interventions will enable the development of more robust systematic reviews, including meta-analysis procedures, and facilitate broader generalizability through larger sample sizes.

## Data Availability Statement

The data analyzed in this study is subject to the following licenses/restrictions: The review dataset can be consulted from the KG upon reasonable request. Requests to access these datasets should be directed to kellenufcspa@gmail.com.

## Author contributions

KG: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Visualization, Writing – original draft, Writing – review & editing. PC: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Software, Supervision, Visualization, Writing – original draft, Writing – review & editing. BS: Data curation, Methodology, Resources, Visualization, Writing – original draft, Writing – review & editing. CR: Conceptualization, Data curation, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

## Funding

The author(s) declare that no financial support was received for the research, authorship, and/or publication of this article.

## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

## References

Almeida, N., Rebessi, I. P., Szupszynski, K., and Neufeld, C. B. (2021). Uma intervenção de terapia focada na compaixão em grupos online no contexto da pandemia por COVID-19. *Psicológica* 52:e41526. doi: 10.15448/1980-8623.2021.3.41526

American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders: DSM-5*. Washington: Author

Ashar, Y. K., Gordon, A., Schubiner, H., Uipi, C., Knight, K., Anderson, Z., et al. (2022). Effect of pain reprocessing therapy vs placebo and usual care for patients with chronic back pain. *JAMA Psychiatry* 79, 13–23. doi: 10.1001/jamapsychiatry.2021.2669

Bassols, A., Bosch, F., Campillo, M., and Baños, J. E. (2003). Back pain in the general population of Catalonia (Spain). Pre-valence, characteristics and therapeutic behavior. *Gac. Sanit.* 17, 97–107. doi: 10.1016/s0213-9111(03)71706-3

Berry, M. P., Lutz, J., Schuman-Olivier, Z., Germer, C., Pollak, S., Edwards, R. R., et al. (2020). Brief self-compassion training alters neural responses to evoked pain for chronic low back pain: a pilot study. *Pain Med.* 21, 2172–2185. doi: 10.1093/pm/pnaa178

Camillo, G. D., Antonello, C. S., and Tomazzoni, G. C. (2022). Autocompaixão e Práticas de Espiritualidade. *RAEP.* 23, 346–374. doi: 10.13058/raep.2022.v23n2.2034

Cargnin, Z. A., Schneider, D. G., Vargas, M. A. O., and Schneider, I. J. C. (2019). Incapacidade funcional e intensidade da dor na lombalgia crônica inespecífica em trabalhadores de enfermagem. *Cogit. Enferm.* 24:e65058. doi: 10.5380/ce.v24i0.65058

Carson, J. W., Keefe, F. J., Lynch, T. R., Carson, K. M., Goli, V., Fras, A. M., et al. (2005). Loving-kindness meditation for chronic low back pain: results from a pilot trial. *J. Holist. Nurs.* 23, 287–304. doi: 10.1177/0898010105277651

Carvalho, S. A., Gillanders, D., Palmeira, L., Pinto-Gouveia, J., and Castilho, P. (2018). Mindfulness, selfcompassion, and depressive symptoms in chronic pain: The role of pain acceptance. *J. Clin. Psychol.* 74, 2094–2106. doi: 10.1002/jclp.22689

Chapin, H. L., Darnall, B. D., Seppala, E. M., Doty, J. R., Hah, J. M., and Mackey, S. C. (2014). Pilot study of a compassion meditation intervention in chronic pain. *J. Compassion. Health Care* 1, 1–12. doi: 10.1186/s40639-014-0004-x

Cherkin, D. C., Sherman, K. J., Balderson, B. H., Cook, A. J., Anderson, M. L., Hawkes, R. J., et al. (2016). Effect of mindfulness-based stress reduction vs cognitive behavioral therapy or usual care on back pain and functional limitations in adults with chronic low back pain: a randomized clinical trial. *JAMA* 315, 1240–1249. doi: 10.1001/jama.2016.2323

Craig, B. M., Reeve, B. B., Brown, P. M., Cella, D., Hays, R. D., Lipscomb, J., et al. (2014). US valuation of health outcomes measured using the PROMIS-29. *Value Health* 17, 846–853. doi: 10.1016/j.jval.2014.09.005

Cunha, M., Xavier, A., and Vitória, I. (2013). Avaliação da auto-compaixão em adolescentes: Adaptação e qualidades psicométricas da escala de auto-compaixão. *RPCA* 4, 95–117.

Curtis, S. A., and Pirie, K. I. (2018). Dor crônica, perda e o futuro—Desenvolvimento e avaliação de uma ferramenta inovadora e interativa de educação sobre a dor. *Br. J. Pain* 12, 136–144. doi: 10.1177/2049463717728809

Daut, R. L., Cleeland, C. S., and Flanery, R. C. (1983). Development of the Wisconsin Brief Pain Questionnaire to assess pain in cancer and other diseases. *Pain* 17, 197–210. doi: 10.1016/0304-3959(83)90143-4

de Souza, D. P. R., De-Las-Peñas, C. F., Vallejo, F. J. M., Blanco, J. F. B., Gutiérrez, L. M., and Sendín, F. A. (2016). Differences in pain perception, health-related quality of life, disability, mood, and sleep between Brazilian and Spanish people with chronic non-specific low back pain. *Braz. J. Phys. Ther.* 20, 412–421. doi: 10.1590/bjpt-rbf.2014.0175

Derogatis, L. R., and Melisaratos, N. (1983). The Brief Symptom Inventory: An introductory report. *Psychol. Med.* 13, 595–605. doi: 10.1017/S0033291700048017

Desconsi, M. B., Bartz, P. T., Fiegenbaum, T. R., Candotti, C. T., and Vieira, A. (2019). Tratamento de pacientes com dor lombar crônica inespecífica por fisioterapeutas: um estudo transversal. *Fisioter. Pesqui.* 26, 15–21. doi: 10.1590/1809-2950/17003626012019

Devilly, G. J., and Borkovec, T. D. (2000). Psychometric properties of the credibility/expectancy questionnaire. *J. Behav. Ther. Exp. Psychiatry* 31, 73–86. doi: 10.1016/s0005-7916(00)00012-4

Dindo, L., Zimmerman, M. B., Hadlandsmyth, K., StMarie, B., Embree, J., Marchman, J., et al. (2018). Acceptance and commitment therapy for prevention of chronic postsurgical pain and opioid use in at-risk veterans: a pilot randomized controlled study. *J. Pain* 19, 1211–1221. doi: 10.1016/j.jpain.2018.04.016

Ferrari, M., Hunt, C., Harrysunker, A., Abbott, M. J., Beath, A. P., and Einstein, D. A. (2019). Self-compassion interventions and psychosocial outcomes: a meta-analysis of RCTs. *Mindfulness* 10, 1455–1473. doi: 10.1007/s12671-019-01134-6

Field, A. (2017). *Discovering Statistics Using IBM SPSS Statistics: North American Edition*. London: SAGE Publications Ltd.

Finan, P. H., and Garland, E. L. (2015). The role of positive affect in pain and its treatment. *Clin. J. Pain* 31, 177–187. doi: 10.1097/AJP.0000000000000092

Fraga, M. M., Terreri, M. T., Azevedo, R. T., Hilário, M. O. E., and Len, C. A. (2019). Percepção e enfrentamento da dor em crianças e adolescentes com fibromialgia juvenil e artrite idiopática juvenil poliarticular. *Rev. Paul. Pediatr.* 37, 11–19. doi: 10.1590/1984-0462/;2019;37;1;00006

Free, C., Phillips, G., Felix, L., Galli, L., Patel, V., and Edwards, P. (2010). The effectiveness of M-health technologies for improving health and health services: A systematic review protocol. *BMC. Res. Notes* 3:250. doi: 10.1186/1756-0500-3-250

Galvão, T. F., Pansani, T. S. A., and Harrad, D. (2015). Principais itens para relatar Revisões sistemáticas e Meta-análises: a recomendação PRISMA. *Epidemiol. Serv. Saúde* 24, 335–342. doi: 10.5123/S1679-49742015000200017

Garbi, M. O. S. S., Hortense, P., Gomez, R. R. F., Silva, T. C. R., Castanho, A. C. F., and Sousa, F. A. E. F. (2014). Intensidade de dor, incapacidade e depressão em indivíduos com dor lombar crônica. *Rev. Latino Am. Enfermagem* 22, 569–575. doi: 10.1590/0104-1169.3492.2453

Garland, E. L., Baker, A. K., Larsen, P., Riquino, M. R., Priddy, S. E., Thomas, E., et al. (2017). Randomized controlled trial of brief mindfulness training and hypnotic suggestion for acute pain relief in the hospital setting. *J. Gen. Intern. Med.* 32, 1106–1113. doi: 10.1007/s11606-017-4116-9

Germer, C., and Neff, K. D. (2019). "Mindful Self-Compassion (MSC)" in *The Handbook of Mindfulness-Based Programs: Every Established Intervention, From Medicine to Education*. ed. I. Ivtzan (London: Routledge), 357–367.

Gilbert, P. (2010). *Compassion Focused Therapy: Distinctive Features*. London: Routledge

Gilbert, P. (2014). The origins and nature of compassion focused therapy. *Br. J. Clin. Psychol.* 53, 6–41. doi: 10.1111/bjc.12043

Gilbert, P. (2015). The evolution and social dynamics of compassion. *Soc. Personal. Psychol. Compass* 9, 239–254. doi: 10.1111/spc3.12176

Gilbert, P., and Choden, (2014). *Mindful Compassion: How the Science of Compassion Can Help You Understand Your Emotions, Live in the Present, and Connect Deeply With Others*. Oakland: New Harbinger Publications

Gilbert, P., Mcewan, K., Catarino, F., Baião, R., and Palmeira, L. (2014). Fears of happiness and compassion in relationship with depression, alexithymia, and attachment security in a depressed sample. *Br. J. Clin. Psychol.* 53, 228–244. doi: 10.1111/bjc.12037

Gilbert, P., and Procter, S. (2006). Compassionate mind training for people with high shame and self-criticism: Overview and pilot study of a group therapy approach. *Clin. Psychol. Psychother.* 13, 353–379. doi: 10.1002/cpp.507

Greater Good (2004). Research on Buddhist conceptions of compassion: An annotated bibliography. Available at: https://greatergood.berkeley.edu/article/item/buddhist_conceptions_of_compassion_an_annotated_bibliography

Hanssen, M. M., Vancleef, L. M. G., Vlaeyen, J. W. S., and Peters, M. L. (2014). More optimism, less pain! The influence of generalized and pain-specific expectations on experienced cold-pressor pain. *J. Behav. Med.* 37, 47–58. doi: 10.1007/s10865-012-9463-8

Hariton, E., and Locascio, J. J. (2018). Randomised controlled trials—the gold standard for effectiveness research. *BJOG* 125, 1716–1714. doi: 10.1111/1471-0528.15199

Herr, K. A., Spratt, K., Mobily, P. R., and Richardson, G. (2004). Pain intensity assessment in older adults: Use of experimental pain to compare psychometric properties and usability of selected pain scales with younger adults. *Clin. J. Pain* 20, 207–219. doi: 10.1097/00002508-200407000-00002

Higgins, J. P. T., Thomas, J., Chandler, J., Cumpston, M., Li, T., Page, M. J., et al. (2022). *Cochrane Handbook for Systematic Reviews of Interventions version 6.3*. London: Cochrane.

International Association for the Study of Pain (2019). Chronic Pain has arrived in the ICD-11. Available at: https://www.iasp-pain.org/PublicationsNews/NewsDetail.aspx?ItemNumber=8340andnavItemNumber=643

Jazaieri, H., Jinpa, G. T., McGonigal, K., Rosenberg, E. L., Finkelstein, J., Simon-Thomas, E., et al. (2013). Enhancing compassion: a randomized controlled trial of a compassion cultivation training program. *J. Happiness Stud.* 14, 1113–1126. doi: 10.1007/s10902-012-9373-z

Kilic, A., Hudson, J., McCracken, L. M., Ruparelia, R., Fawson, S., and Hughes, L. D. (2021). A systematic review of the effectiveness of self-compassion-related interventions for individuals with chronic physical health conditions. *Behav. Ther.* 52, 607–625. doi: 10.1016/j.beth.2020.08.001

Lantyer, A. S., Varanda, C. C., Souza, F. G., Padovani, R. C., and Viana, M. B. (2016). Ansiedade e qualidade de vida entre estudantes universitários ingressantes: avaliação e Intervenção. *Rev. Bras. de Ter. Comp. Cogn.* 18, 4–19. doi: 10.31505/rbtcc.v18i2.880

Lanzaro, C., Carvalho, S. A., Lapa, T. A., Valentim, A., and Gago, B. (2021). A systematic review of self-compassion in chronic pain: from correlation to efficacy. *Span. J. Psychol.* 24:e26. doi: 10.1017/SJP.2021.22

Levenig, C. G., Kellmann, M., Kleinert, J., Belz, J., Hesselmann, T., Heidari, J., et al. (2020). Body image in athletes and nonathletes with low back pain: avoidance-endurance-related subgroups and sports status play a role. *J. Sport Rehabil.* 30, 182–189. doi: 10.1123/jsr.2019-0245

Lin, T.-H., Tam, K.-W., Yang, Y.-L., Liou, T.-H., Hsu, T.-H., and Rau, C.-L. (2022). Meditation-based therapy for chronic low back pain management: a systematic review and meta-analysis of randomized controlled trials. *Pain Med.* 23, 1800–1811. doi: 10.1093/pm/pnac037

Luo, X., Liu, J., and Che, X. (2020). Investigating the influence and a potential mechanism of self-compassion on experimental pain: Evidence from a compassionate self-talk protocol and heart rate variability. *J. Pain* 21, 790–797. doi: 10.1016/j.jpain.2019.11.006

Malta, D. C., Bernal, R. T. I., Ribeiro, E. G., Ferreira, E. M. R., Pinto, R. Z., and Pereira, C. A. (2022). Dor crônica na coluna entre adultos brasileiros: Dados da Pesquisa Nacional de Saúde 2019. *Rev. Bras. Epidemiol.* 25:e220032. doi: 10.1590/1980-549720220032.2

Malta, D. C., Oliveira, M. M., Andrade, S. S. C. A., Caiaffa, W. T., Souza, M. F. M., and Bernal, R. T. I. (2017). Factors associated with chronic back pain in adults in Brazil. *Rev. Saúde Públ.* 51, 9s–12s. doi: 10.1590/s1518-8787.2017051000052

McCracken, L. M., Vowles, K. E., and Eccleston, C. (2004). Acceptance of chronic pain: Component analysis and a revised assessment method. *Pain* 107, 159–166. doi: 10.1016/j.pain.2003.10.012

Mehling, W. E., Price, C., Daubenmier, J. J., Acree, M., Bartmess, E., and Stewart, A. (2012). The multidimensional assessment of interoceptive awareness (MAIA). *PLoS One* 7:e48230. doi: 10.1371/journal.pone.0048230

Melzack, R. (1975). The McGill Pain Questionnaire: Major properties and scoring methods. *Pain* 1, 277–299. doi: 10.1016/0304-3959(75)90044-5

Michalsen, A., Kunz, N., Jeitler, M., Brunnhuber, S., Meier, L., Lüdtke, R., et al. (2016). Effectiveness of focused meditation for patients with chronic low back pain—a randomized controlled clinical trial. *Complement. Ther. Med.* 26, 79–84. doi: 10.1016/j.ctim.2016.03.010

Misurya, I., Misurya, P., and Dutta, A. (2020). The effect of self-compassion on psychosocial and clinical outcomes in patients with medical conditions: a systematic review. *Cureus.* 12:e10998. doi: 10.7759/cureus.10998

Moher, D., Liberati, A., Tetzlaff, J., and Altman, D. G.PRISMA Group (2009). Preferred reporting items for systematic reviews and metaanalyses: The PRISMA statement. *PLoS Med.* 6:e1000097. doi: 10.1371/journal.pmed.100009

Neff, K. (2003a). Self-compassion: an alternative conceptualization of a healthy attitude toward oneself. *Self Identity* 2, 85–101. doi: 10.1080/15298860309032

Neff, K. D. (2003b). The development and validation of a scale to measure self-compassion. *Self Identity* 2, 223–250. doi: 10.1080/15298860309027

Neff, K. D. (2011). Self-compassion, self-esteem, and well-being: self-compassion, self-esteem, and well-being. *Soc. Personal. Psychol. Compass* 5, 1–12. doi: 10.1111/j.1751-9004.2010.00330.x

Neff, K. D., and Germer, C. K. (2013). A pilot study and randomized controlled trial of the mindful self-compassion program. *J. Clin. Psychol.* 69, 28–44. doi: 10.1002/jclp.21923

Neff, K. D., Hsieh, Y.-P., and Dejitterat, K. (2005). Self-compassion, achievement goals, and coping with academic failure. *Self Identity* 4, 263–287. doi: 10.1080/13576500444000317

Neff, K. D., Kirkpatrick, K. L., and Rude, S. S. (2007). Self-compassion and adaptive psychological functioning. *J. Res. Pers.* 41, 139–154. doi: 10.1016/j.jrp.2006.03.004

Neff, K. D., Tóth-Király, I., Yarnell, L. M., Arimitsu, K., Castilho, P., Ghorbani, N., et al. (2019). Examining the factor structure of the self-compassion scale in 20 diverse samples: support for use of a total score and six subscale scores. *Psychol. Assess.* 31, 27–45. doi: 10.1037/PAS0000629

Nonnenmacher, C. A. D., and Pureza, J. R. (2019). As relações entre a autocompaixão, a ansiedade social e a segurança social. *Context. Clin.* 12, 1000–1027. doi: 10.4013/ctc.2019.123.14

Ong, A. D., Zautra, A. J., and Reid, M. C. (2015). Chronic pain and the adaptive significance of positive emotions. *Am. Psychol.* 70, 283–284. doi: 10.1037/a0038816

Ouzzani, M., Hammady, H., Fedorowicz, Z., and Elmagarmid, A. (2016). Rayyan—a web and mobile app for systematic reviews. *Syst. Rev.* 5, 1–10. doi: 10.1186/s13643-016-0384-4

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., et al. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 372:71. doi: 10.1136/bmj.n71

Pereira, S. M., and Lourenço, L. M. (2012). The bibliometric study about social anxiety disorder of university. *Arq. Bras. Psicol.* 64, 47–62.

Peters, M. L., Smeets, E., Feijge, M., van Breukelen, G., Andersson, G., Buhrman, M., et al. (2017). Happy despite pain: a randomized controlled trial of an 8-week internet-delivered positive psychology intervention for enhancing well-being in patients with chronic pain. *Clin. J. Pain* 33, 962–975. doi: 10.1097/AJP.0000000000000494

Pirovano, G. J., Pinto, D. C., and do Nascimento, F. R. (2023). A dor em pacientes com lombalgia crônica, sua relação com o sistema nervoso autônomo e a terapia manual. *Monumenta Rev. Estud. Interdiscipl.* 3, 95–126.

Polaski, A. M., Phelps, A. L., Smith, T. J., Helm, E. R., Morone, N. E., Szucs, K. A., et al. (2021). Integrated meditation and exercise therapy: a randomized controlled pilot of a combined nonpharmacological intervention focused on reducing disability and pain in patients with chronic low back pain. *Pain Med.* 22, 444–458. doi: 10.1093/pm/pnaa403

Pulvers, K., and Hood, A. (2013). The role of positive traits and pain catastrophizing in pain perception. *Curr. Pain Headache Rep.* 17:330. doi: 10.1007/s11916-013-0330-2

Refshauge, K. M., and Maher, C. G. (2008). Low back pain investigations and prognosis: a review. *Br. J. Sports Med.* 40, 494–498. doi: 10.1136/bjsm.2004.016659

Reiner, K., Shvartzman, P., Cohen, Z. Z., and Lipsitz, J. D. (2019). Assessing the effectiveness of mindfulness in the treatment of chronic back pain: use of quantitative sensory pain assessment. *Mindfulness* 10, 943–952. doi: 10.1007/s12671-018-1053-6

Riley, S. P., Bialosky, J., and Coronado, R. A. (2020). Are changes in fear-avoidance beliefs and self-efficacy mediators of function and pain at discharge in patients with acute and chronic low back pain? *J. Orthop. Sports Phys. Ther.* 50, 301–308. doi: 10.2519/jospt.2020.8982

Roland, M., and Morris, R. (1983). A study of the natural history of back pain. Part I: Development of a reliable and sensitive measure of disability in low-back pain. *Spine* 8, 141–144. doi: 10.1097/00007632-198303000-00004

Savieto, R. M., Mercer, S., Matos, C. C. P., and Leão, E. R. (2019). Enfermeiros na triagem no serviço de emergência: autocompaixão e empatia. *Rev. Latino Am. Enfermagem* 27:e3151. doi: 10.1590/1518-8345.3049.3151

Shipton, E. A. (2018). Physical therapy approaches in the treatment of low back pain. *Pain Ther.* 7, 127–137. doi: 10.1007/s40122-018-0105-x

Sirois, F. M., Kitner, R., and Hirsch, J. K. (2015). Self-compassion, affect, and health-promoting behaviors. *Health Psychol.* 34, 661–669. doi: 10.1037/hea0000158

Smit, T., Mayorga, N. A., Rogers, A. H., Nizio, P., and Zvolensky, M. J. (2023). Chronic pain acceptance: Relations to opioid misuse and pain management motives among individuals with chronic low back pain. *Addict. Behav.* 136:107495. doi: 10.1016/j.addbeh.2022.107495

Spielberger, C. D. (1999). *Professional Manual for the State-Trait Anger Expression Inventory-2 (STAXI-2)*. Odessa: Psychological Assessment Resources

Sterne, J. A. C., Savović, J., Page, M. J., Elbers, R. G., Blencowe, N. S., Boutron, I., et al. (2019). RoB 2: a revised tool for assessing risk of bias in randomised trials. *BMJ* 366:l4898. doi: 10.1136/bmj.l4898

Sullivan, M. J. L., Bishop, S. R., and Pivik, J. (1995). The Pain Catastrophizing Scale: Development and validation. *Psychol. Assess.* 7, 524–532. doi: 10.1037/1040-3590.7.4.524

Torrijos-Zarcero, M., Mediavilla, R., Rodríguez-Vega, B., Del Río-Diéguez, M., López-Álvarez, I., Rocamora-González, C., et al. (2021). Mindful self-compassion program for chronic pain patients: a randomized controlled trial. *Eur. J. Pain* 25, 930–944. doi: 10.1002/ejp.1734

Ünal, M., Evcik, E., Kocatürk, M., and Algun, Z. C. (2020). Investigating the effects of myofascial induction therapy techniques on pain, function and quality of life in patients with chronic low back pain. *J. Bodyw. Mov. Ther.* 24, 188–195. doi: 10.1016/j.jbmt.2020.07.014

Van Niekerk, L., Johnstone, L., and Matthewson, M. (2022). Predictors of self-compassion in endometriosis: the role of psychological health and endometriosis symptom burden. *Hum. Reprod.* 37, 264–273. doi: 10.1093/humrep/deab257

Vasconcelos, P., Oliveira, C., and Nobre, P. (2020). Autocompaixão, regulação emocional e dor sexual feminina: uma análise exploratória comparativa. *J. Sex. Med.* 17, 289–299. doi: 10.1016/j.jsxm.2019.11.266

Wakelin, K. E., Perman, G., and Simonds, L. M. (2021). Effectiveness of self-compassion related interventions for reducing self-criticism: a systematic review and meta-analysis. *Clin. Psychol. Psychother.* 29, 1–25. doi: 10.1002/cpp.2586

Wang, W., Bian, Q., Zhao, Y., Li, X., Wang, W., Du, J., et al. (2014). Reliability and validity of the Chinese version of the Patient Health Questionnaire (PHQ-9) in the general population. *Gen. Hosp. Psychiatry* 36, 539–544. doi: 10.1016/j.genhosppsych.2014.05.021

Weiss, L. A., Westerhof, G. J., and Bohlmeijer, E. T. (2016). Can we increase psychological well-being? The effects of interventions on psychological well-being: a meta-analysis of randomized controlled trials. *PLoS One* 11:e0158092. doi: 10.1371/journal.pone.0158092

World Health Organization (2003). ICF: International Classification of Functioning, Disability and Health. World Health Organization. Available at: https://www.who.int/standards/classifications/international-classification-of-functioning-disability-and-health

Yang, Y., Mingyuan, Y., Bai, J., Zhao, J., Chen, K., Zhou, X., et al. (2019). Validation of simplified Chinese version of the pain self-efficacy questionnaire (SC-PSEQ) and SC-PSEQ-2 for patients with non-specific low back pain in mainland china. *Spine* 44, E1219–E1226. doi: 10.1097/BRS.0000000000003099

Zgierska, A. E., Burzinski, C. A., Cox, J., Kloke, J., Stegner, A., Cook, D. B., et al. (2016). Mindfulness meditation and cognitive behavioral therapy intervention reduces pain severity and sensitivity in opioid-treated chronic low back pain: pilot findings from a randomized controlled trial. *Pain Med.* 17, 1865–1881. doi: 10.1093/pm/pnw006

Zhang, C., Wang, T., Zeng, P., Zhao, M., Zhang, G., Zhai, S., et al. (2021). Reliability, Validity, and Measurement Invariance of the General Anxiety Disorder Scale Among Chinese Medical University Students. *Front. Psychol.* 12:648755. doi: 10.3389/fpsyt.2021.648755

Zheng, F., Zheng, Y., Liu, S., Yang, J., Xiao, W., Xiao, W., et al. (2022). The effect of M-health-based core stability exercise combined with self-compassion training for patients with nonspecific chronic low back pain: a randomized controlled pilot study. *Pain Ther.* 11, 511–528. doi: 10.1007/s40122-022-00358-0

## 4. ARTIGO 2

# EFFECT OF SELF-COMPASSION ON SLEEP QUALITY AND LOW BACK PAIN IN UNIVERSITY STUDENTS: A CROSS-SECTIONAL STUDY

(Formatado conforme as normas do periódico *Current Psychology*, Qualis A1, Fator de impacto 2.387)

Kellen Greff Ballejos[1], Prisla Ücker Calvetti[1], Caroline Tozzi Reppold[1]

---

Kellen Greff Ballejos

kelleng@ufcspa.edu.br

[1]Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA). R. Sarmento Leite, 245 – Centro Histórico, Porto Alegre/RS, 90050-170.

**Abstract**

Low back pain is a prevalent issue among university students, leading to biopsychosocial impacts. Non-pharmacological treatments, including self-compassion, have shown evidence in managing low back pain; however, research in this area remains limited. This cross-sectional study aims to investigate the influence of self-compassion on sleep quality and low back pain in university students. Participants completed an instrument with sociodemographic questions and psychometric scales, encompassing the Depression Anxiety and Stress Scales (DASS 21), Pain Catastrophizing Scale (PCS), Pittsburgh Sleep Quality Index (PSQI), and Self-Compassion Scale (SCS). Results indicate that self-compassion mediated approximately 16.8% of the relationship between PSQ and the level of low back pain. In this context, PSQ predicts self-compassion and low back pain, while self-compassion predicts low back pain. It is recommended that future studies on the assessment and interventions involving self-compassion components also incorporate the evaluation of sleep quality and pain in university students.

**Keywords:** self-compassion, sleep quality, low back pain, university students.

## Introduction

According to the World Health Organization (WHO, 2013), chronic low back pain stands out as one of the most common global public health problems, generating diverse impacts on society through biopsychosocial factors (Moura et al., 2022; Saltychev et al., 2023). Consequently, it leads to absenteeism, heightened medical costs (Souza et al., 2016; Unal et al., 2020), depression (Steven et al., 2023), stress, and anxiety (Malta et al., 2022).

The prevalence of low back pain is also notably high within academic settings (Barbosa et al., 2021; Morais et al., 2019; Nascimento et al., 2022). This is especially true for university students who endure prolonged periods in improper postures (Geller et al., 2023). Additionally, this population contends with disruptions in sleep patterns inherent to the academic environment (Nascimento et al., 2022). It is crucial to highlight that sleep significantly influences overall physical and mental health (Mesquita et al., 2023). Not only does lower-quality sleep contribute to heightened low back pain levels (Tesfaye et al., 2023), but it is also a predictor of stress, anxiety, and depression (Eilayyan et al., 2023).

Beyond psychological factors, the high prevalence of low back pain among university students is linked to a sedentary lifestyle and overweight (Nazar et al., 2022; Nery et al., 2022; Melo & Cotrim, 2020; Pereira & Silva, 2021; Sant´Anna et al., 2022; Santos et al., 2021), as well as inadequate nutrition (Nazar et al., 2022; Pereira & Silva, 2021). It's important to note that the university context also involves financial challenges and interpersonal relationship difficulties (Melo & Cotrim, 2020). Additionally, the combination of study overload and episodes of low back pain lasting more than three months exacerbates these challenges (Nery et al., 2022).

Clinical practice guidelines recommend a biopsychosocial and non-pharmacological treatment model for low back pain (Lin et al., 2020), acknowledging the role of subjective beliefs in pain perception (Desconsi et al., 2019), including catastrophizing (Van-Niekerk et al., 2022). In line with this, Gilbert (2015) proposes, through Compassion-Focused Therapy, that individuals with self-compassionate skills experience improved mental health by effectively managing the negative subjective emotions associated with pain (Neff, 2003a, 2003b, 2011).

Hence, self-compassion emerges as a beneficial emotional regulation strategy with a focus on subjectivity (Neff, 2003a, 2003b; Neff et al., 2005, 2007; Cunha et al.,

2013) and the management of chronic low back pain (Polaski et al., 2021). Rooted in Buddhist traditions, self-compassion contributes to self-acceptance and the reduction of self-criticism (Neff, 2003a, 2003b, 2011) through the cultivation of self-compassionate skills (Ferrari et al., 2019). Its components include kindness, a sense of humanity, and mindfulness (Neff, 2003a, 2003b, 2011), which are measured and evaluated using the self-compassion scale (Neff et al., 2019).

While a systematic review has endorsed the benefits of biopsychosocial and multidisciplinary interventions for chronic low back pain (Kamper et al., 2015), self-compassion has not been emphasized. Another review associated self-compassion with a reduction in physical pain (Kilic et al., 2021), but without specific reference to chronic low back pain. Recognizing these gaps, it is noteworthy that, apart from the two studies mentioned, only one systematic review has evaluated treatments targeting self-compassion in chronic pain, albeit not focusing on the university population and limited to articles up to 2020 (Lanzaro et al., 2021).

Therefore, this study aims to investigate the impact of self-compassion on sleep quality and low back pain in university students. The hypothesis posits that university students experience inadequate sleep conditions, coupled with biopsychosocial factors that diminish self-compassion, thereby predisposing them to low back pain.

## Method

### Participants

Through sample calculation, 67 participants were estimated. At the end of data collection, the sample comprised 134 university students. Inclusion criteria were adults in the public or private health network, over 18 years old, and diagnosed with low back pain. Exclusion criteria were adults who had not enrolled in higher education or postgraduate studies.

**Table 1** Descriptive Analysis of Biopsychosocial Aspects (n = 134)

| **Variable** | **Category** | ***n*** | **%** |
|---|---|---|---|
| Sex | Female | 101 | 75,4 |
| | Male | 33 | 24,6 |
| Ethnicity | White | 112 | 83,6 |

| | | | |
|---|---|---|---|
| | Others | 22 | 16,4 |
| Marital Status | Married/SU | 67 | 50,0 |
| | Singles | 51 | 38,1 |
| | Others | 16 | 11,9 |
| Chidren | Yes | 58 | 43,3 |
| | No | 76 | 56,7 |
| Income | < 1 MW | 15 | 11,2 |
| | 1 to 2 MW | 21 | 15,7 |
| | 2 to 4 MW | 18 | 13,4 |
| | 4 to 6 MW | 21 | 15,7 |
| | 6 to 8 MW | 18 | 13,4 |
| | > 8 MW | 41 | 30,6 |
| Education | IHE | 24 | 17,9 |
| | CHE | 22 | 16,4 |
| | Postgraduate | 88 | 65,7 |
| Main position | Sitting | 123 | 91,8 |
| | Lying down | 5 | 3,7 |
| | Standing | 26 | 19,4 |
| Physical exercise | No | 44 | 32,8 |
| | Yes | 90 | 67,2 |
| Hours of sleep | 1 to 6 | 63 | 47,0 |
| | > 7 | 71 | 53,0 |
| Sleep period | Daytime | 7 | 5,2 |
| | Nocturnal | 127 | 94,8 |
| Frequent tiredness | Yes | 89 | 66,4 |
| | No | 45 | 33,6 |
| Adequate weigth | Yes | 53 | 39,6 |
| | No | 81 | 60,4 |
| Family history of LBP | Yes | 93 | 69,4 |
| | No | 41 | 30,6 |
| Chronic disease beyond LBP | Yes | 43 | 32,1 |
| | No | 91 | 67,9 |
| Medication for LBP | Yes, 3 to 12 m | 8 | 6,0 |
| | Yes, > 1 year | 13 | 9,7 |
| | No | 113 | 84,3 |

| | | | |
|---|---|---|---|
| Does not carry out LBP activities | Yes, rarely | 46 | 34,3 |
| | Yes, >= 1x m | 30 | 22,4 |
| | No | 58 | 43,3 |
| Duration of LBP | Minutes | 23 | 17,2 |
| | Hours | 59 | 44,0 |
| | Days | 36 | 26,9 |
| | Months | 16 | 11,9 |
| How long have you felt LBP | < 3 m | 19 | 14,2 |
| | > 3 m | 115 | 85,8 |
| LBP in the last year | < 1 | 24 | 17,9 |
| | 2 to 3 | 40 | 29,9 |
| | 4 to 5 | 19 | 14,2 |
| Support network | Yes | 119 | 88,8 |
| | No | 15 | 11,2 |
| Professional diagnosis of MD | Yes | 66 | 49,3 |
| | No | 68 | 50,7 |
| Psychiatric medication | Yes, < 1 year | 4 | 3,0 |
| | Yes, > 1 year | 29 | 21,6 |
| | No | 101 | 75,4 |
| Anxiety crisis | Yes, < 3 m | 33 | 24,6 |
| | Yes, between 3 and 6 m | 30 | 22,4 |
| | Yes, > 1 year | 40 | 29,9 |
| | No | 31 | 23,1 |
| Treatment for LBP | Yes | 89 | 66,4 |
| | No | 45 | 33,6 |

*Note.* N: represents the number participants; Ethnicity (others): brown, black, yellow and undeclared; SU: Stable Union; MW: Minimum Wage; IHE: Incomplete Higher Education; CHE: Complete Higher Education; LBP: Low Back Pain; m: month; MD: Mental Disorder.

## Instruments

### Depression Anxiety and Stress Scale (DASS – 21)

The DASS-21 assesses symptoms of depression, anxiety, and stress, indicating the extent to which individuals experienced these symptoms in the previous week. Responses are

recorded on a 4-point Likert scale. This 21-item instrument, developed by Lovibond & Lovibond (1995), was adapted for use in Brazil by Vignola and Tucci (2014; Martins et al, 2019), demonstrating adequate precision estimates (alphas between 0.86 and 0.92) and content-based validity evidence in internal and external criteria. In the current study, the scale exhibited satisfactory internal consistency: $\alpha = 0.91$ (stress), $\alpha = 0.90$ (anxiety), and $\alpha = 0.92$ (depression).

**Pain Catastrophizing Scale (PCS)**

The PCS evaluates the level of catastrophizing thoughts about pain, with patients reporting the intensity of these thoughts or feelings. Responses are recorded using a 5-point Likert scale. This 13-item instrument, developed by Sullivan et al. (1995) and adapted for Brazil by Sardá Junior et al. (2008), demonstrated reliable precision estimates (alphas between 0.91 and 0.93) and validity evidence based on external criteria. In the present study, the scale showed excellent internal consistency: $\alpha = 0.95$.

**Pittsburgh Sleep Quality Index (PSQI)**

The PSQI evaluates sleep quality over the past month in chronic pain patients. Responses are recorded on a 3-point Likert scale. Comprising 19 items, the scale's factorial structure is organized into 7 factors (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disorders, use of sleeping medication, and daytime dysfunction). Developed by Buysse (1989) and adapted for Brazil by Bertolazi et al. (2011), the instrument exhibited reliable precision estimates (alphas between 0.73 and 0.75) and validity evidence based on internal consistency. In the present study, the scale demonstrated satisfactory internal consistency: $\alpha = 0.81$.

**Self-Compassion Scale (SCS)**

The SCS assesses self-compassion and is administered using a 5-point Likert scale. This 26-item instrument's factor structure comprises 6 factors: kindness to oneself, severe self-criticism, sense of humanity, isolation, Mindfulness, and over-identification. Developed

by Neff (2003) and adapted by Souza and Hutz (2013, 2016), the original instrument demonstrates reliable precision estimates (alpha of 0.92) and validity evidence based on internal consistency. In the current study, the scale exhibited robust internal consistency with $\alpha = 0.94$.

**Procedures**

Initially, potential venues for disseminating the research were explored. After prospecting, the research was widely promoted in clinics and universities, utilizing social networks, bulletin boards, and emails. Data collection commenced on January 2023 through the Google Forms platform and concluded on March 31, 2023.

**Data Analysis**

Categorical variables were presented as absolute and relative frequencies, while quantitative variables were expressed as mean and standard deviation. Pearson's correlation coefficient was employed for correlation verification (Cohen, 1988). Student's t-test was applied for comparisons involving binary categorical variables, and ANOVA was utilized for other variables. Multiple linear regression models were employed to identify psychological factors associated with self-compassion and the level of low back pain. Factors with significant correlations were selected, incorporating global Catastrophizing and Self-compassion scores, alongside covariates of interest such as gender and duration of backache. The stepwise variable selection method was utilized. We investigated the mediating effect of self-compassion on the relationship between PSQ and low back pain through Model 4 (Hayes, 2013) using the PROCESS macro. The bootstrapping method with 2000 samples generated the 95%BCa CI, where the effect was considered significant if zero was not encompassed within the interval limits. The analyses were conducted using SPSS version 25 software.

**Ethical Procedures**

The project underwent scrutiny by the UFCSPA Research Ethics Committee and

commenced only after receiving approval (CAAE 50814221.0.0000.5345). The study adhered to the guidelines established by the National Health Council (NHC), specifically Resolution 466/2012 (NHC, 2012) and 510/2016 (NHC, 2016), which govern research involving human subjects in Brazil. Participants were informed of the research objectives and procedures through the Free and Informed Consent Form.

## Results

The descriptive and comparative analysis concerning biopsychosocial aspects, low back pain, and self-compassion is presented in **Table 2**.

**Table 2** Descriptive and Comparative Analysis of Biopsychosocial Aspects, Low Back Pain, and Self-Compassion

| | | **Low Back Pain** | | | | **Self-Compassion** | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Variable** | **Category** | **M** | **SD** | **p-value** | ***d*** | **M** | **SD** | **p-value** | ***d*** |
| Sex | Female | 4,92 | 2,26 | **0,005** | 0,57 | 2,89 | 0,89 | 0,701 | 0,08 |
| | Male | 3,64 | 2,15 | | | 2,96 | 0,72 | | |
| Sleep | Daytime | 6,71 | 1,80 | **0,012** | 0,99 | 3,07 | 1,06 | 0,616 | 0,19 |
| | Nocturnal | 4,49 | 2,26 | | | 2,90 | 0,84 | | |
| Medication for LBP | 3 to 12 m | 6,50 | 2,45 | | | 3,07 | 1,02 | | |
| | > 1 year | 7,08 | 1,50 | | | 2,84 | 0,84 | | |
| | No | 4,19 | 2,12 | **0,000** | 0,18 | 2,91 | 0,85 | 0,835 | 0,00 |
| Duration of LBP | Minutes | 2,52 | 1,70 | **0,000** | 0,20 | 3,17 | 0,75 | 0,210 | 0,03 |
| | Hours | 4,83 | 2,17 | | | 2,78 | 0,85 | | |
| | Days | 4,92 | 2,33 | | | 2,87 | 0,84 | | |
| | Months | 6,06 | 1,39 | | | 3,11 | 0,95 | | |
| LBP time | < 3 m | 2,63 | 1,98 | **0,000** | 1,06 | 3,35 | 0,81 | **0,015** | 0,61 |
| | > 3 m | 4,93 | 2,18 | | | 2,84 | 0,84 | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| LBP in last year | < 1 | 2,96 | 2,29 | **0,000** | 0,23 | 3,18 | 0,84 | 0,344 | 0,03 |
| | 2 to 3 | 4,03 | 2,15 | | | 2,88 | 0,78 | | |
| | 4 to 5 | 4,53 | 1,74 | | | 2,73 | 0,82 | | |
| | > 5 | 5,86 | 1,91 | | | 2,87 | 0,91 | | |
| Professional Diagnosis of DM | Yes | 5,11 | 2,36 | **0,012** | 0,44 | 2,63 | 0,81 | **0,000** | 0,68 |
| | No | 4,12 | 2,13 | | | 3,18 | 0,80 | | |

*Note.* LBP: low Back Pain; m: month; MD: Mental Disorder; M: average; SD: Standard Deviation; p-value: p<0,05; *d:* Cohen effect size.

**Table 3** Correlation between Psychological Aspects, Sleep, Low Back Pain, and Self-Compassion

| | Anxiety | Depression | Stress | PCS | PSQ | LBP | SCS |
|---|---|---|---|---|---|---|---|
| Anxiety | 1 | .732 | .774 | .507 | .340 | .333 | -.414 |
| | | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |
| Depression | | 1 | .735 | .512 | .405 | .254 | -.544 |
| | | | 0,000 | 0,000 | 0,000 | 0,003 | 0,000 |
| Stress | | | 1 | .512 | .413 | .367 | -.534 |
| | | | | 0,000 | 0,000 | 0,000 | 0,000 |
| PCS | | | | 1 | .229 | .478 | -.421 |
| | | | | | 0,008 | 0,000 | 0,000 |
| PSQ | | | | | 1 | .278 | -.241 |
| | | | | | | 0,001 | 0,005 |
| LBP | | | | | | 1 | -.249 |
| | | | | | | | 0,004 |
| SCS | | | | | | | 1 |

*Note.* PCS: Pain Catastrophizing Scale; PSQ: Pittsburgh Sleep Scale; LBP: low Back Pain; SCS:

Self-Compassion Scale; P-value<0,05.

Upon examining the correlation between psychological aspects (anxiety, depression, stress, and catastrophizing), sleep, low back pain, and self-compassion (Table 3), a negative correlation was observed, signifying less self-compassionate subjects. These correlations are statistically significant at the 5% level (p-value <0.05).

**Table 4** Linear Regression Model

| **Model** | **Unstandardized Coefficients** | | **Standardized Coefficients** | ***t*** | **P - value** | **CI 95%** |
|---|---|---|---|---|---|---|
| | **B** | **Standard Error** | **β** | | | |
| (Constant) | 1,30 | 0,52 | | 2,51 | 0,013 | 0,275, 2,317 |
| LBP >3 m | 1,76 | 0,48 | 0,27 | 3,69 | 0,000 | 0,82, 2,70 |
| Sex F | 0,90 | 0,38 | 0,17 | 2,36 | 0,020 | 0,15, 1,66 |

*Note.* LBP: Low Back Pain; CI 95%: Confidence Interval.

The regression analysis for predictive purposes yielded a significant model (F=21.4, GL=3.133, p-value<0.001), explaining 31.6% of the variability in low back pain.

**Table 5** Linear Regression Model

| **Model** | **Unstandardized Coefficients** | | **Standardized Coefficients** | ***t*** | **P - value** | **CI 95%** |
|---|---|---|---|---|---|---|
| | **B** | **Standard Error** | **β** | | | |
| (Constant) | 3,01 | 0,26 | | 11,47 | 0,000 | 2,49, 3,53 |
| Depression | -0,07 | 0,01 | -0,49 | -7,06 | 0,000 | -0,09, -0,05 |
| LBP>3 m | -0,43 | 0,17 | -0,18 | -2,57 | 0,011 | -0,76, -0,10 |

*Note.* LBP: Low Back Pain; CI 95%: Confidence Interval.

Regarding self-compassion, the regression analysis presented a significant model (F=27.23, GL=3.133, p-value<0.001), explaining 37.2% of the variability of self-compassion.

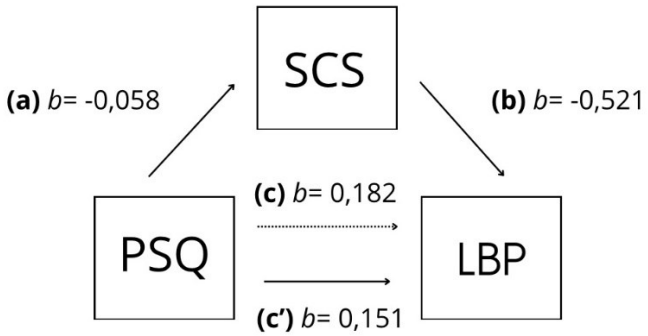



**Fig. 1** Effect of Self-Compassion Mediation on the Relationship Between Sleep Quality and Low Back Pain

In the realm of statistical analyses, the mediation effect of self-compassion on the relationship between PSQ and low back pain (LBP) was notably significant, with beta=0.030 (95% CI: 0.002; 0.067). Consequently, self-compassion mediated approximately 16.8% of the relationship between PSQ and low back pain levels. In this context, PSQ predicts self-compassion and low back pain, while self-compassion predicts low back pain.

## Discussion

In accordance with the findings of the present study and existing literature, women constitute the majority of low back pain cases (Costa et al., 2021; Moura et al., 2022; Saltychev et al., 2023). A plausible explanation involves several biopsychosocial factors that may act as predictors of pain among women (Alves et al., 2021; Amesiya et al., 2023; Hernandez-Lucas et al., 2023; Moura et al., 2022; Nabi et al., 2023; Ravn et al., 2023; Zaina et al., 2020). Among these factors, the literature highlights lower height, physical strength, muscle mass, and bone mass, in addition to Low back pain is a prevalent global health issue affecting both genders, with higher rates among women due to factors such as more fragile joints, pregnancy, household chores, and abdominal weight gain during

perimenopause (Lima et al., 2022; Malta et al., 2022; Tesfaye et al., 2023). Psychological factors, including stress, anxiety, and depression, contribute to women experiencing more symptoms compared to men (Santos et al., 2020), coupled with lower levels of self-compassion (Souza et al., 2020). These aspects elucidate the elevated prevalence of low back pain in women, as the negative emotions associated with these factors can exacerbate the occurrence of low back pain (Cargnin et al., 2021; Diez et al., 2022).

University students also constitute a population with a notable prevalence of low back pain, attributed to prolonged sitting, engagement in electronic work with inadequate postures, and the use of low-ergonomic furniture, intensifying lumbar fatigue (Barbosa et al., 2021; Morais et al., 2019; Nascimento et al., 2022; Tsai et al., 2023). Additionally, the demanding university context, characterized by substantial study demands and high workloads, contributes to sleep disorders among students (Nascimento et al., 2022).

Regarding sleep, the findings indicate a stronger association between low back pain and the group experiencing daytime sleep. Studies suggest that daytime sleep lacks the same quality as nighttime sleep (Behera & Koley, 2021; Nabi et al., 2023), potentially resulting in muscle stiffness and consequent low back pain (Gemedo et al., 2023). Individuals experiencing insufficient or poor-quality sleep are thus twice as likely to develop low back pain (Tesfaye et al., 2023). Additionally, poor sleep contributes to stress, a predictor of low back pain (Ampiah et al., 2023; Eilayyan et al., 2023; Wang et al., 2023), along with other psychological aspects such as anxiety and depression (Alves et al., 2021; Eilayyan et al., 2023; Nabi et al., 2023; Zaina et al., 2020).

Consistent with the findings, depression may arise from biopsychosocial factors and negative perceptions linked to low back pain (Amesiya et al., 2023; Bresolin et al., 2020; Eilayyan et al., 2023; Wang et al., 2023). Depression manifests across various domains, including social, work, and relationships, pivotal to an individual's identity, and often experiences detrimental effects due to low back pain (Alves et al., 2021; Ampiah et al., 2023; Eilayyan et al., 2023; Wang et al., 2023). This entire context engenders feelings of sadness, frustration, anguish, and hopelessness (Ampiah et al., 2023), alongside irritability and a negative mood (Costa et al., 2021), anger (Ampiah et al., 2023; Eilayyan et al., 2023), isolation (Ampiah et al., 2023; Eilayyan et al., 2023; Wang et al., 2023), stigmatization, marginalization, shame, guilt, financial difficulties, and even treatment

abandonment due to the belief that health services are inaccessible (Alves et al., 2021; Wang et al., 2023).

Certain studies shed light on how personal characteristics of personality and subjectivity (Ampiah et al., 2023; Bresolin et al., 2020; Hernandez-Lucas et al., 2023; Moura et al., 2022; Ravn et al., 2023) can impact perceptions and expectations regarding pain and recovery (Amesiya et al., 2023). Within these characteristics, negative beliefs are often identified, contributing to increased pain, as observed in the present study through catastrophizing. In line with a similar study, factors such as fear of incapacity, death due to severe pain, concerns about the future, shame, and medication side effects are prevalent (Ampiah et al., 2023). Concurrent with beliefs that may exacerbate pain are levels of catastrophizing associated with anxiety (Eilayyan et al., 2023; Hernandez-Lucas et al., 2023; Wang et al., 2023).

A higher level of anxiety or pain catastrophizing is linked to the fear avoidance model (Wang et al., 2023). According to literature findings, pain perception is essential for its control through strategies that manage pain, decrease fear, and alleviate catastrophic thinking (Eilayyan et al., 2023; Hernandez-Lucas et al., 2023; Ravn et al., 2023). Nevertheless, psychoeducation can effectively diminish pain catastrophizing and fear of movement (kinesiophobia) (Amesiya et al., 2023; Ampiah et al., 2023; Eilayyan et al., 2023; Hernandez-Lucas et al., 2023; Ravn et al., 2023; Wang et al., 2023; Wood et al., 2023). A consequence of kinesiophobia is generated by catastrophizing and anxiety, resulting in reduced physical activity, weight gain, and consequently, heightened pain (Boscato & Paiva, 2022; Lima et al., 2022; Wang et al., 2023).

It is crucial to emphasize that, as indicated in this study, the negative biopsychosocial aspects mentioned earlier are predictors of low back pain, especially when combined, significantly impacting quality of life, pain duration, and severity, perpetuating a negative cycle that prolongs both pain and treatment. Positive factors, when appropriately managed, can act as mediators in the chronicity of low back pain and its influences (Rocha et al., 2021). Thus, the significance of a multidisciplinary and non-pharmacological approach is underscored, a rarity in current practices (Ravn et al., 2023). This approach encompasses psychoeducation and self-care, with psychotherapy being the primary treatment (Boscato & Paiva, 2022; Hernandez-Lucas et al., 2023). In alignment with the present study, self-compassion can contribute to pain reduction (Camillo et al.,

2022; Lanzaro et al., 2021; Vasconcelos et al., 2020) through Compassion-Focused Therapy (Gilbert, 2014), aiming to cultivate self-compassionate skills that mitigate negative effects (Ferrari et al., 2019).

Some studies demonstrate negative correlations between self-compassion and pain predictors, such as anxiety (Amesiya et al., 2023; Souza et al., 2020), depression (Souza et al., 2020), and stress (Amesiya et al., 2023; Eilayyan et al., 2023; Fajardo et al., 2023; Gemedo et al., 2023; Souza et al., 2020). Additionally, there is a positive association between self-compassion and mental health related to chronic pain. In this context and in line with the findings, self-compassion can serve as a mediator for relieving the suffering associated with low back pain and its negative biopsychosocial aspects (Camillo et al., 2022; Lanzaro et al., 2021; Vasconcelos et al., 2020) by reducing anger, disability, catastrophizing, anxiety, and fear, while enhancing acceptance and transforming beliefs about pain. This enables appropriate treatment and a favorable prognosis (Ashar et al., 2022).

In conclusion, this study has elucidated that a broad spectrum of changes can trigger chronic low back pain. Therefore, understanding the associations between these changes is crucial for developing effective non-pharmacological preventive and therapeutic approaches for low back pain. In this regard, it can be asserted that the biopsychosocial aspects linked to low back pain and self-compassion interfere with the psychological suffering of university students. Conversely, self-compassion can be beneficial. Consequently, the adoption of interventions based on self-compassion is recommended to enhance the prognosis of low back pain and its associated biopsychosocial factors.

However, it is important to acknowledge a limitation, namely, a gap in the literature, given the scarcity of studies addressing the relationship between biopsychosocial factors, self-compassion, and low back pain in university students. Therefore, it is suggested that more specific studies be conducted, exploring the interplay of sleep quality, self-compassion, and pain in young adults, encompassing health education, promotion, and prevention strategies through lifestyle care specifically tailored to university students.

## References

Alves, J. C. R., Santos, P. L. M. dos, Oliveira, C. D. S., Silva, L. S. B., Cavalcanti, A. P. R., OliveiraE. M. de, & Falcão, L. F. M. (2021). Perfil algométrico e funcional de pacientes com dor lombar atendidos em um ambulatório de fisioterapia como parte de um projeto de desenvolvimento de recurso terapêutico. *Revista Eletrônica Acervo Saúde*, *13*(10), e9042. https://doi.org/10.25248/reas.e9042.2021

Amesiya, R., Nyati, M., Waiswa, G., & Mwaka, E. S. (2023). Health-related quality of life in patients with low back pain in a low resource setting: a cross-sectional study at a tertiary hospital in Uganda. *African health sciences*, *23*(1), 565–574. https://doi.org/10.4314/ahs.v23i1.59

Ampiah, J. A., Moffatt, F., & Diver, C. (2023). Uma investigação qualitativa do impacto psicossocial da dor lombar crônica em Gana. *BMJ Open*; *13*, e073538. https://doi: 10.1136/bmjopen-2023-073538

Ashar, Y. K., Gordon, A., Schubiner, H., Uipi, C., Knight, K., Anderson, Z., Carlisle, J.,Polisky, L., Geuter, S., Flood, T. F., Kragel, P. A., Dimidjian, S., Lumley, M. A., & Wager, T. D. (2022). Effect of Pain Reprocessing Therapy vs Placebo and Usual Care for Patients With Chronic Back Pain. *JAMA Psychiatry, 79*, 1–12. https://doi: 10.1001/jamapsychiatry.2021.2669

Barbosa, R. M., Queiroz, H. S., Santos, L. O., Silva Júnior, M. N., Santos, A. C. N. (2021). Prevalência da dor em estudantes universitários: uma revisão sistemática. *Sci. med. 31(1): 38883.*

Behera, S., & Koley, S. (2021). Lombalgia e seus fatores associados entre professores do ensino médio em Cuttack, Odisha: um estudo transversal. *IJMSDR. 5*(6), 90–97. https://doi: 10.32553/ijmsdr.v5i6.816.

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

Boscato, K. L., & Paiva, L. M. (2022). Revisão de métodos para tratamento da dor lombar. *Revista Foco*, *15*(1), e0300. https://doi.org/10.54751/revistafoco.v15n1-018

Bresolin, J. Z., Dalmolin, G. L., Vasconcellos, S. J. L., Barlem, E. L. D., Andolhe, R., &

Magnago, T. S. B. S. (2020). Sintomas depressivos em estudantes universitários da área da saúde. *Revista Latino-Americana de Enfermagem, 28*, 1-10. https://doi: 10.1590/1518- 8345.3210.3239

Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatr Res*, 28: 193-213.

Camillo, G. D., Antonello, C. S., & Tomazzoni, G. C. (2022). Autocompaixão e Práticas de Espiritualidade: *RAEP. 23*, 346-374. https://doi.org/10.13058/raep.2022.v23n2.2034

Cargnin, Z. A., Schneider, D. G., & Schneider, I. J. C. (2021). Prevalence and factorsassociated with nonspecific low back pain in nursing workers. *Texto e Contexto Enferm. 29*, 1-16. https://doi.org/10.1590/1980-265X-TCE-2018-0311

Cohen, J. (1988). *Análise de Poder Estatístico para Ciências do Comportamento* (2ª ed.). Hillsdale, N. J.: Lawrence Erlbaum Associates, Editores.

Costa, E. A. da., Sousa, T. R. de., Pantoja, A. J. C., & Marinho, D. F. (2021). Perfil de dor nas costas em fisioterapeutas que atuam em ambulatórios de Santarém-PA. *Pesquisa, Sociedade e Desenvolvimento*, *10* (13), e250101321304. https://doi.org/10.33448/rsd-v10i13.21304

Cunha, M., Xavier, A. & Vitória, I. (2013). Avaliação da auto-compaixão em adolescentes: Adaptação e qualidades psicométricas da Escala de Auto-Compaixão. *Revista de Psicologia da Criança e do Adolescente*, *4*(2), 95-117.

Desconsi, M. B., Bartz, P. T., Fiegenbaum, T. R., Candotti, C. T., & Vieira, A. (2019). Tratamento de pacientes com dor lombar crônica inespecífica por fisioterapeutas: um estudo transversal. *Fisioter. Pesqui. 26*, 15-21. https://doi:10.1590/1809-2950/17003626012019

Diez, G. G., Anitua, E., Castellanos, N., Vázquez, C., Galindo-Villardón, P., & Alkhraisat, M. H. (2022). The effect of mindfulness on the inflammatory, psychological and biomechanical domains of adult patients with low back pain: A randomized controlled clinical trial. *Plos One, 17*, e0276734. https://doi.org/10.1371/journal.pone.0276734

Eilayyan, O., Gogovor, A., Zidarov, D., Mayo, N., & Ahmed, S. (2023). Identifying domains of health-related quality of life: the perspective of individuals with low back

pain. *Journal of patient-reported outcomes*, *7*(1), 79. https://doi.org/10.1186/s41687-023-00597-5

Fajardo, J. C. S., Oh, S., Kim, B., Kim, S., Jang, G., & Yoon, B. C. (2023). Redução da dor e melhoria do alinhamento da postura em idosos com dor lombar crônica: uma nova abordagem usando massagem termal espinhal e compressão de células pneumáticas da panturrilha. *Med Sei Monit, 29*, e940944.

Ferrari, M., Hunt, C., Harrysunker, A., Abbott, M. J., Beath, A. P., & Einstein, D. A. (2019). Self-compassion interventions and psychosocial outcomes: A meta-analysis of RCTs. *Mindfulness*. 10, 1455-1473. https://doi.org/10.1007/s12671-019-01134-6

Geller, I. V., Ilkiu, G. S. M., Amarantes, W. A., Ruski, M. V., & Gonzales, D. A. (2023). Não foi só ensinar: alterações osteomusculares em docentes no sistema home office de ensino. *Espac. Saúde. 24*:e903. https//doi.org/10.22421/1517-7130

Gemedo, S., Andualem, Z., Hailu Tesfaye, A., & Dessie, A. (2023). Magnitude and influencing factors of work-related low back pain among high school teachers in West Arsi zone, Southwest Ethiopia: evidenced from multicentred cross-sectional study. *BMJ open*, *13*(7), e074014. https://doi.org/10.1136/bmjopen-2023-074014

Gilbert, P. (2014). The origins and nature of compassion focused therapy. *British Journal of Clinical Psychology*. *53*, 6-41. https://doi.org/10.1111/bjc.12043

Gilbert, P. (2015). The evolution and social dynamics of compassion. Social and Personality. Soc. Personal. *Psychol. Compass 9*, 239-254. https://doi.org/10.1111/spc3.12176

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach.* The Guilford Press.

Hernandez-Lucas, P., Leirós-Rodríguez, R., Mota, J., & García-Soidán, J. L. (2023). Effects of a back school-based intervention on non-specific low back pain in adults: a randomized controlled trial. *BMC complementary medicine and therapies*, *23*(1), 229. https://doi.org/10.1186/s12906-023-04061-1

Kamper, S. J., Apeldoorn, A. T., Chiarotto, A., Smeets, R. J. E. M., Ostelo, R., & Guzman, J. (2015). Reabilitação biopsicossocial multidisciplinar para dor lombar crônica: revisão sistemática Cochrane e meta-análise. *BMJ, 18*. http://doi.org/10.1136/bmj.h444

Lanzaro, C., Carvalho, S. A., Lapa, T. A., Valentim, A., & Gago, B. (2021). A systematic

review of self-compassion in chronic pain: from correlation to efficacy. *The Spanish Journal of Psychology*. 24, e26. doi: 10.1017/SJP.2021.22

Lima, F. V., Dias, L. G., Bette, P. A. B., Motter, A. A., Macedo, A. C. B., & Zotz, T. G. G. (2022). Perfil da dor lombar em trabalhadores dos restaurantes de uma universidade pública do sul do Brasil: https://doi.org/10.15343/0104-7809.202246483492P. *O Mundo Da Saúde*, *46*, 483–492.

Lin, I., Wiles, L., Waller, R., Goucke, R., Nagree, Y., Gibberd, M., Straker, L., Maher, C. G., O'Sullivan, P. P. B. (2020). Como são as melhores práticas de tratamento para dores musculoesqueléticas? Onze recomendações consistentes de diretrizes de prática clínica de alta qualidade: revisão sistemática. *Br J Sports Med, 54*(2), 79-86. http://doi.org/10.1136/bjsports-2018-099878

Lovibond, P. F., & Lovibond, S. H. (1995). The Structure of Negative Emocional States: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy, 33*(3), 335-343.

Malta, D. C., Bernal, R. T. I., Ribeiro, E. G., Ferreira, E. M. R., Pinto, R. Z., and Pereira, C. A. (2022). Dor crônica na coluna entre adultos brasileiros: Dados da Pesquisa Nacional de Saúde 2019. *Rev. Bras. Epidemiol. 25*, e220032. https://doi.org/10.1590/1980-549720220032.2

Martins, B. G., da Silva, W. R., Maroco, J., & Campos, J. A. D. B. (2019). "Escala de Depressão, Ansiedade e Estresse: propriedades psicométricas e prevalência das afetividades": Retificação. *Jornal Brasileiro de Psiquiatria, 69* (3), 32.

Melo, G. de P., M., & Cotrim, T. P. (2020). A dor lombar como indicador de alteração na qualidade de vida no trabalho de docentes universitários: Uma revisão da literatura. *Brazilian Journal of Development. 6*. 74905-74921. https://doi.org/10.34117/bjdv6n10-061.

Mesquita, L. F., Bochi, G. S., Souza, G. L. S., Nogueira, D. A., & Ruginsk, S. G. (2023). Evaluation of sleep quality and serum levels of serotonin and cortisol in patients with chronic pain. *Arq. ciências saúde UNIPAR, 27(6), 3042-3062.*

Morais, B. X., Dalmolin, G. L., Andolhe, R., Dullius, A. I. S., & Rocha, L. P. (2019). Musculoskeletal pain in undergraduate health students: prevalence and associated factors. *Rev Esc Enferm 53*, e03444. https://doi.org/10.1590/S1980-

220X2018014403444

Moura, C. C., Nogueira, D. A., Chaves, É. C. L., Lunes, D. H., Corrêa, H. P., & Chianca, T. C. M. (2022). Physical and emotional factors associated with the severity of chronic back pain in adults: a cross-sectional study. *Texto e Contexto Enferm. 31,* e20200525. https://doi.org/10.1590/1980-265x- tce-2020-0525

Nabi, M. H., Hawlader, M. D. H, Naz, F. (2023). Dor lombar entre motoristas de ônibus profissionais: um estudo transversal em Bangladesh. *BMC Saúde Pública 23*, 1172. https://doi.org/10.1186/s12889-023-16018-7

Nascimento, F. P. B., Tracera, G. M. P., Santos, K. M., Sousa, K. H. J. F., Jesus, S. A., Tomaz, A. P. K. A., & Zeitoune, R. C. G. (2022). Danos à saúde relacionados ao trabalho de enfermeiros em um hospital universitário. *Acta Paulista de Enfermagem*, *35*, eAPE039014234. https://doi.org/10.37689/acta-ape/2022ao014234

Nazar, G., Arteaga-Marín, M. J., Irrázabal-Medina, B., Martínez-Matamala, S., Oñate-Salinas, V., Pinot-Aravena, D., Schade-Villagrán, C. & Bustos, C. (2022). Autorregulación y autocompasión en conductas promotoras de salud y de riesgo em estudiantes universitários. *Ciencia y Enfermería, 28*. https://doi.org/10.29393/CE28-1AAGC80001.

Neff, K. (2003a). The development and validation of scale to measure self-compassion. *Self and Identity*, 2, 223-250.

Neff, K. (2003b). Self-compassion: An alternative conceptualization of healthy attitude toward oneself. Self and Identity, 2, 85-101.

Neff, K. D., Hsieh, Y., & Dejitterat, K. (2005). Self-compassion, achievement goals and copingwith academic failure. *Self and Identity*, *4*, 263-287.

Neff, K. D., Kirkpatrick, K. L., & Rude, S. S. (2007). Self-compassion and adaptive psychological functioning. *Journal of Research in Personality, 41*, 139-154. https://doi.org/10.1080/13576500444000317

Neff, K. D. (2011). Self-compassion, self-esteem, and well-being. Social and Personality Compass, *5*(1), 1-12.

Neff, K. D., Tóth-Király, I., Yarnell, L. M., Arimitsu, K., Castilho, P., Ghorbani, N., Guo, H. X., Hirsch, J. K., Hupfeld, J., Hutz, C. S., Kotsou, I., Lee, W. K., Montero Marin, J., Sirois, F. M., Souza, L. K., Svendsen, J. L., Wilkinson, R. B., & Mantzios, M.

(2019). Examining the factor structure of the Self-Compassion Scale in 20 diverse samples: Support for use of a total score and six subscale scores. *Psychol Assess. 31*, 27–45. https://doi.org/10.1037/PAS0000629

Nery, C., Santos, J., Teixeira, B., Santos, A., Veras, T., Carvalho, L., & Hazime, F. (2022). Dor crônica em universitários: parte 1: prevalência e fatores associados. *Revista Brasileira de Qualidade de Vida. 14*. https://doi.org/10.3895/rbqv.v14n0.15763.

Pereira, M. D., & Silva, J. P. da. (2021). Self-Compassion in University Students: An Integrative Literature Review. In *SciELO Preprints*. https://doi.org/10.1590/SciELOPreprints.2521

Polaski, A. M., Phelps, A. L., Smith, T. J., Helm, E. R., Morone, N. E., Szucs, K. A., Kostek, M. C., and Kolber, B. J. (2021). Integrated Meditation and Exercise Therapy: A Randomized Controlled Pilot of a Combined Nonpharmacological Intervention Focused on Reducing Disability and Pain in Patients with Chronic Low Back Pain. Pain Med. 22, 444–458. doi: 10.1093/pm/pnaa403

Ravn, S. L., Andersen, T. E. & Schiøttz-Christensen, B. (2023). Conteúdo da comunicação dos médicos com pacientes que sofrem de dor na coluna em situações de avaliação em um centro especializado em coluna: Um estudo qualitativo avaliando avaliações da dor psicologicamente informadas antes e depois da participação dos médicos em um curso de Terapia de Aceitação e Compromisso. *Distúrbios musculoesqueléticos BMC*, *24* (1), 549. https://doi.org/10.1186/s12891-023-06392-z

Rocha, J. R. O., Uhlig, S., Karloh, M., Santos, A. R. S., & Sousa, T. R. (2021). Caracterização de fatores biopsicossociais de pacientes com dor lombar crônica inespecífica Characterization of biopsychosocial factors of patients with chronic nonspecific low back pain. *BrJP. 4*(4), 332-338.

Saltychev, M., Hellgren, H., & Juhola, J. (2023). Fatores que afetam a associação entre intensidade de dor e atividade física entre pessoas com dor lombar. *International Journal of Rehabilitation Research, 46*(3), 293-296. https://doi.org/ 10.1097/MRR.0000000000000591

Sant'Anna, P. C. F., Morimoto, T. M., Miranda, F. de S., & Garcez, A. da S. (2022). Dor lombar em estudantes universitários: qual o impacto da pandemia de COVID-19?. *Fisioterapia E Pesquisa*, *29*(3), 284-290. https://doi.org/10.1590/1809-

2950/220109100922PT

Santos, A. F., Mussi, F. C., Pires, C. G., Santos, C. A., & Paim, M. A. (2020). Qualidade do sonoe fatores associados em universitários de enfermagem. *Acta Paulistana de Enfermagem33*, 1-8. https://doi.org/10.37689/acta-ape/2020ao0144

Santos, F., Silva, K., & Indiara, A. (2021). A prevalência de lombalgia em universitários: revisão de literatura. *Research, Society and Development. 10*. e353101321347. https://doi.org/10.33448/rsd-v10i13.21347.

Sardá Júnior, J. J., Nicholas, M. K., Pimenta, C. A. de M., Asghari, A., & Thieme, A. L. (2010). Validação do questionário de incapacidade Roland Morris para dor em geral. *Rev. Dor, 11*, 28-36.

Souza, L. K. de, & Hutz, C. H. (2013). *Adaptação e validação da Escala de Autocompaixão e Comparações com Autoestima e Autoeficácia* (Relatório final de pesquisa). Porto Alegre, RS: Universidade Federal do Rio Grande do Sul, Programa de Pós-Graduação em Psicologia.

Souza, L. K. de, & Hutz, C. H. (2016). Adaptation of the Self-Compassion Scale for Use in Brazil: Evidences of Construct Validity. *Trends in Psychology*/*Temas em Psicologia, 24*(1), 159-172. https://doi.org/10.9788/TP2016.1-11.

Souza, L. K. de, Policarpo, D., & Hutz, C. S. (2020). Self-compassion and Symptoms of Stress, Anxiety, and Depression. *Trends in Psychology*, 28, 85-98. https://doi.org/10.1007/s43076-020- 00018-2

Steven, L., Spoonemore, R. C., McConnell, W. E., Owen, J. L., Young, D. J., & Clewley, D. I. R. (2023). The influence of pain-related comorbidities on pain intensity and pain-related psychological distress in patients presenting with musculoskeletal pain. *Journal of Physical Therapy, 27*(4), 100532. https://doi.org/10.1016/j.bjpt.2023.100532.

Sullivan, M. J. L., Bishop, S. R., & Pivik, J. (1995). The Pain Catastrophizing Scale: development e validação. *Psychol Assess, 7*, 524-532.

Tesfaye, A. H., Abere, G., Mekonnen, T. H., Jara, A. G., & Aragaw, F. M. (2023). A systematic review and meta-analysis of low back pain and its associated factors among school teachers in Africa. *BMC musculoskeletal disorders*, *24*(1), 499. https://doi.org/10.1186/s12891-023-06633-1

Tsai, M. C., Chu, E. T., & Lee, C. R. (2023). An Automated Sitting Posture Recognition

System Utilizing Pressure Sensors. *Sensors (Basel, Switzerland)*, *23*(13), 5894. https://doi.org/10.3390/s23135894

Unal, M., Evci K, E., Kocatürk, M., & Algun, Z. C. (2020). Investigating the effects of myofascial induction therapy techniques on pain, function and quality of life in patients with chronic low back pain. *J. Bodyw. Mov. Ther. 24*, 188–195. https://doi.org/10.1016/j.jbmt.2020.07.014

Van-Niekerk, L., Johnstone, L., & Matthewson, M. (2022). Predictors of self- compassion in endometriosis: The role of psychological health and endometriosis symptom burden. *Hum Reprod. 37*, 264–273. https://doi.org/10.1093/humrep/deab257

Vasconcelos, P., Oliveira, C., & Nobre, P. (2020). Autocompaixão, regulação emocional e dor sexual feminina: uma análise exploratória comparativa. J Sex Med*, 17*(2), 289-299. https://doi.org/10.1016 / j.jsxm.2019.11.266.

Vignola, R. C. B., & Tucci, A. M. (2014). Adaptation and validation of the depression, anxiety and stress scale (DASS) to Brazilian Portuguese. *Journal of affective disorders*, *155*, 104- 109.

Zaina, F., Balagué, F., Battié, M., Karppinen, J., & Negrini, S. (2020). Low back pain rehabilitation in 2020: new frontiers and old limits of our understanding. *European journal of physical and rehabilitation medicine*, *56*(2), 212–219. https://doi.org/10.23736/S1973-9087.20.06257-7

Wang, L. Y., Fu, T. S., Tsia, M. C., & Hung, C. I. (2023). The associations of depression, anxiety, and insomnia at baseline with disability at a five-year follow-up point among outpatients with chronic low back pain: a prospective cohort study. *BMC musculoskeletal disorders*, *24*(1), 565. https://doi.org/10.1186/s12891-023-06682-6

Wood, L., Bejarano, G., Csiernik, B., Gisela, C. M., Mansell, G., Jill, A. H., Lewis, M., & Aidan, G. C. (2023). Pain catastrophising and kinesiophobia mediate pain and physical function improvements with Pilates exercise in chronic low back pain: a mediation analysis of a randomised controlled trial. *Journal of Physiotherapy, 69*(3), 168-174. https://doi.org/10.1016/j.jphys.2023.05.008.

World Health Organization. (2013). Health topics. Noncommunicable diseases. Geneva: World Health Organization.

## 5. CONCLUSÃO GERAL

As descobertas deste estudo evidenciaram que a dor lombar crônica é um dos problemas de saúde pública mais prevalentes no mundo, gerando impactos psicossociais negativos e altos custos para a sociedade. Contudo, existe também, uma alta prevalência de dor lombar no contexto universitário, tendo em vista que os estudantes ficam períodos prolongados em postura inadequada e convivem com diversos aspectos biopsicossociais negativos, conforme já citado ao longo do estudo.

Com base no artigo 1, através da condução de uma revisão sistemática sobre os benefícios da autocompaixão para a dor lombar em adultos, pode-se ressaltar que as terapias baseadas na meditação de autocompaixão com o componente de *mindfulness*, melhoram os fatores biopsicossociais envolvidos na dor lombar crônica, traços de autocompaixão, dor, e saúde mental, contribuindo de forma fundamentada com esta tese. Foram associadas às reduções significativas na dor lombar e aos seus aspectos biopsicossociais relacionados. Portanto, a autocompaixão pode ser benéfica e contribuir para o tratamento psicoterapêutico não farmacológico relacionado com a dor lombar, como uma abordagem complementar para os pacientes com esta condição. Nesse sentido, os participantes que envolvem os tratamentos de meditação através do treino de autocompaixão, podem experimentar maior alívio da dor lombar em relação ao tratamento convencional isolado.

Com base no artigo 2, sua abordagem possibilitou uma avaliação dos potenciais benefícios da terapia não farmacológica voltada à dor lombar e seus aspectos biopsicossociais através da autocompaixão. Os resultados mostraram que o sono de qualidade contribui para a melhora da autocompaixão e a dor lombar, enquanto a autocompaixão prediz a dor lombar em universitários. Apresentou ainda, que a dor lombar é multidimensional e subjetiva, envolvendo aspectos físicos e psicológicos. Nesse sentido, é primordial compreender como

essas variáveis se associam para que sejam desenvolvidos tratamentos voltados à população em contexto universitário e que assim, possam melhorar o prognóstico da dor lombar e seus fatores biopsicossociais relacionados. Contudo, os resultados orientam à pesquisas futuras, contribuindo para o aprimoramento de abordagens terapêuticas e não farmacológicas adequadas à população nesse contexto.

Conclui-se que a adoção de intervenções baseadas na autocompaixão são benéficas para a melhora do prognóstico da dor lombar e seus fatores biopsicossociais associados, através de estratégias autocompassivas que envolvem o autoconhecimento corporal, aceitação e *minfulness*, visando o controle da dor no lugar de crenças de catastrofização e autocrítica, assim como práticas psicoeducativas que envolvam o conhecimento, administração e manejo da dor lombar, higiene do sono e benefícios da prática de exercícios físicos. Contudo, apesar dos resultados deste estudo demonstrarem relevância por mapear os benefícios da autocompaixão em pacientes adultos com dor lombar, ressalta-se que são poucos os artigos encontrados na literatura que abordam a relação entre a autocompaixão e fatores biopsicossociais associados à dor lombar especificamente, sendo a principal limitação.

No entanto, torna-se relevante aprofundar e compreender como esses fatores se relacionam para que sejam desenvolvidas abordagens não farmacológicas alternativas preventivas e de promoção à saúde mais específicas para a dor lombar nos contextos elucidados. Desta forma, sugere-se que mais estudos empíricos sejam realizados aprofundando a relação entre as principais variáveis deste estudo.

## 6. IMPACTOS DO TRABALHO

Os estudos realizados apresentaram resultados relevantes, contribuindo para o conhecimento científico e adoção de novas práticas não farmacológicas para o manejo da dor lombar através da autocompaixão. Além da reflexão proporcionada aos participantes a cerca da dor lombar. Nesse sentido, a utilização das estratégias autocompassivas mencionadas em conjunto com a psicoeducação e condições biopsicossociais adequadas podem reduzir a necessidade e intensidade de tratamento médico convencional e reabilitação intensiva a longo prazo.

Portanto, foi relevante identificar os fatores relacionados à dor lombar e seus aspectos biopsicossociais visando contribuir para medidas preventivas e tratamentos alternativos através de estratégias que melhorem a dor lombar. Desta maneira, reduzindo os custos com tratamentos covencionais através da autogestão dos sintomas.

Assim, sugere-se a adoção de intervenções alternativas não farmacológicas embasadas na autocompaixão, considerando os benefícios explanados neste estudo e melhora do prognóstico da dor lombar e seus fatores biopsicossociais associados. Contudo, apesar dos resultados do presente estudo demonstrarem relevância por mapear os benefícios da autocompaixão em pacientes adultos com dor lombar, é importante o aprofundamento científico dos aspectos até aqui mencionados.

# APÊNDICES E ANEXOS

## APÊNDICE A

## Questionário biopsicossocial

# AUTOCOMPAIXÃO E DOR LOMBAR

Prezado (a) participante

Você está sendo convidado (a) a fazer parte da nossa pesquisa.

Com o objetivo de investigar a relação entre a autocompaixão e a dor lombar em adultos, convidamos você a participar do estudo do Laboratório de Pesquisa em Avaliação Psicológica com o tema: **"Avaliação da Autocompaixão em adultos com dor lombar"**, desenvolvido no Programa de Pós-Graduação em Ciências da Reabilitação da Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA), pela Doutoranda Kellen Greff Ballejos, sob orientação da Profª Drª Caroline Tozzi Reppold e coorientação da Profª Drª Prisla Ücker Calvetti. Este estudo de avaliação sobre aspectos psicológicos e dor lombar contribui para compreender mecanismos e promover prevenção à saúde.

# 1. Você leu e concorda com o Termo de Consentimento Livre e Esclarecido?

**Termo de Consentimento Livre e Esclarecido (TCLE)**

Você está sendo convidado (a) a participar da pesquisa intitulada "Avaliação de uma teleintervenção *mHealth* na perspectiva da Autocompaixão em Dor Lombar: Um Ensaio Clínico Randomizado Controlado" desenvolvida pela Doutoranda Kellen Greff Ballejos, sob orientação da Profª. Drª. Caroline Tozzi Reppold e coorientação da Profª. Drª. Prisla Ücker Calvetti, no Programa de Pós-Graduação em Ciências da Reabilitação da Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA). O objetivo é investigar a eficácia de uma teleintervenção *mHealth* assíncrona psicoeducativa em grupo na perspectiva da Autocompaixão via aplicativo de mensagem em adultos com diagnóstico de dor lombar em comparação com o grupo de tratamento convencional.

A participação é voluntária e envolve um questionário biopsicossocial e instrumentos de avaliação psicológica. O preenchimento será em 3 momentos e estima-se que dure em torno de 30 minutos cada. As intervenções serão através de 5 módulos, distribuídos em (no máximo) 8 semanas, com duração de 50 minutos cada, através do aplicativo Telegram. A inclusão será em grupo controle ou experimental. Os dados serão arquivados na UFCSPA por um período de 5 anos (conforme Resolução 466/12 de Conselho Nacional da Saúde). Serão utilizados apenas para esta pesquisa e futuras publicações. A participação não acarreta nenhum custo e não trará remuneração. Sua identidade será mantida em sigilo e as informações guardadas com confidencialidade.

Quaisquer dúvidas poderão ser encaminhadas a qualquer momento à pesquisadora responsável, Profa. Dra Caroline Tozzi Reppold e à Doutoranda Kellen Greff Ballejos, pelos e-mails reppold@ufcspa.edu.br e kellenufcspa@gmail.com. Ainda, ao Comitê de Ética em Pesquisa da UFCSPA (CEP - UFCSPA), entidade responsável pela defesa da dignidade e integridade dos sujeitos de pesquisa, localizado na Sala 407 do Prédio 03 da UFCSPA, na Rua Sarmento Leite, 245, Porto Alegre, Rio Grande do Sul, Brasil, CEP 90050-170, cujo telefone para contato é 51-3303-8804 e horário de segunda à sexta-feira.

Sua participação contribuirá para o aumento da autocompaixão e bem-estar em dor lombar. A pesquisa poderá ser interrompida a qualquer momento. O risco é mínimo (desconforto em relação ao tempo despendido no preenchimento do instrumento). Diante a comprovação de danos em decorrência ao preenchimento da pesquisa, poderá ser solicitada indenização via judicial, de acordo com a legislação. É garantido o direito de não aceitar ou retirar sua permissão à participação à qualquer momento. A autorização para a participação, dependerá do seu aceite *online* e você receberá uma via do TCLE.

Estou suficientemente informado(a), que minha participação é voluntária e que posso retirar este consentimento a qualquer momento. Estou ciente também, dos objetivos e procedimentos aos quais serei submetido(a), dos possíveis danos deles provenientes e da garantia de confidencialidade e esclarecimentos. Diante do exposto, expresso minha concordância, de espontânea vontade, em participar deste estudo.

_____

Nome Assinatura do(a) participante

_____

Nome Assinatura da pesquisadora

Porto Alegre, _____ de _____ de 2021.

- ○ Sim
- ○ Não

2. Idade

*Marcar apenas uma oval.*

- Menos de 18 anos
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25
- 26
- 27
- 28
- 29
- 30
- 31
- 32
- 33
- 34
- 35
- 36
- 37
- 38
- 39
- 40
- 41
- 42
- 43
- 44
- 45
- 46
- 47
- 48
- 49
- 50
- 51
- 52
- 53
- 54
- 55

- [ ] 56
- [ ] 57
- [ ] 58
- [ ] 59
- [ ] 60
- [ ] 61
- [ ] 62
- [ ] 63
- [ ] 64
- [ ] 65
- [ ] 66
- [ ] 67
- [ ] 68
- [ ] 69
- [ ] 70
- [ ] 71
- [ ] 72
- [ ] 73
- [ ] 74
- [ ] 75
- [ ] 76
- [ ] 77
- [ ] 78
- [ ] 79
- [ ] 80
- [ ] 81
- [ ] 82
- [ ] 83
- [ ] 84
- [ ] 85
- [ ] 86
- [ ] 87
- [ ] 88
- [ ] 89
- [ ] 90
- [ ] 91
- [ ] 92
- [ ] 93
- [ ] 94
- [ ] 95
- [ ] 96

- [ ] 97
- [ ] 98
- [ ] 99

3. Estado

*Marcar apenas uma oval.*

- [ ] AC
- [ ] AL
- [ ] AP
- [ ] AM
- [ ] BA
- [ ] CE
- [ ] DF
- [ ] ES
- [ ] GO
- [ ] MA
- [ ] MT
- [ ] MS
- [ ] MG
- [ ] PA
- [ ] PB
- [ ] PR
- [ ] PE
- [ ] PI
- [ ] RJ
- [ ] RN
- [ ] RS
- [ ] RO
- [ ] RR
- [ ] SC
- [ ] SP
- [ ] SE
- [ ] TO

4. Sexo

*Marcar apenas uma oval.*

- ◯ Feminino
- ◯ Masculino
- ◯ Outro

5. Raça/etnia

*Marcar apenas uma oval.*

- ◯ Branco
- ◯ Preto
- ◯ Pardo
- ◯ Amarelo
- ◯ Indígena
- ◯ Não declarado

6. Estado Civil

*Marcar apenas uma oval.*

- ◯ Solteiro (a)
- ◯ Divorciado (a)
- ◯ Viúvo (a)
- ◯ Casado (a) ou União Estável
- ◯ Outro

7. Você tem filhos?

*Marcar apenas uma oval.*

- ◯ Sim
- ◯ Não

8. Qual sua renda mensal?

*Marcar apenas uma oval.*

- ◯ Até um salário mínimo
- ◯ De um a dois salários mínimos
- ◯ De dois a quatro salários mínimos
- ◯ De quatro a seis salários mínimos
- ◯ De seis a oito salários mínimos
- ◯ Acima de oito salários mínimos

9. Escolaridade (marque até onde completou):

*Marcar apenas uma oval.*

- ◯ Ensino Fundamental Incompleto
- ◯ Ensino Fundamental Completo
- ◯ Ensino Médio Incompleto
- ◯ Ensino Médio Completo
- ◯ Curso Superior Incompleto
- ◯ Curso Superior Completo
- ◯ Curso técnico
- ◯ Pós-graduação
- ◯ Outro

10. Quando está acordado (a), você passa a maior parte do tempo:
*Marque quantas alternativas forem necessárias:

*Marque todas que se aplicam.*

- ☐ Sentado (a)
- ☐ Deitado (a)
- ☐ Em pé

11. Pratica exercício físico regularmente?

*Marcar apenas uma oval.*

- ◯ Sim, uma vez por semana
- ◯ Sim, duas vezes na semana
- ◯ Sim, três vezes ou mais na semana
- ◯ Não pratico exercício físico regularmente

12. Quantas horas você dorme diariamente?

*Marcar apenas uma oval.*

- ◯ De 1 a 4
- ◯ De 5 a 6
- ◯ De 7 a 10
- ◯ Acima de 11

13. Seu sono é diurno ou noturno?

*Marcar apenas uma oval.*

- ◯ Diurno
- ◯ Noturno

14. Você se sente cansado (a) constantemente?

*Marcar apenas uma oval.*

- ◯ Sim
- ◯ Não

15. Você considera seu peso adequado?

*Marcar apenas uma oval.*

- ◯ Sim
- ◯ Não, estou acima do peso
- ◯ Não, estou abaixo do peso

16. Tem história de dor lombar na família?
*Marque quantas alternativas forem necessárias:

*Marque todas que se aplicam.*

- [ ] Sim, pai
- [ ] Sim, mãe
- [ ] Sim, tia/tio
- [ ] Sim, avô/avó
- [ ] Sim, irmão/irmã
- [ ] Sim, primo/prima
- [ ] Outro
- [ ] Não

17. Além da dor lombar, você tem alguma doença crônica?

*Marcar apenas uma oval.*

- ◯ Sim
- ◯ Não
- ◯ Outro: _____

18. Você toma alguma medicação para a dor lombar?

*Marcar apenas uma oval.*

- ◯ Sim, há 3 meses
- ◯ Sim, há 6 meses
- ◯ Sim, há 1 ano
- ◯ Sim, há mais de 1 ano
- ◯ Não

19. Qual seu nível de dor lombar?

*Marcar apenas uma oval.*

- ◯ 0
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5
- ◯ 6
- ◯ 7
- ◯ 8
- ◯ 9
- ◯ 10

20. Você deixa de cumprir alguma atividade importante por conta da dor lombar?

*Marcar apenas uma oval.*

- ◯ Sim, todos os dias
- ◯ Sim, quase todos os dias
- ◯ Sim, uma vez por semana
- ◯ Sim, uma vez por mês
- ◯ Sim, raramente
- ◯ Não

21. Como você descreveria sua dor lombar?
*Marque quantas alternativas forem necessárias:

*Marque todas que se aplicam.*

- ☐ Queimação
- ☐ Choque
- ☐ Latejante
- ☐ Pontada
- ☐ Formigamento
- ☐ Peso
- ☐ Ferroada
- ☐ Pressão
- ☐ Fisgada
- ☐ Outro

22. Sua dor lombar piora quando:
*Marque quantas alternativas forem necessárias:

*Marque todas que se aplicam.*

- [ ] Faz esforço físico
- [ ] Está em repouso
- [ ] Se movimenta
- [ ] Não piora

23. Você sente que sua dor lombar irradia:

*Marcar apenas uma oval.*

- ◯ Para os membros inferiores
- ◯ Virilha
- ◯ Não irradia

24. Qual a duração da sua dor lombar?

*Marcar apenas uma oval.*

- ◯ Minutos
- ◯ Horas
- ◯ Dias
- ◯ Meses

25. Há quanto tempo você sente dor lombar:

*Marcar apenas uma oval.*

- ◯ Há menos de 3 meses
- ◯ Há mais de 3 meses

26. Quantas crises/episódios de dor lombar você teve no último ano?

*Marcar apenas uma oval.*

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5
- ◯ Mais de 5
- ◯ Não tive

27. Você recebeu diagnóstico de dor lombar através de algum profissional da saúde?
*Marque quantas alternativas forem necessárias:

*Marque todas que se aplicam.*

- ☐ Sim, médico (a)
- ☐ Sim, fisioterapeuta
- ☐ Outro profissional
- ☐ Não

28. Há quanto tempo você recebeu o diagnóstico de dor lombar?

*Marcar apenas uma oval.*

- ◯ Há mais de 3 meses
- ◯ Há menos de 3 meses
- ◯ Não recebi nenhum diagnóstico profissional

29. A dor faz você se sentir triste?

*Marcar apenas uma oval.*

- ◯ Sim
- ◯ Não

30. A dor piora quando está estressado (a) ou com problemas?

*Marcar apenas uma oval.*

- ◯ Sim
- ◯ Não

31. Você tem medo de sentir dor?

*Marcar apenas uma oval.*

- ◯ Sim
- ◯ Não

32. Você acredita que a dor irá passar?

*Marcar apenas uma oval.*

- ◯ Sim
- ◯ Não

33. Você costuma sentir raiva quando está com dor?

*Marcar apenas uma oval.*

- ◯ Sim
- ◯ Não

34. Você se considera uma pessoa tensa?

*Marcar apenas uma oval.*

- ◯ Sim
- ◯ Não

35. Você tem rede de apoio/suporte social?
*Marque quantas alternativas forem necessárias:

*Marque todas que se aplicam.*

- [ ] Sim, família
- [ ] Sim, amigos
- [ ] Sim, colegas/conhecidos
- [ ] Outro
- [ ] Não

36. Você já recebeu diagnóstico profissional de algum transtorno mental?
*Marque quantas alternativas forem necessárias:

*Marque todas que se aplicam.*

- [ ] Sim, de psicóloga (o)
- [ ] Sim, de psiquiatra
- [ ] Não

37. Qual transtorno mental você tem diagnosticado?
*Marque quantas alternativas forem necessárias:

*Marque todas que se aplicam.*

- [ ] Transtorno depressivo
- [ ] Transtorno de ansiedade
- [ ] Transtorno bipolar
- [ ] Transtorno psicótico
- [ ] Transtorno alimentar
- [ ] Transtorno obsessivo-compulsivo
- [ ] Outro
- [ ] Nenhum

38. Você toma alguma medicação psiquiátrica?

*Marcar apenas uma oval.*

- ◯ Sim, há menos de 3 meses
- ◯ Sim, há mais de 3 meses
- ◯ Sim, há mais de 6 meses
- ◯ Sim, há mais de 1 ano
- ◯ Não

39. Você já passou por alguma crise de ansiedade?

*Marcar apenas uma oval.*

- ◯ Sim, há menos de 3 meses
- ◯ Sim, há mais de 3 meses
- ◯ Sim, há mais de 6 meses
- ◯ Sim, há mais de 1 ano
- ◯ Nunca tive crise de ansiedade

40. Você tem alguma limitação ou deficiência física?

*Marcar apenas uma oval.*

- ◯ Sim
- ◯ Não

41. Qual tratamento você faz para a dor lombar?
*Marque quantas alternativas forem necessárias:

*Marque todas que se aplicam.*

- ☐ Médico
- ☐ Fisioterapêutico
- ☐ Quiropraxia
- ☐ Acupuntura
- ☐ Psicológico
- ☐ Nenhum
- ☐ Outro

## APÊNDICE B

### Termo de Consentimento Livre e Esclarecido (TCLE)

Você está sendo convidado (a) a participar da pesquisa intitulada "Avaliação de uma teleintervenção *mHealth* na perspectiva da Autocompaixão em Dor Lombar: Um Ensaio Clínico Randomizado Controlado" desenvolvida pela Doutoranda Kellen Greff Ballejos, sob orientação da Profª. Drª. Caroline Tozzi Reppold e coorientação da Profª. Drª. Prisla Ücker Calvetti, no Programa de Pós-Graduação em Ciências da Reabilitação da Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA). O objetivo é investigar a eficácia de uma teleintervenção *mHealth* assíncrona psicoeducativa em grupo na perspectiva da Autocompaixão via aplicativo de mensagem gratuito em pacientes adultos com diagnóstico de dor lombar em comparação com o grupo controle de tratamento convencional.

A participação é voluntária e implica em responder um questionário contendo questões biopsicossociais e instrumentos de avaliação psicológica. Os dados coletados serão arquivados na UFCSPA por um período de 5 anos e após, destruídos (conforme Resolução 466/12 de Conselho Nacional da Saúde). Os dados serão utilizados apenas para esta pesquisa e futuras publicações dela derivadas. A participação não acarreta nenhum custo e não lhe trará remuneração. Sua identidade será mantida em absoluto sigilo e as informações guardadas com total confidencialidade.

Quaisquer dúvidas relativas à pesquisa, poderão ser encaminhadas a qualquer momento à pesquisadora responsável, Profa. Dra Caroline Tozzi Reppold e à Doutoranda Kellen Greff Ballejos, pelos e-mails reppold@ufcspa.edu.br e kellenufcspa@gmail.com. Ainda, ao Comitê de Ética em Pesquisa da UFCSPA (CEP - UFCSPA), entidade responsável pela defesa da dignidade e integridade dos sujeitos de pesquisa, localizado na Sala 407 do Prédio 03 da UFCSPA, na Rua Sarmento Leite, 245, Porto Alegre, Rio Grande do Sul, Brasil, CEP 90050-170, cujo telefone para contato é 51-3303-8804 e horário de segunda à sexta-feira, das 08h30min às 12h e das 13h30min às 17h.

Sua participação contribuirá para ações de apoio para o aumento da autocompaixão e bem-estar em dor lombar. A pesquisa poderá ser interrompida a qualquer momento e sem qualquer prejuízo. O risco é mínimo (desconforto em relação ao tempo despendido no preenchimento do instrumento). É garantido o direito de não aceitar ou retirar sua permissão à participação à qualquer momento. A autorização para a participação nesta pesquisa, dependerá de sua confirmação de aceite *online*.

Estou suficientemente informado(a), que minha participação é voluntária e que posso retirar este consentimento a qualquer momento sem penalidades. Estou ciente também, dos objetivos da pesquisa e procedimentos aos quais serei submetido(a), dos possíveis danos deles provenientes e da garantia de confidencialidade e esclarecimentos sempre que desejar. Diante do exposto, expresso minha concordância, de espontânea vontade, em participar deste estudo.

_____

Nome Assinatura do(a) participante

_____

Nome Assinatura da pesquisadora

Porto Alegre, _____ de _____ de 2021.

# ANEXO A

## Escala de Depressão, Ansiedade e Estresse de 21 itens (DASS – 21)

**Instruções:** Por favor, leia cuidadosamente cada uma das afirmações abaixo e circule o número apropriado 0,1,2 ou 3 que indique o quanto ela se aplicou a você durante a última semana, conforme a indicação a seguir:

0 Não se aplicou de maneira alguma

1 Aplicou-se em algum grau, ou por pouco de tempo

2 Aplicou-se em um grau considerável, ou por uma boa parte do tempo

3 Aplicou-se muito, ou na maioria do tempo

| | | | | | |
|---|---|---|---|---|---|
| 1 | Achei difícil me acalmar | 0 | 1 | 2 | 3 |
| 2 | Senti minha boca seca | 0 | 1 | 2 | 3 |
| 3 | Não consegui vivenciar nenhum sentimento positivo | 0 | 1 | 2 | 3 |
| 4 | Tive dificuldade em respirar em alguns momentos (ex. respiração ofegante, falta de ar, sem ter feito nenhum esforço físico) | 0 | 1 | 2 | 3 |
| 5 | Achei difícil ter iniciativa para fazer as coisas | 0 | 1 | 2 | 3 |
| 6 | Tive a tendência de reagir de forma exagerada às situações | 0 | 1 | 2 | 3 |
| 7 | Senti tremores (ex. nas mãos) | 0 | 1 | 2 | 3 |
| 8 | Senti que estava sempre nervoso | 0 | 1 | 2 | 3 |
| 9 | Preocupei-me com situações em que eu pudesse entrar em pânico e parecesse ridículo (a) | 0 | 1 | 2 | 3 |
| 10 | Senti que não tinha nada a desejar | 0 | 1 | 2 | 3 |
| 11 | Senti-me agitado | 0 | 1 | 2 | 3 |
| 12 | Achei difícil relaxar | 0 | 1 | 2 | 3 |
| 13 | Senti-me depressivo (a) e sem ânimo | 0 | 1 | 2 | 3 |

| | | | | | |
|---|---|---|---|---|---|
| 14 | Fui intolerante com as coisas que me impediam de continuar o que eu estava fazendo | 0 | 1 | 2 | 3 |
| 15 | Senti que ia entrar em pânico | 0 | 1 | 2 | 3 |
| 16 | Não consegui me entusiasmar com nada | 0 | 1 | 2 | 3 |
| 17 | Senti que não tinha valor como pessoa | 0 | 1 | 2 | 3 |
| 18 | Senti que estava um pouco emotivo/sensível demais | 0 | 1 | 2 | 3 |
| 19 | Sabia que meu coração estava alterado mesmo não tendo feito nenhum esforço físico (ex. aumento da frequência cardíaca, disritmia cardíaca) | 0 | 1 | 2 | 3 |
| 20 | Senti medo sem motivo | 0 | 1 | 2 | 3 |
| 21 | Senti que a vida não tinha sentido | 0 | 1 | 2 | 3 |

# ANEXO B

## Escala de Pensamento Catastrófico sobre a Dor (B-PCS)

Nome: Idade: Sexo: □ M □ F Data: /
Escolaridade (anos completos de estudo, excluir mobral):

**Instruções:**
**Listamos 13 declarações que descrevem diferentes pensamentos e sentimentos que podem lhe aparecer na cabeça quando sente dor. Indique o *GRAU destes pensamentos e sentimentos quando está com dor***

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | A preocupação durante todo o tempo com a duração da dor é | 0 Mínima | 1 leve | 2 Moderada | 3 Intensa | 4 Muito intensa |
| 2 | O sentimento de não poder prosseguir (continuar) é | 0 Mínimo | 1 leve | 2 Moderado | 3 Intenso | 4 Muito intenso |
| 3 | O sentimento que a dor é terrível e que não vai melhorar é | 0 Mínimo | 1 leve | 2 Moderado | 3 Intenso | 4 Muito intenso |
| 4 | O sentimento que a dor é horrível e que você não vai resistir é | 0 Mínimo | 1 leve | 2 Moderado | 3 Intenso | 4 Muito intenso |
| 5 | O pensamento de não poder mais estar com alguém é | 0 Mínimo | 1 leve | 2 Moderado | 3 Intenso | 4 Muito intenso |
| 6 | O medo que a dor pode se tornar ainda pior é | 0 Mínimo | 1 leve | 2 Moderado | 3 Intenso | 4 Muito intenso |
| 7 | O pensamento sobre outros episódios de dor é | 0 Mínimo | 1 leve | 2 Moderado | 3 Intenso | 4 Muito intenso |
| 8 | O desejo profundo que a dor desapareça é | 0 Mínimo | 1 leve | 2 Moderado | 3 Intenso | 4 Muito intenso |
| 9 | O sentimento de não conseguir tirar a dor do pensamento é | 0 Mínimo | 1 leve | 2 Moderado | 3 Intenso | 4 Muito intenso |
| 10 | O pensamento que ainda poderá doer mais é | 0 Mínimo | 1 leve | 2 Moderado | 3 Intenso | 4 Muito intenso |
| 11 | O pensamento que a dor é grave porque ela não quer parar é | 0 Mínimo | 1 leve | 2 Moderado | 3 Intenso | 4 Muito intenso |
| 12 | O pensamento de que não há nada para fazer para diminuir a intensidade da dor é | 0 Mínimo | 1 leve | 2 Moderado | 3 Intenso | 4 Muito intenso |
| 13 | A preocupação que alguma coisa ruim pode acontecer por causa da dor é | 0 Mínima | 1 leve | 2 Moderado | 3 Intenso | 4 Muito intenso |

# ANEXO C

## Índice da qualidade do sono de Pittsburgh (PSQI-BR)

As seguintes perguntas são relativas aos seus hábitos de sono **durante o último mês somente**. Suas respostas devem indicar a lembrança mais exata da maioria dos dias e noites do último mês. Por favor, responda a todas as perguntas.

Nome:_____Idade:_____ Data:___/___/___

**1.** Durante o último mês, quando você geralmente foi para a cama a noite?

Hora usual de deitar:_____

**2.** Durante o último mês, quanto tempo (em minutos) você geralmente levou para dormir à noite?

Número de minutos:_____

**3.** Durante o último mês, quando você geralmente levantou de manhã?

Hora usual de levantar:_____

**4.** Durante o último mês, quantas horas de sono você teve por noite? (Esta pode ser diferente do número de horas que você ficou na cama)

Horas de sono por noite:_____

Para cada uma das questões restantes, marque a **melhor (uma)** resposta. Por favor, responda a todas as questões.

**5.** Durante o último mês, com que frequência você teve dificuldade para dormir porque você:

**A)** não conseguiu adormecer em até 30 minutos

1 = nenhuma no último mês

2 = menos de uma vez por semana

3 = uma ou duas vezes por semana

4 = três ou mais vezes na semana

**B)** acordou no meio da noite ou de manhã cedo

1 = nenhuma no último mês

2 = menos de uma vez por semana

3 = uma ou duas vezes por semana

4 = três ou mais vezes na semana

**C)** precisou levantar para ir ao banheiro

1 = nenhuma no último mês 2 = menos de uma vez por semana

3 = uma ou duas vezes por semana 4 = três ou mais vezes na semana

**D)** não conseguiu respirar confortavelmente

1 = nenhuma no último mês 2 = menos de uma vez por semana

3 = uma ou duas vezes por semana 4 = três ou mais vezes na semana

**E)** tossiu ou roncou forte

1 = nenhuma no último mês 2 = menos de uma vez por semana

3 = uma ou duas vezes por semana 4 = três ou mais vezes na semana

**F)** Sentiu muito frio

1 = nenhuma no último mês 2 = menos de uma vez por semana

3 = uma ou duas vezes por semana 4 = três ou mais vezes na semana

**G)** sentiu muito calor

1 = nenhuma no último mês 2 = menos de uma vez por semana

3 = uma ou duas vezes por semana 4 = três ou mais vezes na semana

**H)** teve sonhos ruins

1 = nenhuma no último mês 2 = menos de uma vez por semana

3 = uma ou duas vezes por semana 4 = três ou mais vezes na semana

**I)** teve dor

1 = nenhuma no último mês 2 = menos de uma vez por semana

3 = uma ou duas vezes por semana 4 = três ou mais vezes na semana

**J)** outras razões, por favor descreva:

_____

1 = nenhuma no último mês 2 = menos de uma vez por semana

3= uma ou duas vezes por semana 4 = três ou mais vezes na semana

**6.** Durante o último mês como você classificaria a qualidade do seu sono de uma maneira geral:

1=Muito boa 2=Boa

3=Ruim 4=Muito ruim

**7.** Durante o último mês, com que frequencia você tomou medicamento (prescrito ou por conta própria) para lhe ajudar

1 = nenhuma no último mês 2 = menos de uma vez por semana

3 = uma ou duas vezes por semana 4 = três ou mais vezes na semana

**8.** No último mês, que frequencia você teve dificuldade para ficar acordado enquanto dirigia, comia ou participava de uma atividade social (festa, reunião de amigos)

1 = nenhuma no último mês 2 = menos de uma vez por semana

3 = uma ou duas vezes por semana 4 = três ou mais vezes na semana

**9.** Durante o último mês, quão problemático foi pra você manter o entusiasmo (ânimo) para fazer as coisas (suas atividades habituais)?

1=Nenhuma dificuldade 2=Um problema leve

3=Um problema razoável 4=Um grande problema

**10.** Você tem um parceiro (a), esposo (a) ou colega de quarto?

**A)** Não

**B)** Parceiro ou colega, mas em outro quarto

**C)** Parceiro no mesmo quarto, mas em outra cama

**D)** Parceiro na mesma cama

Se você tem um parceiro ou colega de quarto pergunte a ele com que freqüência, no último mês você apresentou:

**A)** Ronco forte

1 = nenhuma no último mês 2 = menos de uma vez por semana

3 = uma ou duas vezes por semana 4 = três ou mais vezes na semana

**B)** Longas paradas de respiração enquanto dormia

1 = nenhuma no último mês 2 = menos de uma vez por semana

3 = uma ou duas vezes por semana 4 = três ou mais vezes na semana

**C)** contrações ou puxões de pernas enquanto dormia

1 = nenhuma no último mês 2 = menos de uma vez por semana

3 = uma ou duas vezes por semana 4 = três ou mais vezes na semana

**D)** episodios de desorientação ou confusão durante o sono

1 = nenhuma no último mês 2 = menos de uma vez por semana

3 = uma ou duas vezes por semana 4 = três ou mais vezes na semana

**E)** Outras alterações (inquietações) enquanto você dorme, por favor descreva:_____

1 = nenhuma no último mês 2 = menos de uma vez por semana

3 = uma ou duas vezes por semana 4 = três ou mais vezes na semana

## ANEXO D

## Escala de Autocompaixão

Para cada frase, marque o número que mostra com que frequência você se comporta da forma descrita. Use a escala de 1 até 5 para marcar sua escolha, sendo que 1 corresponde a "quase nunca" (QN), e 5 significa "quase sempre" (QS). Não existem respostas certas ou erradas. Gostaríamos de sua opinião pessoal. Você pode escolher qualquer número de 1 até 5. *Nota.* O escore geral é calculado a partir da soma dos pontos marcados em cada item, divididos por 26. Os seguintes itens devem ser invertidos para o cálculo do escore geral da escala: 1, 2, 4, 6, 8, 11, 13, 16, 18, 20, 21, 24 e 25.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Sou realmente crítico e severo com meus próprios erros e defeitos. | 1 | 2 | 3 | 4 | 5 |
| 2 | Quando fico “pra baixo”, não consigo parar de pensar em tudo que está errado comigo. | 1 | 2 | 3 | 4 | 5 |
| 3 | Quando as coisas vão mal para mim, vejo as dificuldades como parte da vida e que acontecem com todo mundo. | 1 | 2 | 3 | 4 | 5 |
| 4 | Quando penso nos meus defeitos, eu me sinto realmente isolado do resto do mundo. | 1 | 2 | 3 | 4 | 5 |
| 5 | Tento ser amável comigo quando me sinto emocionalmente mal. | 1 | 2 | 3 | 4 | 5 |
| 6 | Quando eu falho em algo importante para mim, fico totalmente consumido por sentimentos de incompetência | 1 | 2 | 3 | 4 | 5 |
| 7 | Quando me sinto realmente mal, lembro que há outras pessoas no mundo se sentindo como eu. | 1 | 2 | 3 | 4 | 5 |
| 8 | Quando as coisas estão realmente difíceis, costume ser duro comigo mesmo. | 1 | 2 | 3 | 4 | 5 |
| 9 | Quando algo me deixa aborrecido, tento buscar equilíbrio emocional. | 1 | 2 | 3 | 4 | 5 |
| 10 | Quando percebo que fui inadequado, tento lembrar que a maioria das pessoas também passa por isso. | 1 | 2 | 3 | 4 | 5 |
| 11 | . Sou intolerante e impaciente com os aspectos de que não gosto na minha personalidade. | 1 | 2 | 3 | 4 | 5 |
| 12 | Quando estou passando por um momento realmente difícil, eu me dou o apoio e o cuidado de que preciso. | 1 | 2 | 3 | 4 | 5 |
| 13 | Quando fico “pra baixo”, sinto que a maioria das pessoas é mais feliz do que eu. | 1 | 2 | 3 | 4 | 5 |
| 14 | Quando algo doloroso acontece, tento ver a situação de | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | forma equilibrada. | | | | | |
| 15 | Tento entender meus defeitos como parte da condição humana. | 1 | 2 | 3 | 4 | 5 |
| 16 | Quando vejo características que eu não gosto em mim, sou duro comigo mesmo. | 1 | 2 | 3 | 4 | 5 |
| 17 | Quando eu falho em algo importante para mim, tento ver as coisas por outro ângulo. | 1 | 2 | 3 | 4 | 5 |
| 18 | Quando passo por dificuldades emocionais, costumo pensar que as coisas são mais fáceis para as outras pessoas. | 1 | 2 | 3 | 4 | 5 |
| 19 | Sou bondoso comigo quando estou passando por algum sofrimento. | 1 | 2 | 3 | 4 | 5 |
| 20 | Quando algo me deixa incomodado, sou completamente tomado por sentimentos negativos. | 1 | 2 | 3 | 4 | 5 |
| 21 | Costumo ser um pouco insensível comigo quando estou sofrendo. | 1 | 2 | 3 | 4 | 5 |
| 22 | Quando fico “pra baixo”, tento aceitar e entender meus sentimentos. | 1 | 2 | 3 | 4 | 5 |
| 23 | Sou compreensivo com meus próprios erros e defeitos. | 1 | 2 | 3 | 4 | 5 |
| 24 | Quando algo doloroso acontece comigo, costumo reagir de forma exagerada. | 1 | 2 | 3 | 4 | 5 |
| 25 | Quando eu falho em algo importante para mim, costumo me sentir muito sozinho nessa situação. | 1 | 2 | 3 | 4 | 5 |
| 26 | Tento ser compreensivo e paciente com os aspectos da minha personalidade dos quais não gosto | 1 | 2 | 3 | 4 | 5 |

## ANEXO E

## Normas de submissão (Artigo 2)



Springer Search Authors & Editors Log in

Current Psychology

A Journal for Diverse Perspectives on Diverse Psychological Issues

SN

Home > Current Psychology > Submission guidelines

# Submission guidelines

## Contents


- Instructions for Authors
  - Article Types
  - Classifications Required for Submission
  - Editorial procedure
  - Manuscript Submission
  - Title Page
  - Text
  - References
  - Tables
  - Artwork and Illustrations Guidelines
  - APA Style
  - Supplementary Information (SI)
  - Ethical Responsibilities of Authors
  - Authorship principles
  - Compliance with Ethical Standards
  - Competing Interests
  - Research involving human participants, their data or biological material

- Informed consent
- Research Data Policy and Data Availability Statements
- After acceptance
- Open Choice
- Editing Services
- Open access publishing
- Mistakes to avoid during manuscript preparation

## Instructions for Authors

### Article Types

Regular Article: This article type is limited to a maximum of 10,000 words, not including references, tables, and figures. There should be a maximum of 3-4 figures, 3-4 tables, and 40-45 references. The abstract should be between 150 and 250 words, and the manuscript should include 4-6 keywords.

Brief Report: This article type is limited to 1,000 words. The abstract should be no longer than 150 words. There should be a maximum of two figures or tables and 20 references.

Back to top ↑

### Classifications Required for Submission

Including Classifications with submission of your manuscript is required for this journal. When submitting your manuscript, please enter all of the manuscript's relevant areas of research when prompted. This will ensure that the initial submission and peer review process runs smoothly.

Back to top ↑

### Editorial procedure

### Double-blind peer review

This journal follows a double-blind reviewing procedure. This means that the author will remain anonymous to the reviewers throughout peer review. It is the responsibility of the author to anonymize the manuscript and any associated materials.

- Author names, affiliations and any other potentially identifying information should be removed from the manuscript text and any accompanying files (such as figures of supplementary material);
- A separate Title Page should be submitted, containing title, author names, affiliations, and the contact information of the corresponding author. Any acknowledgements, disclosures, or funding information should also be included on this page;
- Authors should avoid citing their own work in a way that could reveal their identity.

This journal also publishes special/guest-edited issues. The peer review process for these articles is the same as the peer review process of the journal in general.

Additionally, if a guest editor authors an article in their issue/collection, they will not handle the peer review process.

Back to top ↑

## Manuscript Submission

### Manuscript Submission

Submission of a manuscript implies: that the work described has not been published before; that it is not under consideration for publication anywhere else; that its publication has been approved by all co-authors, if any, as well as by the responsible authorities – tacitly or explicitly – at the institute where the work has been carried out. The publisher will not be held legally responsible should there be any claims for compensation.

### Permissions

Authors wishing to include figures, tables, or text passages that have already been published elsewhere are required to obtain permission from the copyright owner(s) for both the print and online format and to include evidence that such permission has been granted when submitting their papers. Any material received without such evidence will be assumed to originate from the authors.

**Online Submission**

Please follow the hyperlink "Submit manuscript" and upload all of your manuscript files following the instructions given on the screen.

**Source Files**

Please ensure you provide all relevant editable source files at every submission and revision. Failing to submit a complete set of editable source files will result in your article not being considered for review. For your manuscript text please always submit in common word processing formats such as .docx or LaTeX.

Back to top ↑

## Title Page

Please make sure your title page contains the following information.

**Title**

The title should be concise and informative.

**Author information**

- The name(s) of the author(s)
- The affiliation(s) of the author(s), i.e. institution, (department), city, (state), country
- A clear indication and an active e-mail address of the corresponding author

- If available, the 16-digit ORCID of the author(s)

If address information is provided with the affiliation(s) it will also be published.

For authors that are (temporarily) unaffiliated we will only capture their city and country of residence, not their e-mail address unless specifically requested.

Large Language Models (LLMs), such as ChatGPT, do not currently satisfy our authorship criteria. Notably an attribution of authorship carries with it accountability for the work, which cannot be effectively applied to LLMs. Use of an LLM should be properly documented in the Methods section (and if a Methods section is not available, in a suitable alternative part) of the manuscript.

**Abstract**

Please provide an abstract of 150 to 250 words. The abstract should not contain any undefined abbreviations or unspecified references.

*For life science journals only (when applicable)*

- Trial registration number and date of registration for prospectively registered trials
- Trial registration number and date of registration, followed by "retrospectively registered", for retrospectively registered trials

**Keywords**

Please provide 4 to 6 keywords which can be used for indexing purposes.

**Statements and Declarations**

The following statements should be included under the heading "Statements and Declarations" for inclusion in the published paper. Please note that submissions that do not include relevant declarations will be returned as incomplete.

- **Competing Interests:** Authors are required to disclose financial or non-financial interests that are directly or indirectly related to the work submitted for publication.

Please refer to "Competing Interests and Funding" below for more information on how to complete this section.

Please see the relevant sections in the submission guidelines for further information as well as various examples of wording. Please revise/customize the sample statements according to your own needs.

Back to top ↑

## Text

### Text Formatting

Manuscripts should be submitted in Word.

- Use a normal, plain font (e.g., 10-point Times Roman) for text.
- Use italics for emphasis.
- Use the automatic page numbering function to number the pages.
- Do not use field functions.
- Use tab stops or other commands for indents, not the space bar.
- Use the table function, not spreadsheets, to make tables.
- Use the equation editor or MathType for equations.
- Save your file in docx format (Word 2007 or higher) or doc format (older Word versions).

Manuscripts with mathematical content can also be submitted in LaTeX. We recommend using Springer Nature's LaTeX template.

### Headings

Please use no more than three levels of displayed headings.

**Abbreviations**

Abbreviations should be defined at first mention and used consistently thereafter.

**Footnotes**

Footnotes can be used to give additional information, which may include the citation of a reference included in the reference list. They should not consist solely of a reference citation, and they should never include the bibliographic details of a reference. They should also not contain any figures or tables.

Footnotes to the text are numbered consecutively; those to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data). Footnotes to the title or the authors of the article are not given reference symbols.

Always use footnotes instead of endnotes.

**Acknowledgments**

Acknowledgments of people, grants, funds, etc. should be placed in a separate section on the title page. The names of funding organizations should be written in full.

Back to top ↑

## References

**Citation**

Cite references in the text by name and year in parentheses. Some examples:

- Negotiation research spans many disciplines (Thompson, 1990).
- This result was later contradicted by Becker and Seligman (1996).

- This effect has been widely studied (Abbott, 1991; Barakat et al., 1995; Kelso & Smith, 1998; Medvec et al., 1999).

Authors are encouraged to follow official APA version 7 guidelines on the number of authors included in reference list entries (i.e., include all authors up to 20; for larger groups, give the first 19 names followed by an ellipsis and the final author's name). However, if authors shorten the author group by using et al., this will be retained.

**Reference list**

The list of references should only include works that are cited in the text and that have been published or accepted for publication. Personal communications and unpublished works should only be mentioned in the text.

Reference list entries should be alphabetized by the last names of the first author of each work.

Journal names and book titles should be *italicized*.

If available, please always include DOIs as full DOI links in your reference list (e.g. "https://doi.org/abc").

- Journal article Grady, J. S., Her, M., Moreno, G., Perez, C., & Yelinek, J. (2019). Emotions in storybooks: A comparison of storybooks that represent ethnic and racial groups in the United States. *Psychology of Popular Media Culture, 8*(3), 207–217. https://doi.org/10.1037/ppm0000185
- Article by DOI Hong, I., Knox, S., Pryor, L., Mroz, T. M., Graham, J., Shields, M. F., & Reistetter, T. A. (2020). Is referral to home health rehabilitation following inpatient rehabilitation facility associated with 90-day hospital readmission for adult patients with stroke? *American Journal of Physical Medicine & Rehabilitation*. Advance online publication. https://doi.org/10.1097/PHM.0000000000001435
- Book Sapolsky, R. M. (2017). *Behave: The biology of humans at our best and worst*. Penguin Books.
- Book chapter Dillard, J. P. (2020). Currents in the study of persuasion. In M. B. Oliver, A. A. Raney, & J. Bryant (Eds.), *Media effects: Advances in theory and research* (4th ed., pp. 115–129). Routledge.

- Online document Fagan, J. (2019, March 25). *Nursing clinical brain*. OER Commons. Retrieved January 7, 2020, from https://www.oercommons.org/authoring/53029-nursing-clinical-brain/view

Back to top ↑

## Tables

- All tables are to be numbered using Arabic numerals.
- Tables should always be cited in text in consecutive numerical order.
- For each table, please supply a table caption (title) explaining the components of the table.
- Identify any previously published material by giving the original source in the form of a reference at the end of the table caption.
- Footnotes to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data) and included beneath the table body.

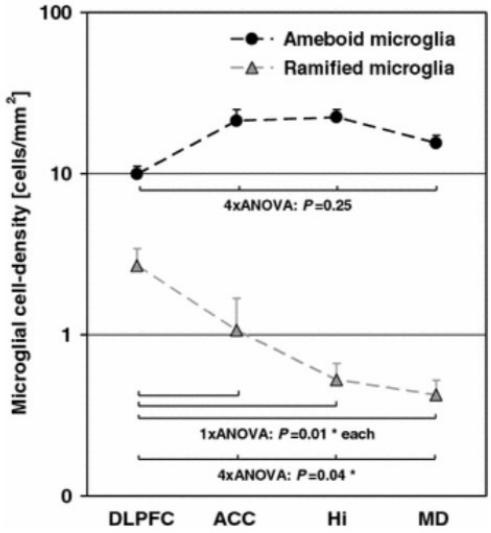
Back to top ↑

## Artwork and Illustrations Guidelines

### Electronic Figure Submission

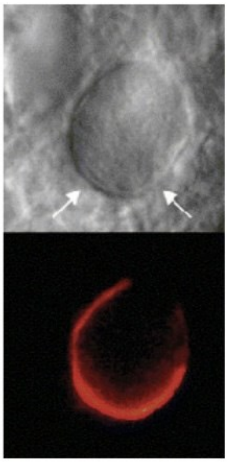
- Supply all figures electronically.
- Indicate what graphics program was used to create the artwork.
- For vector graphics, the preferred format is EPS; for halftones, please use TIFF format. MSOffice files are also acceptable.
- Vector graphics containing fonts must have the fonts embedded in the files.
- Name your figure files with "Fig" and the figure number, e.g., Fig1.eps.

### Line Art




- Definition: Black and white graphic with no shading.
- Do not use faint lines and/or lettering and check that all lines and lettering within the figures are legible at final size.
- All lines should be at least 0.1 mm (0.3 pt) wide.
- Scanned line drawings and line drawings in bitmap format should have a minimum resolution of 1200 dpi.
- Vector graphics containing fonts must have the fonts embedded in the files.

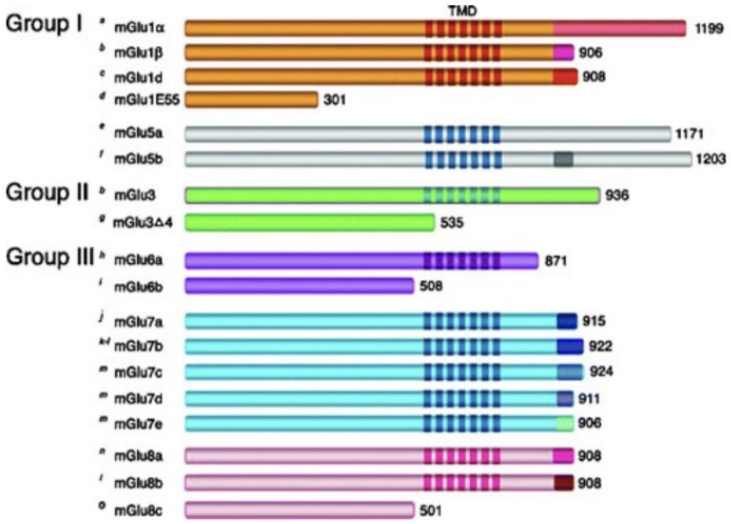
### Halftone Art



- Definition: Photographs, drawings, or paintings with fine shading, etc.

- If any magnification is used in the photographs, indicate this by using scale bars within the figures themselves.
- Halftones should have a minimum resolution of 300 dpi.

### Combination Art




- Definition: a combination of halftone and line art, e.g., halftones containing line drawing, extensive lettering, color diagrams, etc.
- Combination artwork should have a minimum resolution of 600 dpi.

### Color Art

- Color art is free of charge for online publication.
- If black and white will be shown in the print version, make sure that the main information will still be visible. Many colors are not distinguishable from one another when converted to black and white. A simple way to check this is to make a xerographic copy to see if the necessary distinctions between the different colors are still apparent.
- If the figures will be printed in black and white, do not refer to color in the captions.
- Color illustrations should be submitted as RGB (8 bits per channel).

### Figure Lettering

- To add lettering, it is best to use Helvetica or Arial (sans serif fonts).

- Keep lettering consistently sized throughout your final-sized artwork, usually about 2–3 mm (8–12 pt).
- Variance of type size within an illustration should be minimal, e.g., do not use 8-pt type on an axis and 20-pt type for the axis label.
- Avoid effects such as shading, outline letters, etc.
- Do not include titles or captions within your illustrations.

**Figure Numbering**

- All figures are to be numbered using Arabic numerals.
- Figures should always be cited in text in consecutive numerical order.
- Figure parts should be denoted by lowercase letters (a, b, c, etc.).
- If an appendix appears in your article and it contains one or more figures, continue the consecutive numbering of the main text. Do not number the appendix figures,"A1, A2, A3, etc." Figures in online appendices [Supplementary Information (SI)] should, however, be numbered separately.

**Figure Captions**

- Each figure should have a concise caption describing accurately what the figure depicts. Include the captions in the text file of the manuscript, not in the figure file.
- Figure captions begin with the term Fig. in bold type, followed by the figure number, also in bold type.
- No punctuation is to be included after the number, nor is any punctuation to be placed at the end of the caption.
- Identify all elements found in the figure in the figure caption; and use boxes, circles, etc., as coordinate points in graphs.
- Identify previously published material by giving the original source in the form of a reference citation at the end of the figure caption.

**Figure Placement and Size**

- Figures should be submitted within the body of the text. Only if the file size of the manuscript causes problems in uploading it, the large figures should be submitted separately from the text.
- When preparing your figures, size figures to fit in the column width.

- For large-sized journals the figures should be 84 mm (for double-column text areas), or 174 mm (for single-column text areas) wide and not higher than 234 mm.
- For small-sized journals, the figures should be 119 mm wide and not higher than 195 mm.

**Permissions**

If you include figures that have already been published elsewhere, you must obtain permission from the copyright owner(s) for both the print and online format. Please be aware that some publishers do not grant electronic rights for free and that Springer will not be able to refund any costs that may have occurred to receive these permissions. In such cases, material from other sources should be used.

**Accessibility**

In order to give people of all abilities and disabilities access to the content of your figures, please make sure that

- All figures have descriptive captions (blind users could then use a text-to-speech software or a text-to-Braille hardware)
- Patterns are used instead of or in addition to colors for conveying information (colorblind users would then be able to distinguish the visual elements)
- Any figure lettering has a contrast ratio of at least 4.5:1

Back to top ↑

## APA Style

The style and punctuation of the references should conform to strict APA style. In general, the journal follows the recommendations of the 2020 Publication Manual of the American Psychological Association (7th ed.) and it is suggested contributors refer to this publication.

Back to top ↑

## Supplementary Information (SI)

Springer accepts electronic multimedia files (animations, movies, audio, etc.) and other supplementary files to be published online along with an article or a book chapter. This feature can add dimension to the author's article, as certain information cannot be printed or is more convenient in electronic form.

Before submitting research datasets as Supplementary Information, authors should read the journal's Research data policy. We encourage research data to be archived in data repositories wherever possible.

**Submission**

- Supply all supplementary material in standard file formats.
- Please include in each file the following information: article title, journal name, author names; affiliation and e-mail address of the corresponding author.
- To accommodate user downloads, please keep in mind that larger-sized files may require very long download times and that some users may experience other problems during downloading.
- High resolution (streamable quality) videos can be submitted up to a maximum of 25GB; low resolution videos should not be larger than 5GB.

**Audio, Video, and Animations**

- Aspect ratio: 16:9 or 4:3
- Maximum file size: 25 GB for high resolution files; 5 GB for low resolution files
- Minimum video duration: 1 sec
- Supported file formats: avi, wmv, mp4, mov, m2p, mp2, mpg, mpeg, flv, mxf, mts, m4v, 3gp

**Text and Presentations**

- Submit your material in PDF format; .doc or .ppt files are not suitable for long-term viability.

- A collection of figures may also be combined in a PDF file.

**Spreadsheets**

- Spreadsheets should be submitted as .csv or .xlsx files (MS Excel).

**Specialized Formats**

- Specialized format such as .pdb (chemical), .wrl (VRML), .nb (Mathematica notebook), and .tex can also be supplied.

**Collecting Multiple Files**

- It is possible to collect multiple files in a .zip or .gz file.

**Numbering**

- If supplying any supplementary material, the text must make specific mention of the material as a citation, similar to that of figures and tables.
- Refer to the supplementary files as “Online Resource”, e.g., "... as shown in the animation (Online Resource 3)", “... additional data are given in Online Resource 4”.
- Name the files consecutively, e.g. “ESM_3.mpg”, “ESM_4.pdf”.

**Captions**

- For each supplementary material, please supply a concise caption describing the content of the file.

**Processing of supplementary files**

- Supplementary Information (SI) will be published as received from the author without any conversion, editing, or reformatting.

**Accessibility**

In order to give people of all abilities and disabilities access to the content of your supplementary files, please make sure that

- The manuscript contains a descriptive caption for each supplementary material

- Video files do not contain anything that flashes more than three times per second (so that users prone to seizures caused by such effects are not put at risk)

Back to top ↑

## Ethical Responsibilities of Authors

This journal is committed to upholding the integrity of the scientific record. As a member of the Committee on Publication Ethics (COPE) the journal will follow the COPE guidelines on how to deal with potential acts of misconduct.

Authors should refrain from misrepresenting research results which could damage the trust in the journal, the professionalism of scientific authorship, and ultimately the entire scientific endeavour. Maintaining integrity of the research and its presentation is helped by following the rules of good scientific practice, which include*:

- The manuscript should not be submitted to more than one journal for simultaneous consideration.
- The submitted work should be original and should not have been published elsewhere in any form or language (partially or in full), unless the new work concerns an expansion of previous work. (Please provide transparency on the re-use of material to avoid the concerns about text-recycling ('self-plagiarism').
- A single study should not be split up into several parts to increase the quantity of submissions and submitted to various journals or to one journal over time (i.e. 'salami-slicing/publishing').
- Concurrent or secondary publication is sometimes justifiable, provided certain conditions are met. Examples include: translations or a manuscript that is intended for a different group of readers.
- Results should be presented clearly, honestly, and without fabrication, falsification or inappropriate data manipulation (including image based manipulation). Authors

should adhere to discipline-specific rules for acquiring, selecting and processing data.

- No data, text, or theories by others are presented as if they were the author's own ('plagiarism'). Proper acknowledgements to other works must be given (this includes material that is closely copied (near verbatim), summarized and/or paraphrased), quotation marks (to indicate words taken from another source) are used for verbatim copying of material, and permissions secured for material that is copyrighted.

**Important note: the journal may use software to screen for plagiarism.**

- Authors should make sure they have permissions for the use of software, questionnaires/(web) surveys and scales in their studies (if appropriate).

- Research articles and non-research articles (e.g. Opinion, Review, and Commentary articles) must cite appropriate and relevant literature in support of the claims made. Excessive and inappropriate self-citation or coordinated efforts among several authors to collectively self-cite is strongly discouraged.

- Authors should avoid untrue statements about an entity (who can be an individual person or a company) or descriptions of their behavior or actions that could potentially be seen as personal attacks or allegations about that person.

- Research that may be misapplied to pose a threat to public health or national security should be clearly identified in the manuscript (e.g. dual use of research). Examples include creation of harmful consequences of biological agents or toxins, disruption of immunity of vaccines, unusual hazards in the use of chemicals, weaponization of research/technology (amongst others).

- Authors are strongly advised to ensure the author group, the Corresponding Author, and the order of authors are all correct at submission. Adding and/or deleting authors during the revision stages is generally not permitted, but in some cases may be warranted. Reasons for changes in authorship should be explained in detail. Please note that changes to authorship cannot be made after acceptance of a manuscript.

*All of the above are guidelines and authors need to make sure to respect third parties rights such as copyright and/or moral rights.

Upon request authors should be prepared to send relevant documentation or data in order to verify the validity of the results presented. This could be in the form of raw data, samples, records, etc. Sensitive information in the form of confidential or proprietary data is excluded.

If there is suspicion of misbehavior or alleged fraud the Journal and/or Publisher will carry out an investigation following COPE guidelines. If, after investigation, there are valid concerns, the author(s) concerned will be contacted under their given e-mail address and given an opportunity to address the issue. Depending on the situation, this may result in the Journal's and/or Publisher's implementation of the following measures, including, but not limited to:

- If the manuscript is still under consideration, it may be rejected and returned to the author.

- If the article has already been published online, depending on the nature and severity of the infraction:

  - an erratum/correction may be placed with the article

  - an expression of concern may be placed with the article

  - or in severe cases retraction of the article may occur.

The reason will be given in the published erratum/correction, expression of concern or retraction note. Please note that retraction means that the article is **maintained on the platform**, watermarked "retracted" and the explanation for the retraction is provided in a note linked to the watermarked article.

- The author's institution may be informed

- A notice of suspected transgression of ethical standards in the peer review system may be included as part of the author's and article's bibliographic record.

**Fundamental errors**

Authors have an obligation to correct mistakes once they discover a significant error or inaccuracy in their published article. The author(s) is/are requested to contact the journal and explain in what sense the error is impacting the article. A decision on how to correct the literature will depend on the nature of the error. This may be a correction or retraction. The retraction note should provide transparency which parts of the article are impacted by the error.

**Suggesting / excluding reviewers**

Authors are welcome to suggest suitable reviewers and/or request the exclusion of certain individuals when they submit their manuscripts. When suggesting reviewers, authors should make sure they are totally independent and not connected to the work in any way. It is strongly recommended to suggest a mix of reviewers from different countries and different institutions. When suggesting reviewers, the Corresponding Author must provide an institutional email address for each suggested reviewer, or, if this is not possible to include other means of verifying the identity such as a link to a personal homepage, a link to the publication record or a researcher or author ID in the submission letter. Please note that the Journal may not use the suggestions, but suggestions are appreciated and may help facilitate the peer review process.

Back to top ↑

## Authorship principles

These guidelines describe authorship principles and good authorship practices to which prospective authors should adhere to.

**Authorship clarified**

The Journal and Publisher assume all authors agreed with the content and that all gave explicit consent to submit and that they obtained consent from the responsible

authorities at the institute/organization where the work has been carried out, **before** the work is submitted.

The Publisher does not prescribe the kinds of contributions that warrant authorship. It is recommended that authors adhere to the guidelines for authorship that are applicable in their specific research field. In absence of specific guidelines it is recommended to adhere to the following guidelines*:

All authors whose names appear on the submission

1) made substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data; or the creation of new software used in the work;

2) drafted the work or revised it critically for important intellectual content;

3) approved the version to be published; and

4) agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

* Based on/adapted from:

ICMJE, Defining the Role of Authors and Contributors,

Transparency in authors' contributions and responsibilities to promote integrity in scientific publication, McNutt at all, PNAS February 27, 2018

**Disclosures and declarations**

All authors are requested to include information regarding sources of funding, financial or non-financial interests, study-specific approval by the appropriate ethics committee for research involving humans and/or animals, informed consent if the research involved human participants, and a statement on welfare of animals if the research involved animals (as appropriate).

The decision whether such information should be included is not only dependent on the scope of the journal, but also the scope of the article. Work submitted for publication may have implications for public health or general welfare and in those cases it is the responsibility of all authors to include the appropriate disclosures and declarations.

**Data transparency**

All authors are requested to make sure that all data and materials as well as software application or custom code support their published claims and comply with field standards. Please note that journals may have individual policies on (sharing) research data in concordance with disciplinary norms and expectations.

**Role of the Corresponding Author**

**One author** is assigned as Corresponding Author and acts on behalf of all co-authors and ensures that questions related to the accuracy or integrity of any part of the work are appropriately addressed.

The Corresponding Author is responsible for the following requirements:

- ensuring that all listed authors have approved the manuscript before submission, including the names and order of authors;
- managing all communication between the Journal and all co-authors, before and after publication;*
- providing transparency on re-use of material and mention any unpublished material (for example manuscripts in press) included in the manuscript in a cover letter to the Editor;
- making sure disclosures, declarations and transparency on data statements from all authors are included in the manuscript as appropriate (see above).

* The requirement of managing all communication between the journal and all co-authors during submission and proofing may be delegated to a Contact or Submitting

Author. In this case please make sure the Corresponding Author is clearly indicated in the manuscript.

**Author contributions**

In absence of specific instructions and in research fields where it is possible to describe discrete efforts, the Publisher recommends authors to include contribution statements in the work that specifies the contribution of every author in order to promote transparency. These contributions should be listed at the separate title page.

**Examples of such statement(s) are shown below:**

• Free text:

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by [full name], [full name] and [full name]. The first draft of the manuscript was written by [full name] and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Example: CRediT taxonomy:

• Conceptualization: [full name], ...; Methodology: [full name], ...; Formal analysis and investigation: [full name], ...; Writing - original draft preparation: [full name, ...]; Writing - review and editing: [full name], ...; Funding acquisition: [full name], ...; Resources: [full name], ...; Supervision: [full name],....

For **review articles** where discrete statements are less applicable a statement should be included who had the idea for the article, who performed the literature search and data analysis, and who drafted and/or critically revised the work.

For articles that are based primarily on the **student's dissertation or thesis**, it is recommended that the student is usually listed as principal author:

A Graduate Student's Guide to Determining Authorship Credit and Authorship Order, APA Science Student Council 2006

### Affiliation

The primary affiliation for each author should be the institution where the majority of their work was done. If an author has subsequently moved, the current address may additionally be stated. Addresses will not be updated or changed after publication of the article.

### Changes to authorship

Authors are strongly advised to ensure the correct author group, the Corresponding Author, and the order of authors at submission. Changes of authorship by adding or deleting authors, and/or changes in Corresponding Author, and/or changes in the sequence of authors are **not** accepted **after acceptance** of a manuscript.

- **Please note that author names will be published exactly as they appear on the accepted submission!**

Please make sure that the names of all authors are present and correctly spelled, and that addresses and affiliations are current.

Adding and/or deleting authors at revision stage are generally not permitted, but in some cases it may be warranted. Reasons for these changes in authorship should be explained. Approval of the change during revision is at the discretion of the Editor-in-Chief. Please note that journals may have individual policies on adding and/or deleting authors during revision stage.

### Author identification

Authors are recommended to use their ORCID ID when submitting an article for consideration or acquire an ORCID ID via the submission process.

### Deceased or incapacitated authors

For cases in which a co-author dies or is incapacitated during the writing, submission, or peer-review process, and the co-authors feel it is appropriate to include the author, co-authors should obtain approval from a (legal) representative which could be a direct relative.

**Authorship issues or disputes**

In the case of an authorship dispute during peer review or after acceptance and publication, the Journal will not be in a position to investigate or adjudicate. Authors will be asked to resolve the dispute themselves. If they are unable the Journal reserves the right to withdraw a manuscript from the editorial process or in case of a published paper raise the issue with the authors' institution(s) and abide by its guidelines.

**Confidentiality**

Authors should treat all communication with the Journal as confidential which includes correspondence with direct representatives from the Journal such as Editors-in-Chief and/or Handling Editors and reviewers' reports unless explicit consent has been received to share information.

Back to top ↑

## Compliance with Ethical Standards

To ensure objectivity and transparency in research and to ensure that accepted principles of ethical and professional conduct have been followed, authors should include information regarding sources of funding, potential conflicts of interest (financial or non-financial), informed consent if the research involved human participants, and a statement on welfare of animals if the research involved animals.

Authors should include the following statements (if applicable) in a separate section entitled "Compliance with Ethical Standards" when submitting a paper:

- Disclosure of potential conflicts of interest
- Research involving Human Participants and/or Animals
- Informed consent

Please note that standards could vary slightly per journal dependent on their peer review policies (i.e. single or double blind peer review) as well as per journal subject

discipline. Before submitting your article check the instructions following this section carefully.

The corresponding author should be prepared to collect documentation of compliance with ethical standards and send if requested during peer review or after publication.

The Editors reserve the right to reject manuscripts that do not comply with the above-mentioned guidelines. The author will be held responsible for false statements or failure to fulfill the above-mentioned guidelines.

Back to top ↑

## Competing Interests

**Authors** are requested to disclose interests that are directly or indirectly related to the work submitted for publication. Interests within the last 3 years of beginning the work (conducting the research and preparing the work for submission) should be reported. Interests outside the 3-year time frame must be disclosed if they could reasonably be perceived as influencing the submitted work. Disclosure of interests provides a complete and transparent process and helps readers form their own judgments of potential bias. This is not meant to imply that a financial relationship with an organization that sponsored the research or compensation received for consultancy work is inappropriate.

**Editorial Board Members and Editors** are required to declare any competing interests and may be excluded from the peer review process if a competing interest exists. In addition, they should exclude themselves from handling manuscripts in cases where there is a competing interest. This may include – but is not limited to – having previously published with one or more of the authors, and sharing the same institution as one or more of the authors. Where an Editor or Editorial Board Member is on the author list they must declare this in the competing interests section on the submitted manuscript. If they are an author or have any other competing interest regarding a specific manuscript, another Editor or member of the Editorial Board will be assigned to assume responsibility for overseeing peer review. These submissions are subject to the exact same review process as any other manuscript. Editorial Board Members are

welcome to submit papers to the journal. These submissions are not given any priority over other manuscripts, and Editorial Board Member status has no bearing on editorial consideration.

Interests that should be considered and disclosed but are not limited to the following:

**Funding:** Research grants from funding agencies (please give the research funder and the grant number) and/or research support (including salaries, equipment, supplies, reimbursement for attending symposia, and other expenses) by organizations that may gain or lose financially through publication of this manuscript.

**Employment:** Recent (while engaged in the research project), present or anticipated employment by any organization that may gain or lose financially through publication of this manuscript. This includes multiple affiliations (if applicable).

**Financial interests:** Stocks or shares in companies (including holdings of spouse and/or children) that may gain or lose financially through publication of this manuscript; consultation fees or other forms of remuneration from organizations that may gain or lose financially; patents or patent applications whose value may be affected by publication of this manuscript.

It is difficult to specify a threshold at which a financial interest becomes significant, any such figure is necessarily arbitrary, so one possible practical guideline is the following: "Any undeclared financial interest that could embarrass the author were it to become publicly known after the work was published."

**Non-financial interests:** In addition, authors are requested to disclose interests that go beyond financial interests that could impart bias on the work submitted for publication such as professional interests, personal relationships or personal beliefs (amongst others). Examples include, but are not limited to: position on editorial board, advisory board or board of directors or other type of management relationships; writing and/or consulting for educational purposes; expert witness; mentoring relations; and so forth.

Primary research articles require a disclosure statement. Review articles present an expert synthesis of evidence and may be treated as an authoritative work on a subject.

Review articles therefore require a disclosure statement. Other article types such as editorials, book reviews, comments (amongst others) may, dependent on their content, require a disclosure statement. If you are unclear whether your article type requires a disclosure statement, please contact the Editor-in-Chief.

Please note that, in addition to the above requirements, funding information (given that funding is a potential competing interest (as mentioned above)) needs to be disclosed upon submission of the manuscript in the peer review system. This information will automatically be added to the Record of CrossMark, however it is **not added** to the manuscript itself. Under 'summary of requirements' (see below) funding information should be included in the '**Declarations**' section.

**Summary of requirements**

The above should be summarized in a statement and included on **a title page that is separate from the manuscript** with a section entitled "**Declarations**" when submitting a paper. Having all statements in one place allows for a consistent and unified review of the information by the Editor-in-Chief and/or peer reviewers and may speed up the handling of the paper. Declarations include Funding, Competing interests, Ethics approval, Consent, Data, Materials and/or Code availability and Authors' contribution statements. **Please use the title page for providing the statements.**

Once and if the paper is accepted for publication, the production department will put the respective statements in a distinctly identified section clearly visible for readers.

Please see the various examples of wording below and revise/customize the sample statements according to your own needs.

When all authors have the same (or no) competing interests and/or funding it is sufficient to use one blanket statement.

**Examples of statements to be used when funding has been received:**

- Partial financial support was received from [...]

- The research leading to these results received funding from [...] under Grant Agreement No[...].
- This study was funded by [...]
- This work was supported by [...] (Grant numbers [...] and [...]

**Examples of statements to be used when there is no funding:**

- The authors did not receive support from any organization for the submitted work.
- No funding was received to assist with the preparation of this manuscript.
- No funding was received for conducting this study.
- No funds, grants, or other support was received.

**Examples of statements to be used when there are interests to declare:**

- **Financial interests:** Author A has received research support from Company A. Author B has received a speaker honorarium from Company Wand owns stock in Company X. Author C is consultant to company Y.

  **Non-financial interests:** Author C is an unpaid member of committee Z.

- **Financial interests:** The authors declare they have no financial interests.

  **Non-financial interests:** Author A is on the board of directors of Y and receives no compensation as member of the board of directors.

- **Financial interests:** Author A received a speaking fee from Y for Z. Author B receives a salary from association X. X where s/he is the Executive Director.

  **Non-financial interests:** none.

- **Financial interests:** Author A and B declare they have no financial interests. Author C has received speaker and consultant honoraria from Company M and Company N.

Dr. C has received speaker honorarium and research funding from Company M and Company O. Author D has received travel support from Company O.

**Non-financial interests:** Author D has served on advisory boards for Company M, Company N and Company O.

**Examples of statements to be used when authors have nothing to declare:**

- The authors have no relevant financial or non-financial interests to disclose.
- The authors have no competing interests to declare that are relevant to the content of this article.
- All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.
- The authors have no financial or proprietary interests in any material discussed in this article.

Authors are responsible for correctness of the statements provided in the manuscript. See also Authorship Principles. The Editor-in-Chief reserves the right to reject submissions that do not meet the guidelines described in this section.

Back to top ↑

## Research involving human participants, their data or biological material

### Ethics approval

When reporting a study that involved human participants, their data or biological material, authors should include a statement that confirms that the study was approved (or granted exemption) by the appropriate institutional and/or national research ethics committee (including the name of the ethics committee) and certify that

the study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. If doubt exists whether the research was conducted in accordance with the 1964 Helsinki Declaration or comparable standards, the authors must explain the reasons for their approach, and demonstrate that an independent ethics committee or institutional review board explicitly approved the doubtful aspects of the study. If a study was granted exemption from requiring ethics approval, this should also be detailed in the manuscript (including the reasons for the exemption).

**Retrospective ethics approval**

If a study has not been granted ethics committee approval prior to commencing, retrospective ethics approval usually cannot be obtained and it may not be possible to consider the manuscript for peer review. The decision on whether to proceed to peer review in such cases is at the Editor's discretion.

**Ethics approval for retrospective studies**

Although retrospective studies are conducted on already available data or biological material (for which formal consent may not be needed or is difficult to obtain) ethics approval may be required dependent on the law and the national ethical guidelines of a country. Authors should check with their institution to make sure they are complying with the specific requirements of their country.

**Ethics approval for case studies**

Case reports require ethics approval. Most institutions will have specific policies on this subject. Authors should check with their institution to make sure they are complying with the specific requirements of their institution and seek ethics approval where needed. Authors should be aware to secure informed consent from the individual (or parent or guardian if the participant is a minor or incapable) See also section on **Informed Consent**.

**Cell lines**

If human cells are used, authors must declare in the manuscript: what cell lines were used by describing the source of the cell line, including when and from where it was

obtained, whether the cell line has recently been authenticated and by what method. If cells were bought from a life science company the following need to be given in the manuscript: name of company (that provided the cells), cell type, number of cell line, and batch of cells.

It is recommended that authors check the NCBI database for misidentification and contamination of human cell lines. This step will alert authors to possible problems with the cell line and may save considerable time and effort.

Further information is available from the International Cell Line Authentication Committee (ICLAC).

Authors should include a statement that confirms that an institutional or independent ethics committee (including the name of the ethics committee) approved the study and that informed consent was obtained from the donor or next of kin.

**Research Resource Identifiers (RRID)**

Research Resource Identifiers (RRID) are persistent unique identifiers (effectively similar to a DOI) for research resources. This journal encourages authors to adopt RRIDs when reporting key biological resources (antibodies, cell lines, model organisms and tools) in their manuscripts.

**Examples:**

**Organism:** *Filip1*$^{tm1a(KOMP)Wtsi}$ **RRID:MMRRC_055641-UCD**

**Cell Line:** RST307 cell line **RRID:CVCL_C321**

**Antibody:** Luciferase antibody DSHB Cat# LUC-3, **RRID:AB_2722109**

**Plasmid:** mRuby3 plasmid **RRID:Addgene_104005**

**Software:** ImageJ Version 1.2.4 **RRID:SCR_003070**

RRIDs are provided by the Resource Identification Portal. Many commonly used research resources already have designated RRIDs. The portal also provides authors

links so that they can quickly register a new resource and obtain an RRID.

**Clinical Trial Registration**

The World Health Organization (WHO) definition of a clinical trial is "any research study that prospectively assigns human participants or groups of humans to one or more health-related interventions to evaluate the effects on health outcomes". The WHO defines health interventions as "A health intervention is an act performed for, with or on behalf of a person or population whose purpose is to assess, improve, maintain, promote or modify health, functioning or health conditions" and a health-related outcome is generally defined as a change in the health of a person or population as a result of an intervention.

To ensure the integrity of the reporting of patient-centered trials, authors must register prospective clinical trials (phase II to IV trials) in suitable publicly available repositories. For example www.clinicaltrials.gov or any of the primary registries that participate in the WHO International Clinical Trials Registry Platform.

The trial registration number (TRN) and date of registration should be included as the last line of the manuscript abstract.

For clinical trials that have not been registered prospectively, authors are encouraged to register retrospectively to ensure the complete publication of all results. The trial registration number (TRN), date of registration and the words 'retrospectively registered' should be included as the last line of the manuscript abstract.

**Standards of reporting**

Springer Nature advocates complete and transparent reporting of biomedical and biological research and research with biological applications. Authors are recommended to adhere to the minimum reporting guidelines hosted by the EQUATOR Network when preparing their manuscript.

Exact requirements may vary depending on the journal; please refer to the journal's Instructions for Authors.

Checklists are available for a number of study designs, including:

Randomised trials (CONSORT) and Study protocols (SPIRIT)

Observational studies (STROBE)

Systematic reviews and meta-analyses (PRISMA) and protocols (Prisma-P)

Diagnostic/prognostic studies (STARD) and (TRIPOD)

Case reports (CARE)

Clinical practice guidelines (AGREE) and (RIGHT)

Qualitative research (SRQR) and (COREQ)

Animal pre-clinical studies (ARRIVE)

Quality improvement studies (SQUIRE)

Economic evaluations (CHEERS)

**Summary of requirements**

The above should be summarized in a statement and placed in a 'Declarations' section before the reference list under a heading of 'Ethics approval'.

Examples of statements to be used when ethics approval has been obtained:

• All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was approved by the Bioethics Committee of the Medical University of A (No. ...).

• This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of University B (Date.../No. ...).

• Approval was obtained from the ethics committee of University C. The procedures used in this study adhere to the tenets of the Declaration of Helsinki.

• The questionnaire and methodology for this study was approved by the Human Research Ethics committee of the University of D (Ethics approval number: ...).

Examples of statements to be used for a retrospective study:

• Ethical approval was waived by the local Ethics Committee of University A in view of the retrospective nature of the study and all the procedures being performed were part of the routine care.

• This research study was conducted retrospectively from data obtained for clinical purposes. We consulted extensively with the IRB of XYZ who determined that our study did not need ethical approval. An IRB official waiver of ethical approval was granted from the IRB of XYZ.

• This retrospective chart review study involving human participants was in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The Human Investigation Committee (IRB) of University B approved this study.

Examples of statements to be used when no ethical approval is required/exemption granted:

• This is an observational study. The XYZ Research Ethics Committee has confirmed that no ethical approval is required.

• The data reproduced from Article X utilized human tissue that was procured via our Biobank AB, which provides de-identified samples. This study was reviewed and deemed exempt by our XYZ Institutional Review Board. The BioBank protocols are in accordance with the ethical standards of our institution and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Authors are responsible for correctness of the statements provided in the manuscript. See also Authorship Principles. The Editor-in-Chief reserves the right to reject submissions that do not meet the guidelines described in this section.

Back to top ↑

## Informed consent

All individuals have individual rights that are not to be infringed. Individual participants in studies have, for example, the right to decide what happens to the (identifiable) personal data gathered, to what they have said during a study or an interview, as well as to any photograph that was taken. This is especially true concerning images of vulnerable people (e.g. minors, patients, refugees, etc) or the use of images in sensitive contexts. In many instances authors will need to secure written consent before including images.

Identifying details (names, dates of birth, identity numbers, biometrical characteristics (such as facial features, fingerprint, writing style, voice pattern, DNA or other distinguishing characteristic) and other information) of the participants that were studied should not be published in written descriptions, photographs, and genetic profiles unless the information is essential for scholarly purposes and the participant (or parent/guardian if the participant is a minor or incapable or legal representative) gave written informed consent for publication. Complete anonymity is difficult to achieve in some cases. Detailed descriptions of individual participants, whether of their whole bodies or of body sections, may lead to disclosure of their identity. Under certain circumstances consent is not required as long as information is anonymized and the submission does not include images that may identify the person.

Informed consent for publication should be obtained if there is any doubt. For example, masking the eye region in photographs of participants is inadequate protection of anonymity. If identifying characteristics are altered to protect anonymity, such as in genetic profiles, authors should provide assurance that alterations do not distort meaning.

Exceptions where it is not necessary to obtain consent:

• Images such as x rays, laparoscopic images, ultrasound images, brain scans, pathology slides unless there is a concern about identifying information in which case, authors should ensure that consent is obtained.

• Reuse of images: If images are being reused from prior publications, the Publisher will assume that the prior publication obtained the relevant information regarding consent. Authors should provide the appropriate attribution for republished images.

**Consent and already available data and/or biologic material**

Regardless of whether material is collected from living or dead patients, they (family or guardian if the deceased has not made a pre-mortem decision) must have given prior written consent. The aspect of confidentiality as well as any wishes from the deceased should be respected.

**Data protection, confidentiality and privacy**

When biological material is donated for or data is generated as part of a research project authors should ensure, as part of the informed consent procedure, that the participants are made aware what kind of (personal) data will be processed, how it will be used and for what purpose. In case of data acquired via a biobank/biorepository, it is possible they apply a broad consent which allows research participants to consent to a broad range of uses of their data and samples which is regarded by research ethics committees as specific enough to be considered "informed". However, authors should always check the specific biobank/biorepository policies or any other type of data provider policies (in case of non-bio research) to be sure that this is the case.

**Consent to Participate**

For all research involving human subjects, freely-given, informed consent to participate in the study must be obtained from participants (or their parent or legal guardian in the case of children under 16) and a statement to this effect should appear in the manuscript. In the case of articles describing human transplantation studies, authors must include a statement declaring that no organs/tissues were obtained from prisoners and must also name the institution(s)/clinic(s)/department(s) via which organs/tissues were obtained. For manuscripts reporting studies involving vulnerable

groups where there is the potential for coercion or where consent may not have been fully informed, extra care will be taken by the editor and may be referred to the Springer Nature Research Integrity Group.

**Consent to Publish**

Individuals may consent to participate in a study, but object to having their data published in a journal article. Authors should make sure to also seek consent from individuals to publish their data prior to submitting their paper to a journal. This is in particular applicable to case studies. A consent to publish form can be found

here. (Download docx, 36 kB)

**Summary of requirements**

The above should be summarized in a statement and placed in a 'Declarations' section before the reference list under a heading of 'Consent to participate' and/or 'Consent to publish'. Other declarations include Funding, Competing interests, Ethics approval, Consent, Data and/or Code availability and Authors' contribution statements.

Please see the various examples of wording below and revise/customize the sample statements according to your own needs.

Sample statements for **"Consent to participate"**:

Informed consent was obtained from all individual participants included in the study.

Informed consent was obtained from legal guardians.

Written informed consent was obtained from the parents.

Verbal informed consent was obtained prior to the interview.

Sample statements for **"Consent to publish"**:

The authors affirm that human research participants provided informed consent for publication of the images in Figure(s) 1a, 1b and 1c.

The participant has consented to the submission of the case report to the journal.

Patients signed informed consent regarding publishing their data and photographs.

Sample statements if identifying information about participants is available in the article:

Additional informed consent was obtained from all individual participants for whom identifying information is included in this article.

Authors are responsible for correctness of the statements provided in the manuscript. See also Authorship Principles. The Editor-in-Chief reserves the right to reject submissions that do not meet the guidelines described in this section.

Images will be removed from publication if authors have not obtained informed consent or the paper may be removed and replaced with a notice explaining the reason for removal.

Back to top ↑

## Research Data Policy and Data Availability Statements

This journal follows Springer Nature research data policy. Sharing of all relevant research data is strongly encouraged and authors must add a Data Availability Statement to original research articles.

Research data includes a wide range of types, including spreadsheets, images, textual extracts, archival documents, video or audio, interview notes or any specialist formats generated during research.

**Data availability statements**

All original research must include a data availability statement. This statement should explain how to access data supporting the results and analysis in the article, including links/citations to publicly archived datasets analysed or generated during the study. Please see our full policy here.

If it is not possible to share research data publicly, for instance when individual privacy could be compromised, this statement should describe how data can be accessed and any conditions for reuse. Participant consent should be obtained and documented prior to data collection. See our guidance on sensitive data for more information.

When creating a data availability statement, authors are encouraged to consider the minimal dataset that would be necessary to interpret, replicate and build upon the findings reported in the article.

Further guidance on writing a data availability statement, including examples, is available at:

Data availability statements

**Data repositories**

Authors are strongly encouraged to deposit their supporting data in a publicly available repository. Sharing your data in a repository promotes the integrity, discovery and reuse of your research, making it easier for the research community to build on and credit your work.

See our data repository guidance for information on finding a suitable repository.

We recommend the use of discipline-specific repositories where available. For a number of data types, submission to specific public repositories is mandatory.

See our list of mandated data types.

The journal encourages making research data available under open licences that permit reuse. The journal does not enforce use of particular licences in third party repositories. You should ensure you have necessary rights to share any data that you deposit in a repository.

**Data citation**

The journal recommends that authors cite any publicly available data on which the conclusions of the paper rely. This includes data the authors are sharing alongside their

publication and any secondary data the authors have reused. Data citations should include a persistent identifier (such as a DOI), should be included in the reference list using the minimum information recommended by DataCite (Dataset Creator, Dataset Title, Publisher [repository], Publication Year, Identifier [e.g. DOI, Handle, Accession or ARK]) and follow journal style.

See our further guidance on citing datasets.

**Research data and peer review**

If the journal that you are submitting to uses double-anonymous peer review and you are providing reviewers with access to your data (for example via a repository link, supplementary information or data on request), it is strongly suggested that the authorship in the data is also anonymised. There are data repositories that can assist with this and/or will create a link to mask the authorship of your data.

**Support with research data policy**

Authors who need help understanding our data sharing policy, finding a suitable data repository, or organising and sharing research data can consult our Research Data Helpdesk for guidance.

See our FAQ page for more information on Springer Nature's research data policy.

Back to top ↑

## After acceptance

Upon acceptance, your article will be exported to Production to undergo typesetting. Once typesetting is complete, you will receive a link asking you to confirm your affiliation, choose the publishing model for your article as well as arrange rights and payment of any associated publication cost.

Once you have completed this, your article will be processed and you will receive the proofs.

**Article publishing agreement**

Depending on the ownership of the journal and its policies, you will either grant the Publisher an exclusive licence to publish the article or will be asked to transfer copyright of the article to the Publisher.

**Offprints**

Offprints can be ordered by the corresponding author.

**Color illustrations**

Online publication of color illustrations is free of charge. For color in the print version, authors will be expected to make a contribution towards the extra costs.

**Proof reading**

The purpose of the proof is to check for typesetting or conversion errors and the completeness and accuracy of the text, tables and figures. Substantial changes in content, e.g., new results, corrected values, title and authorship, are not allowed without the approval of the Editor.

After online publication, further changes can only be made in the form of an Erratum, which will be hyperlinked to the article.

**Online First**

The article will be published online after receipt of the corrected proofs. This is the official first publication citable with the DOI. After release of the printed version, the paper can also be cited by issue and page numbers.

Back to top ↑

## Open Choice

Open Choice allows you to publish open access in more than 1850 Springer Nature journals, making your research more visible and accessible immediately on publication.

Article processing charges (APCs) vary by journal – view the full list

Benefits:

- Increased researcher engagement: Open Choice enables access by anyone with an internet connection, immediately on publication.
- Higher visibility and impact: In Springer hybrid journals, OA articles are accessed 4 times more often on average, and cited 1.7 more times on average*.
- Easy compliance with funder and institutional mandates: Many funders require open access publishing, and some take compliance into account when assessing future grant applications.

It is easy to find funding to support open access – please see our funding and support pages for more information.

*) Within the first three years of publication. Springer Nature hybrid journal OA impact analysis, 2018.

Open Choice

Funding and Support pages

**Copyright and license term – CC BY**

Open Choice articles do not require transfer of copyright as the copyright remains with the author. In opting for open access, the author(s) agree to publish the article under the Creative Commons Attribution License.

Find more about the license agreement

Back to top ↑

## Editing Services

**English**

How can you help improve your manuscript for publication?

Presenting your work in a well-structured manuscript and in well-written English gives it its best chance for editors and reviewers to understand it and evaluate it fairly. Many researchers find that getting some independent support helps them present their results in the best possible light. The experts at Springer Nature Author Services can help you with manuscript preparation—including **English language editing, developmental comments, manuscript formatting, figure preparation, translation**, and more.

Get started and save 15%

You can also use our free Grammar Check tool for an evaluation of your work.

Please note that using these tools, or any other service, is not a requirement for publication, nor does it imply or guarantee that editors will accept the article, or even select it for peer review.

**Chinese (中文)**

您怎么做才有助于改进您的稿件以便顺利发表？

如果在结构精巧的稿件中用精心组织的英语展示您的作品，就能最大限度地让编辑和审稿人理解并公正评估您的作品。许多研究人员发现，获得一些独立支持有助于他们以尽可能美好的方式展示他们的成果。Springer Nature Author Services 的专家可帮助您准备稿件，具体包括**润色英语表述、添加有见地的注释、为稿件排版、设计图表、翻译**等。

开始使用即可节省 15% 的费用

您还可以使用我们的免费语法检查工具来评估您的作品。

请注意，使用这些工具或任何其他服务不是发表前必须满足的要求，也不暗示或保证相关文章定会被编辑接受（甚至未必会被选送同行评审）。

**Japanese (日本語)**

発表に備えて、論文を改善するにはどうすればよいでしょうか？

内容が適切に組み立てられ、質の高い英語で書かれた論文を投稿すれば、編集者や査読者が論文を理解し、公正に評価するための最善の機会となります。多くの研究者は、個別のサポートを受けることで、研究結果を可能な限り最高の形で発表できると思っています。Springer Nature Author Servicesのエキスパートが、**英文の編集、建設的な提言、論文の書式、図の調整、翻訳**など、論文の作成をサポートいたします。

今なら15%割引でご利用いただけます

原稿の評価に、無料の文法チェックツールもご利用いただけます。

これらのツールや他のサービスをご利用いただくことは、論文を掲載するための要件ではありません。また、編集者が論文を受理したり、査読に選定したりすることを示唆または保証するものではないことにご注意ください。

**Korean (한국어)**

게재를 위해 원고를 개선하려면 어떻게 해야 할까요?

여러분의 작품을 체계적인 원고로 발표하는 것은 편집자와 심사자가 여러분의 연구를 이해하고 공정하게 평가할 수 있는 최선의 기회를 제공합니다. 많은 연구자들은 어느 정도 독립적인 지원을 받는 것이 가능한 한 최선의 방법으로 자신의 결과를 발표하는 데 도움이 된다고 합니다. Springer Nature Author Services 전문가들은 **영어 편집, 발전적인 논평, 원고 서식 지정, 그림 준비, 번역** 등과 같은 원고 준비를 도와드릴 수 있습니다.

지금 시작하면 15% 할인됩니다.

또한 당사의 무료 문법 검사도구를 사용하여 여러분의 연구를 평가할 수 있습니다.

이러한 도구 또는 기타 서비스를 사용하는 것은 게재를 위한 필수 요구사항이 아니며, 편집자가 해당 논문을 수락하거나 피어 리뷰에 해당 논문을 선택한다는 것을 암시하거나 보장하지는 않습니다.

Back to top ↑

## Open access publishing

To find out more about publishing your work Open Access in *Current Psychology*, including information on fees, funding and licenses, visit our Open access publishing page.

Back to top ↑

## For authors

Submission guidelines

Language editing services

Ethics & disclosures

Open Access fees and funding

Contact the journal

Calls for papers

Submit manuscript

**Working on a manuscript?**

Avoid the most common mistakes and prepare your manuscript for journal editors.

Learn more →

## Explore

Online first articles

Volumes and issues

Collections

Sign up for alerts

**Publish with us**

Authors & Editors

Journal authors

Publishing ethics

Open Access & Springer

**Discover content**

SpringerLink

Books A-Z

Journals A-Z

Video

**Other services**

Instructors

Librarians (Springer Nature)

Societies and Publishing Partners

Advertisers

Shop on Springer.com

**About Springer**

# ANEXO F

REPÚBLICA FEDERATIVA DO BRASIL
MINISTÉRIO DA EDUCAÇÃO
UFCSPA
UNIVERSIDADE FEDERAL DE CIÊNCIAS DA SAÚDE DE PORTO ALEGRE
Rua Sarmento Leite, 245 - Fones: 0 xx 51 3303 9000 - Fax: 0 xx 51 3303.8810
CEP 90050-170 - Porto Alegre - RS - www.ufcspa.edu.br

## Termo de Compromisso de Utilização de Dados (TCUD)

Eu, **Kellen Greff Ballejos,** da Universidade Federal Ciências da Saúde de Porto Alegre, no âmbito da pesquisa intitulada "Avaliação de uma teleintervenção *mHealth* na perspectiva da Autocompaixão em Dor Lombar: Um Ensaio Clínico Randomizado Controlado", comprometo-me com a utilização dos dados obtidos**,** a fim de obtenção dos objetivos previstos, somente após receber a aprovação do sistema CEP-CONEP.

Comprometo-me a manter a confidencialidade dos dados coletados no **(banco de dados do Google Forms),** bem como com a privacidade de seus conteúdos.

Esclareço que os dados a serem coletados se referem a **(autocompaixão e dor lombar em adultos)**, no período de **janeiro/2022 a outubro/2022.**

Declaro entender que é minha a responsabilidade de cuidar da integridade das informações e de garantir a confidencialidade dos dados e a privacidade dos indivíduos que terão suas informações acessadas.

Também é minha a responsabilidade de não repassar os dados coletados ou o banco de dados em sua íntegra, ou parte dele, à pessoas não envolvidas na equipe da pesquisa.

Por fim, comprometo-me com a guarda, cuidado e utilização das informações apenas para cumprimento dos objetivos previstos nesta pesquisa aqui referida. Qualquer outra pesquisa em que eu precise coletar informações serão submetidas a apreciação do CEP/ENSP.

Porto Alegre, 31/07/2021.

Kellen Greff Ballejos
Membro da equipe

Caroline Tozzi Reppold
Assinatura do pesquisador responsável

## ANEXO G

REPÚBLICA FEDERATIVA DO BRASIL
MINISTÉRIO DA EDUCAÇÃO

UFCSPA
UNIVERSIDADE FEDERAL DE CIÊNCIAS DA SAÚDE DE PORTO ALEGRE
Rua Sarmento Leite, 245 - Fones: 0 xx 51 3303 9000 - Fax: 0 xx 51 3303.8810
CEP 90050-170 - Porto Alegre - RS - www.ufcspa.edu.br

# TERMO DE COMPROMISSO PARA ENTREGA DE RELATÓRIO SEMESTRAL OU FINAL

**Título do Projeto**

"Avaliação de uma teleintervenção *mHealth* na perspectiva da Autocompaixão em Dor Lombar: Um Ensaio Clínico Randomizado Controlado",

**Eu, pesquisador abaixo, comprometo-me a entregar relatório parcial ou final referente ao desenvolvimento do projeto de pesquisa acima citado.**

**Relatório parcial previsto para: novembro/2022**
**Relatório parcial previsto para: julho/2023**
**Relatório final previsto para: outubro/2024**

| Nome do Pesquisador Responsável | Assinatura |
|---|---|
| Caroline Tozzi Reppold | |
| **E- mail:** reppold@ufcspa.edu.br | **Telefone:** |

**Data:** 31/07/2021

# ANEXO H

UNIVERSIDADE FEDERAL DE CIÊNCIAS DA SAÚDE DE PORTO ALEGRE

## PARECER CONSUBSTANCIADO DO CEP

**DADOS DO PROJETO DE PESQUISA**

**Título da Pesquisa:** Avaliação de uma teleintervenção mHealth na perspectiva da Autocompaixão em Dor Lombar: Um Ensaio Clínico Randomizado Controlado

**Pesquisador:** Caroline Reppold

**Área Temática:**

**Versão:** 2

**CAAE:** 50814221.0.0000.5345

**Instituição Proponente:** Universidade Federal de Ciências da Saúde de Porto Alegre

**Patrocinador Principal:** Financiamento Próprio

**DADOS DO PARECER**

**Número do Parecer:** 4.983.012

**Apresentação do Projeto:**

As informações elencadas nos campos "Apresentação do Projeto", Objetivo da Pesquisa" e "Avaliação dos Riscos e Benefícios" foram retiradas do arquivo informações Básicas da Pesquisa e do Projeto Detalhado (Anexados à PB em 06/08/21)

A dor crônica, entre elas a dor lombar, é uma das principais causas de incapacidade no mundo, além de gerar grandes impactos na vida dos indivíduos. Esses aspectos podem ser minimizados de acordo com a percepção de autocompaixão.

Abordagens com foco na compaixão podem contribuir com as pessoas no sentido de lidarem com o estresse associado a dor. O treinamento de autocompaixão (compaixão por si mesmo) melhora o gerenciamento e regulação da intensidade da dor crônica, sendo um recurso útil diante de experiências difíceis, havendo um acolhimento e aceitação do próprio sofrimento e melhora no bem-estar psicológico. Através da autocompaixão os pacientes conseguem reduzir aspectos negativos da vida, entre eles, a intensidade da dor.

O mobile health (mHealth), é o uso das Tecnologias da Informação e Comunicação (TICs) para cuidados em saúde através de dispositivos móveis. Os aplicativos de celular, que estão entre as tecnologias mais utilizadas, possibilitam intervenções a qualquer momento e local, conforme a necessidade do paciente. A introdução de uma intervenção psicoeducacional assíncrona pode trazer benefícios para profissionais e usuários, tendo como vantagens o anonimato, a economia de tempo e a

**Endereço:** Rua Sarmento Leite ,245
**Bairro:** Sarmento **CEP:** 90.050-170
**UF:** RS **Município:** PORTO ALEGRE
**Telefone:** (51)3303-8804 **E-mail:** cep@ufcspa.edu.br

possibilidade de atendimento à distância.

- Hipóteses:
H1 – Serão evidenciados altos níveis de percepção de dor lombar crônica;
H2 – Serão evidenciados baixos níveis de percepção de autocompaixão;
H3 – Haverá correlação entre as variáveis psicológicas e a resposta à teleintervenção para autocompaixão.

-Critérios de inclusão: adultos de até 59 anos, da rede de saúde pública ou privada e com diagnóstico de dor lombar.
-Critérios de Exclusão: adultos com algum tipo de limitação, deficiência física ou diagnóstico de Transtorno Psicótico.

Após a verificação dos critérios de inclusão, será enviado o link com o convite e o TCLE para a participação no estudo, assim como as instruções para preenchimento do instrumento principal. Posteriormente, os participantes serão alocados aleatoriamente em dois grupos (intervenção e controle). Serão aplicadas além do questionário biopsicossocial, escalas psicométricas, entre elas: Depression Anxiety Stress Scales (DASS – 21), Escala de pensamento catastrófico sobre a dor (B-PCS), Indice de Qualidade do Sono de Pittisburgh (PSQI-BR) e Escala de Autocompaixão.
Os participantes serão avaliados em relação a diversas medidas psicológicas e psiquiátricas em três momentos (pré-intervenção, pós-intervenção e follow-up, respectivamente nos meses 1 e 2; 4 e 5; 9 e 10) e de forma assíncrona. Os desfechos a serem considerados serão indicadores neurobiológicos (dor e qualidade do sono), neuropsicológico e biopsicossociais (ansiedade, depressão, estresse, autocompaixão, bem estar e catastrofismo). Para a teleintervenção em grupo a pesquisadora será a terapeuta, mas os aplicadores dos instrumentos serão outros acadêmicos treinados.

**Objetivo da Pesquisa:**
OBJETIVO GERAL
Investigar a eficácia de uma teleintervenção mHealth através da psicoeducação assíncrona em grupo via aplicativo de mensagem gratuito, baseada em autocompaixão em pacientes adultos com diagnóstico de dor lombar, oriundos de serviços de saúde do Brasil em comparação com o grupo em tratamento convencional (médico e/ou fisioterapêutico).

OBJETIVOS ESPECÍFICOS

- Investigar os índices de autopercepção de dor lombar crônica em adultos antes e após a teleintervenção mHealth em comparação com o grupo de tratamento convencional (avaliação intragrupo e intergrupo);
- Analisar os índices de autocompaixão percebida em adultos antes e após a teleintervenção mHealth em comparação com o grupo de tratamento convencional (avaliação intragrupo e intergrupo);
- Avaliar a correlação entre as variáveis psicológicas (autocompaixão, sinais e sintomas de ansiedade, depressão e estresse, sono e catastrofismo) e a resposta à teleintervenção para autocompaixão.

**Avaliação dos Riscos e Benefícios:**

Conforme o TCLE:

RISCOS: O risco é mínimo (desconforto em relação ao tempo despendido no preenchimento do instrumento). A pesquisa poderá ser interrompida a qualquer momento e sem qualquer prejuízo.

BENEFÍCIOS: Sua participação contribuirá para ações de apoio para o aumento da autocompaixão e bemestar em dor lombar.

- Nas informações básicas da PB consta como Benefícios: Espera-se que os resultados demonstrem a eficácia da intervenção na modalidade mHealth por meio do uso de tecnologia da informação e comunicação investigada e possa ser uma alternativa de baixo custo e fácil adesão a pacientes, a ser disponibilizada, com evidência de validade, na rede de saúde.

**Comentários e Considerações sobre a Pesquisa:**

Trata-se de ensaio clínico randomizado controlado.

Estimada amostra de 56 adultos (28 grupo controle e 28 grupo intervenção), pacientes recrutados por meio de duas fontes: Sociedade Brasileira do Estudo da Dor (SBED) e Clínicas de fisioterapia e reabilitação física.

Caráter acadêmico, realizado para obtenção do título de Doutor em Ciências da Reabilitação.

Previsão de término em dezembro de 2025.

**Considerações sobre os Termos de apresentação obrigatória:**

Foram apresentados e estão adequados:

-folha de rosto

-termo de compromisso de entrega de relatórios

-termo de anuência do responsável pelo setor onde será realizada a pesquisa

-TCUD assinado por todos membros da pesquisa
-TCLE

**Conclusões ou Pendências e Lista de Inadequações:**

Trata-se de análise de resposta ao parecer pendente n. 4.961.345 emitido pelo CEP em 09 de Setembro de 2021:

1) solicita-se incluir a garantia de que o participante da pesquisa receberá uma via do Termo de Consentimento Livre e Esclarecido
RESPOSTA: Foi incluído no penúltimo parágrafo do TCLE, que o participante receberá uma via do termo.
ANÁLISE: atendida

2) solicita-se explicitação da garantia de indenização diante de eventuais danos decorrentes da pesquisa.
RESPOSTA: Foi incluída no penúltimo parágrafo do TCLE, a garantia de indenização
ANÁLISE: atendida

3) solicita-se (a) explicitação do tempo aproximado de envolvimento do participante respondendo aos instrumentos da pesquisa; (b) explicação breve das etapas do estudo (conforme item 6 "coleta de dados" do Projeto de pesquisa serão 3 momentos), explicitando que a resposta aos questionários ocorrerá em 3 momentos diferentes; (c) além disso, não ficou claro como será realizada a teleintervenção em grupo (quantos encontros/reuniões; será necessário instalar algum aplicativo no smartphone) e qual o tempo de intervenção.
RESPOSTA: Foi acrescentado no segundo parágrafo do TCLE, que o tempo aproximado para o preenchimento do questionário em cada momento será de 30 minutos.
ANÁLISE: atendida

4) solicita-se que seja incluída uma frase informando o participante sobre a possibilidade de inclusão em grupo controle ou experimental.
RESPOSTA: Foi acrescentado no segundo parágrafo do TCLE, sobre a possibilidade de inclusão em grupo controle ou experimental.
ANÁLISE: atendida

O projeto tem validade até 30/12/2025.

UNIVERSIDADE FEDERAL DE CIÊNCIAS DA SAÚDE DE PORTO ALEGRE



**Considerações Finais a critério do CEP:**

Ressalta-se que cabe ao pesquisador responsável encaminhar os relatórios parciais e final da pesquisa, por meio da Plataforma Brasil, via notificação do tipo "relatório" para que sejam devidamente apreciadas no CEP, conforme Norma Operacional CNS no 001/13, item XI.2.d

**Este parecer foi elaborado baseado nos documentos abaixo relacionados:**

| Tipo Documento | Arquivo | Postagem | Autor | Situação |
|---|---|---|---|---|
| Informações Básicas do Projeto | PB_INFORMAÇÕES_BÁSICAS_DO_PROJETO_1804968.pdf | 13/09/2021 22:24:37 | | Aceito |
| Projeto Detalhado / Brochura Investigador | Projeto_Kellen_CEP_12_09_21.docx | 13/09/2021 22:23:33 | Caroline Reppold | Aceito |
| TCLE / Termos de Assentimento / Justificativa de Ausência | TCLE120921.docx | 13/09/2021 22:22:20 | Caroline Reppold | Aceito |
| Solicitação registrada pelo CEP | Cartaresposta_12_09_21_pdf.pdf | 13/09/2021 22:19:42 | Caroline Reppold | Aceito |
| Folha de Rosto | FR_Caroline_Reppold_assinada.pdf | 06/08/2021 21:07:48 | Caroline Reppold | Aceito |
| Outros | Termo_compromisso_entrega_relatorio_semestral_final_Kellen.doc | 06/08/2021 12:35:52 | Caroline Reppold | Aceito |
| Declaração de concordância | Termo_de_Anuencia_pdf.pdf | 06/08/2021 12:34:05 | Caroline Reppold | Aceito |
| Declaração de Pesquisadores | tcdu_Prisla_assinatura.docx | 06/08/2021 12:32:17 | Caroline Reppold | Aceito |
| Declaração de Pesquisadores | tcdu_Caroline.doc | 06/08/2021 12:32:06 | Caroline Reppold | Aceito |

**Situação do Parecer:**

Aprovado

**Necessita Apreciação da CONEP:**

Não

**Endereço:** Rua Sarmento Leite ,245
**Bairro:** Sarmento **CEP:** 90.050-170
**UF:** RS **Município:** PORTO ALEGRE
**Telefone:** (51)3303-8804 **E-mail:** cep@ufcspa.edu.br

UNIVERSIDADE FEDERAL DE CIÊNCIAS DA SAÚDE DE PORTO ALEGRE

Continuação do Parecer: 4.983.012

PORTO ALEGRE, 17 de Setembro de 2021

**Assinado por:**
**Fernanda Bordignon Nunes**
**(Coordenador(a))**

**Endereço:** Rua Sarmento Leite ,245
**Bairro:** Sarmento **CEP:** 90.050-170
**UF:** RS **Município:** PORTO ALEGRE
**Telefone:** (51)3303-8804 **E-mail:** cep@ufcspa.edu.br