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HOW PAIN, STRESS AND MINDFULNESS ARE INTERCONNECTED WITH COMPONENTS OF PSYCHOLOGICAL AND PHYSICAL WELL-BEING OF ADULTS

Abstract

The unity of mind and body is a topic of broad interest for many researchers in Psychology. Widespread conditions of chronic/episodical pain, chronic stress may have connections with other bio-psycho-social conditions. In this article we would like to disclose the unity of mental and physical conditions through the lens of psychological and physical well-being and investigate their interconnection with pain and stress conditions, also mindfulness as possible regulator.

Methods. 106 adults (males 23, females 83) were examined with next 9 scales. Perceived Stress Scale (PSS), Mindful awareness (MAAS), Satisfaction with life scale (SWLS), Scale of subjective happiness (SHS), Numerical Pain Rating Scale (NPRS), Sleep Quality questionnaire, Rosenberg Self-esteem Scale (RSES), Questionnaire of the body image, Arousability and Optimism Scale (AOS).

Pearson criteria was analyzed via SPSS Statistics 23. Python Plotly library was used for visualization of correlations via the warmth diagram.

Results. The analysis of received data showed an amount of related significant correlations ($p<0.01$) between variables which is enough for perspective model building. Mindfulness demonstrates notable negative correlations with perceived pain, stress and its subscales (overwhelming and resistance), pessimism, negative body image. Also, mindfulness shows moderate positive correlations with sleep quality, life satisfaction and subjective well-being, self-esteem. According to this, mindfulness can be understood as regulator for stress, pain and improving some components of psychological and physical well-being.

Value and significance. The paper contributes into the body of knowledge of interrelations between pain, stress, mindfulness and well-being. It covers gap in understanding how these variables are interconnected among adults and complements the model of psychological and physical (or psychophysical) well-being. The results can be used for further researches in relevant fields. In practical terms, these results can be useful in designing pain and stress management interventions, with the usage of mindfulness advancing.

Keywords: *stress, pain, mindfulness, psychological well-being, physical well-being, sleep quality, activity*

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КАК БОЛЬ, СТРЕСС И ОСОЗНАННОСТЬ ВЗАИМОСВЯЗАНЫ С КОМПОНЕНТАМИ ПСИХОЛОГИЧЕСКОГО И ФИЗИЧЕСКОГО БЛАГОПОЛУЧИЯ ВЗРОСЛЫХ

Аннотация

Единство психического и физического является предметом широкого интереса исследователей в психологии. Широко распространенные состояния хронической/эпизодической боли, хронического стресса могут иметь взаимосвязи с другими

био-психо-социальными состояниями. В данной статье мы хотели бы раскрыть единство психических и физических состояний через призму психологического и физического благополучия и исследовать взаимосвязь компонентов благополучия с болью, стрессом, а также осознанностью как возможным регулятором.

Методы. 106 взрослых (мужчин 23, женщин 83) обследовали по следующим 9 шкалам. Шкала воспринимаемого стресса (PSS), Осознанная внимательность (MAAS), Шкала удовлетворенности жизнью (SWLS), Шкала субъективного счастья (SHS), Числовая шкала оценки боли (NPRS), Опросник качества сна, Шкала самооценки Розенберга (RSES), Анкета образ тела (OOCT), активность и оптимизм (AOC).

Критерий Пирсона анализировался с помощью SPSS Statistics 23. Для визуализации корреляций с помощью тепловой диаграммы использовалась библиотека Python Plotly.

Результаты. Анализ полученных данных показал значимые корреляции ($p<0,01$) между большинством переменных, этого достаточно для построения перспективной модели. Осознанность демонстрирует умеренные отрицательные корреляции с переживанием боли, стресса и его подшкалами (перенапряжение и сопротивление), пессимизмом, негативным образом тела. Также осознанность показывает умеренные положительные корреляции с качеством сна, удовлетворенностью жизнью и субъективным благополучием, самооценкой. Таким образом, осознанность можно понимать как регулятор переживания боли, стресса и некоторых компонентов психологического и физического благополучия.

Ценность. Статья вносит вклад в совокупность знаний о взаимосвязях между болью, стрессом, осознанностью и компонентами благополучия. Тематика охватывает пробелы в понимании взаимосвязей указанных переменных у взрослых и дополняет модель психологического и физического (или психофизического) благополучия. Результаты могут быть использованы для дальнейших исследований в релевантных областях. С практической точки зрения эти результаты могут быть полезны при разработке интервенций по управлению болью и стрессом с использованием развития осознанности.

Ключевые слова: *стресс, боль, осознанность, психологическое благополучие, физическое благополучие, качество сна, активность.*

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АУРУ, СТРЕСС ПЕН ХАБАРДАРЛЫҚ ЕРЕСЕКТЕРДІҢ ПСИХОЛОГИЯЛЫҚ ЖӘНЕ ФИЗИКАЛЫҚ САУЛЫҒЫНЫҢ КОМПОНЕНТТЕРІМЕН ӨЗАРА БАЙЛАНЫСЫ РЕТІНДЕ

Аңдатпа

Психикалық және физикалық бірлігі психологиядағы зерттеушілердің кең қызығушылығының тақырыбы болып табылады. Созылмалы/эпизодтық ауырсынудың кең таралған жағдайлары, созылмалы стресс басқа био-психо-әлеуметтік жағдайлармен өзара байланысты болуы мүмкін. Бұл мақалада біз психологиялық және физикалық әл-ауқат призмасы арқылы психикалық және физикалық күйлердің бірлігін ашып, олардың ауырсынумен байланысын зерттегіміз келеді. Стресс, сондай-ақ ықтимал реттеуші ретінде зейін.

Әдістері. Келесі 9 шкала бойынша 106 ересек адам (ерлер 23, әйелдер 83) тексерілді. Қабылданған стресс шкаласы (PSS), зейіннің назар шкаласы (MAAS), өмірге қанағаттану шкаласы (SWLS), субъективті бақыт шкаласы (SHS), ауырсынуды бағалаудың сандық шкаласы (NPRS), ұйқы сапасының сауалнама, Розенберг өзін-өзі бағалау шкаласы (RSES), дене сурет сауалнамасы (OOCT), белсенділік және оптимизм (AOS).

Пирсон сынағы SPSS Statistics 23 көмегімен талданды. Python Plotly жылу графигін пайдаланып корреляцияларды визуализациялау үшін пайдаланылды.

Нәтижелер. Алынған мәліметтерді талдау перспективті модель құру үшін жеткілікті болатын айнымалылар арасындағы маңызды корреляциялар санын ($p<0,01$) көрсетті. Зейінділік ауырсыну, стресс және оның ішкі шкалалары (шамадан тыс жүктеме және қарсылық), пессимизм және теріс дене имиджімен орташа теріс корреляцияны көрсетеді. Зейінділік сонымен қатар ұйқы сапасымен, өмірге қанағаттанумен және субъективті әл-ауқатпен, өзін-өзі бағалаумен қалыпты оң корреляцияны көрсетеді. Тиісінше, зейінді ауырсынуды, стрессті және психологиялық және физикалық әл-ауқаттың кейбір компоненттерін реттеуші ретінде түсінуге болады.

Зерттеудің құндылығы. Мақала ауырсыну, стресс, хабардарлық және әл-ауқаттың құрамдас бөліктері арасындағы байланыстар туралы білімдер жиынтығына ықпал етеді. Тақырып ересектердегі осы айнымалылардың қарым-қатынасын түсінудегі олқылықтарды қамтиды және психологиялық және физикалық (немесе психофизикалық) әл-ауқат моделін ақпаратпен толықтырады. Нәтижелер сәйкес салаларда одан әрі зерттеулер үшін пайдаланылуы мүмкін. Практикалық тұрғыдан алғанда, бұл нәтижелер зейінді дамыту арқылы ауырсынуды және стрессті басқаруға арналған араласуды жобалауда пайдалы болуы мүмкін.

Түйін сөздер: *стресс, ауырсыну, хабардарлық, психологиялық салауаттылық, физикалық саулық, ұйқының сапасы, белсенділік*

1. Introduction:

The unity of mind and body is a topic of broad interest for researchers in Psychology and other Social and Natural Sciences. Understanding the interconnections between mental and physical conditions is crucial for comprehending compound concept of well-being. In this article, we aim to investigate complex interrelations between pain, stress, mindfulness, and components of psychological and physical well-being, with a particular focus on exploring the potential of mindfulness as a regulator for these variables.

Some evidences substantiate there may be the significant impact of pain, stress, and mindfulness on individuals' psychological and physical well-being. Chronic pain is a prevalent condition associated with significant psychological distress and impaired physical functioning [1]. Stress, on the other hand, can exacerbate pain perception and contribute to emotional and physical suffering [2]. Mindfulness as a trait and practice, characterized by non-judgmental attention to the present moment, has gained recognition as a potential strategy to address the influence of pain and stress on overall well-being [3].

Studies have demonstrated the beneficial effects of mindfulness on pain management and stress reduction [4], [5]. Mindfulness interventions have been shown to modulate brain regions involved in pain processing and stress regulation [6]. Moreover, mindfulness practice has been associated with improvements in psychological factors such as subjective well-being, life satisfaction, and self-esteem [7]. Still evidence for mindfulness seem controversial as long as many researches show small decrease of pain via mindfulness practices [8]

Specific interconnections and mechanisms underlying pain, stress, mindfulness, the relationship between physical and psychological well-being can be more complex and need to be investigated.

Previous research has mostly focused on individual relationships between these variables, without fully exploring their complex interplay [9], [10]. Therefore, this study aims to fill this gap by examining the interrelations among pain, stress, mindfulness, and some components of psychological and physical well-being in adults.

Psychological and physical well-being encompass multifaceted constructs that extend beyond the components examined in this study. It is important to acknowledge that there are additional factors contributing to overall well-being that have not been specifically addressed in this research. However, the components investigated in this study are considered significant contributors to well-being, and each of them holds potential as a focal point for therapeutic interventions aimed at enhancing overall well-being.

In this study, we assessed stress, mindfulness and components of physical well-being, including pain perception, sleep quality, activity levels, as well as psychological well-being factors such as subjective well-being, body image, optimism/pessimism and self-esteem.

Through a comprehensive investigation of these interconnections, it is anticipated that substantial associations between the variables will be revealed, thereby establishing a model that elucidates the interplay between stress, mindfulness, and well-being. Furthermore, this study may endeavor to enhance the existing body of knowledge regarding the intricate interconnectedness of pain, stress, mindfulness, and well-being among adult individuals. Gaining a deeper understanding of these relationships holds paramount importance in the development of targeted interventions that effectively address pain and stress management, harnessing the potential of mindfulness as a prospective tool for enhancing various aspects of psychological and physical well-being.

2. METHODS

2.1. Study Design and Participant Sample

In this study we want to investigate how perceiving pain and stress may be interconnected with mindfulness and some components of psychological and physical well-being.

Data was collected from a sample of 106 adult healthy individuals (males 23, females 83), including those who may experience episodic or chronic pain and possible may have daily stress.

Participants were proposed to fill forms via Google Forms collecting demographical information and next 9 scales. Perceived Stress Scale (PSS), Mindful awareness (MAAS), Satisfaction with life scale (SWLS), Scale of subjective happiness (SHS), Numerical Pain Rating Scale (NPRS), Sleep Quality questionnaire, Rosenberg Self-esteem Scale (RSES), Questionnaire of the body image, Arousability and Optimism Scale (AOS).

Participation in the study was voluntary, and individuals did not receive any form of compensation for their involvement. All participants provided informed consent to participate in the study, demonstrating their understanding that their personal data would remain anonymized.

For data analysis the SPSS 23 program was used, Pearson's correlation criteria were used for correlation analysis. Python Plotly library was used for the visualization of the warmth diagram.

2.2. Measures

Mindfulness

Mindful Attention Awareness Scale (MAAS) [7] was employed in this study to measure mindfulness as a trait. The scale comprises 15 items that capture various aspects of mindfulness. Each item is rated on a Likert scale ranging from 1 (almost always) to 6 (almost never).

To evaluate the internal consistency of the MAAS, Cronbach's alpha was computed, yielding a value of 0.75. This indicates that the scale demonstrated satisfactory reliability, suggesting that it consistently measured participants' levels of mindfulness in a dependable manner.

Perceived stress

To assess the level of perceived stress, the Perceived Stress Scale-10 (PSS-10) [11] and its subscales, namely 'overstrain' and 'resistance,' were utilized in this study. The PSS comprises 10 items, e.g.: "In the last month, how often have you been upset because of something that happened unexpectedly." Each item is rated on a Likert scale ranging from 1 (never) to 5 (very often). Additionally, the scores obtained from the scale can be categorized into diagnostic subgroups. Scores range from 0 to 40, with higher scores indicating higher levels of perceived stress. Specifically, scores of 0-13 are interpreted as low stress, scores of 14-26 indicate moderate stress, and scores of 27-40 represent high perceived stress.

The internal consistency of the scale, as measured by Cronbach's alpha, was determined to be 0.75, signifying satisfactory reliability for the purposes of this study. This suggests that the scale consistently measured participants' stress in a reliable manner.

Pain

In this study, we employed an adapted version of the Numerical Pain Rating Scale (NPRS) to assess pain intensity. The NPRS comprises a single item, which prompts respondents to indicate their

current level of pain interference and its intensity using a numerical scale. Participants were asked to select a single response ranging from 0 to 10, with 0 representing the absence of pain and 10 representing the most intense pain they have ever experienced.

Sleep Quality

To assess the components related to physical well-being, we employed the Sleep Quality Questionnaire [12] developed by Wayne A. and Levin Y. The scale consists of six items, which capture various aspects of sleep quality, such as the duration of sleep and frequency of night awakenings. Each question was rated on a Likert scale ranging from 1 to 5, with response options tailored to the specific question at hand (e.g., "1 = instant," "2 = short," "3 = medium," "4 = long," "5 = very long" for the duration of sleep item).

The internal consistency of the questionnaire in this study, as indicated by Cronbach's alpha, was found to be 0.65, suggesting satisfactory reliability. This suggests that the scale consistently measured participants' sleep quality in a reliable manner.

Subjective well-being

To assess the subjective well-being of participants, we employed two scales: Satisfaction with Life Scale (SWLS) [13] and the Scale of Subjective Happiness (SHS) [14]. These scales provided valuable insights into participants' subjective well-being, allowing for a deeper understanding of their life satisfaction and subjective happiness.

The SWLS consists of five items that capture aspects of subjective life satisfaction. Participants were asked to rate each item on a Likert scale ranging from 1 to 7, with "1 = Strongly disagree" and "7 = Strongly agree" as response options.

Similarly, the SHS comprises four items that tap into subjective happiness. Participants were asked to rate each item on a Likert scale ranging from 1 to 7, with different interpretations for each question. Lower scores indicated lower levels of subjective happiness, while higher scores indicated higher levels of subjective happiness.

The internal consistency of the SWLS, as measured by Cronbach's alpha, was determined to be 0.81, indicating good reliability for the purposes of this study. Likewise, the SHS demonstrated good internal consistency, with a Cronbach's alpha of 0.80. This suggests that scales consistently measured participants' subjective well-being in a reliable manner.

Self-esteem and body-acceptance

To assess the self-esteem of participants, we employed the Rosenberg Self-esteem Scale (RSES). The RSES comprises ten items that encompass various aspects of self-esteem, such as feelings of pride or self-worth. Participants were instructed to rate each item on a Likert scale ranging from 1 to 4, where "1 = Strongly agree," "2 = Agree," "3 = Disagree," and "4 = Strongly disagree".

By utilizing the RSES, we were able to gain insights into participants' self-perceptions and levels of self-esteem. This assessment was instrumental in understanding the role of self-esteem within the broader context of psychological well-being.

The internal consistency of the RSES, as measured by Cronbach's alpha, was determined to be 0.75, indicating satisfactory reliability for the purposes of this study. This suggests that the scale consistently measured participants' self-esteem in a reliable manner.

To assess the level of body acceptance (or body image) of participants, we employed the Questionnaire of the body image [15]. This questionnaire comprises 16 items that allow to assess the degree of dissatisfaction with appearance as an integral component of the body image. Participants were instructed to rate each item on a Likert scale ranging from 0 to 3, where 0 - "never", 1 - "sometimes", 2 - "often", 3 - "always".

The internal consistency of the scale, as measured by Cronbach's alpha, was determined to be 0.93, signifying very good reliability for the purposes of this study. This suggests that the scale consistently measured participants' level of body acceptance in a reliable manner.

Activity and negative affect (pessimism)

To assess the subjective well-being of participants, the Arousability and Optimism Scale (AOS) was used [16]. This scale consists of 16 items that measure levels of activity and optimism or pessimism. Participants were instructed to rate each item on a Likert scale ranging from 1 to 4, with

responses such as "1 = Strongly disagree," "2 = Sometimes," "3 = Usually," and "4 = Strongly agree (always)".

The AOS provides valuable insights into participants' levels of activity and their orientation towards optimism or pessimism. It comprises two subscales: Activity and Optimism (in this study, the Optimism subscale is referred to as Pessimism to avoid confusion, as it is inversely related to the Activity subscale).

The internal consistency of the scale, as measured by Cronbach's alpha, was determined to be 0.72, signifying satisfactory reliability for the purposes of this study.

Moreover, the AOS allows for the categorization of participants into five personality types: Active optimists ("Enthusiast"), Active pessimists ("Negativist"), Passive pessimists ("Victim"), Passive optimists ("Lazy"), and realists. However, the present article does not delve into the detailed characterization of these personality groups and their interrelationships. This topic will be explored in a future publication.

After the completion of data collection, Cronbach's alpha was employed to screen the data, and Pearson's correlation criteria were applied using the SPSS software. Subsequently, the warmth diagram was visualized using the Python Plotly library.

3. RESULTS

The correlations among variables were examined to investigate the interrelations between pain, stress, mindfulness, and components of psychological and physical well-being. The results are presented in Table 1.

Table 1. Correlation data of pain, stress, mindfulness, psychological and physical well-being components (N=106)

	Sub.Happiness	PAIN	Satisfact. of Life	SLEEP	MAAS	Self-Esteem	Neg. Body	Activity	Pessimism	PSS	PSSoverwh	PSSres
Sub.Happiness	1	-,374**	,686**	,375**	,399**	,672**	-,510**	,309**	-,687**	-,584**	-,542**	-,298**
PAIN	-,374**	1	-,409**	-,307**	-,278**	-,337**	,344**	-,027	,290**	,332**	,305**	,173
Satisf. of Life	,686**	-,409**	1	,431**	,415**	,545**	-,458**	,245*	-,563**	-,574**	-,467**	-,416**
SLEEP	,375**	-,307**	,431**	1	,359**	,348**	-,413**	,033	-,355**	-,473**	-,424**	-,269**
MAAS	,399**	-,278**	,415**	,359**	1	,341**	-,285**	-,049	-,412**	-,520**	-,419**	-,384**
Self-Esteem	,672**	-,337**	,545**	,348**	,341**	1	-,751**	,382**	-,596**	-,498**	-,399**	-,370**
Neg.Body	-,510**	,344**	-,458**	-,413**	-,285**	-,751**	1	-,234*	,491**	,434**	,336**	,345**
Activity	,309**	-,027	,245*	,033	-,049	,382**	-,234*	1	-,071	-,136	-,033	-,244*
Pessimism	-,687**	,290**	-,563**	-,355**	-,412**	-,596**	,491**	-,071	1	,496**	,426**	,316**
PSS	-,584**	,332**	-,574**	-,473**	-,520**	-,498**	,434**	-,136	,496**	1	,897**	,566**
PSSoverwh	-,542**	,305**	-,467**	-,424**	-,419**	-,399**	,336**	-,033	,426**	,897**	1	,144
PSSres	-,298**	,173	-,416**	-,269**	-,384**	-,370**	,345**	-,244*	,316**	,566**	,144	1

****** significant correlations, double-sided (p<0,01)

***** significant correlations, double-sided (p<0,05)

Table 1 shows the correlation coefficients between pain, stress, mindfulness, and various components of psychological and physical well-being on the sample size of 106 participants.

Pain

Significant negative correlations were observed between pain and subjective happiness ($r = -0.374$, $p < 0.01$), indicating that higher levels of pain were associated with lower levels of subjective happiness. This finding suggests that individuals experiencing elevated pain levels may have reduced subjective well-being. Pain also showed significant negative correlations with satisfaction with life ($r = -0.409$, $p < 0.01$), sleep quality ($r = -0.307$, $p < 0.01$), mindfulness ($r = -0.278$, $p < 0.01$), and self-

esteem ($r = -0.337$, $p < 0.01$). These correlations indicate that higher pain levels are associated with diminished satisfaction with life, poorer sleep quality, reduced mindfulness, and lower self-esteem.

Additionally, noteworthy positive relationships were observed between pain and negative body image ($r = 0.334$, $p < 0.01$), pessimism ($r = 0.290$, $p < 0.01$), stress ($r = 0.332$, $p < 0.01$), and the stress overwhelming subscale of the Perceived Stress Scale (PSS) ($r = 0.305$, $p < 0.01$). These positive correlations suggest that increased pain levels are associated with greater dissatisfaction with one's body self-image, increased pessimistic thoughts, elevated stress levels, and feelings of being overwhelmed by stress. These findings highlight the adverse impact of pain on various psychological factors and emphasize the need to address both the physical and psychological aspects of pain management in clinical and therapeutic interventions.

Subjective well-being

Subjective happiness demonstrated a significant positive correlation with satisfaction with life ($r = 0.686$, $p < 0.01$), indicating that individuals who reported higher levels of satisfaction with life also tended to experience greater levels of subjective happiness. Moreover, subjective happiness showed significant positive correlations with sleep quality ($r = 0.375$, $p < 0.01$), mindfulness ($r = 0.399$, $p < 0.01$), self-esteem ($r = 0.672$, $p < 0.01$), and activity ($r = 0.309$, $p < 0.01$). These findings suggest that individuals with higher levels of subjective happiness tend to have better sleep quality, greater mindfulness, higher self-esteem, and engage in more activity. The positive associations between subjective happiness and these variables indicate that subjective happiness is related to various aspects of psychological and physical well-being.

Significant negative correlations were observed between subjective happiness and negative body image ($r = -0.510$, $p < 0.01$), indicating that higher levels of subjective happiness were associated with higher body acceptance. Similarly, subjective well-being showed significant negative correlations with pessimism ($r = -0.687$, $p < 0.01$), stress ($r = -0.584$, $p < 0.01$) and subscales - stress overwhelming ($r = -0.542$, $p < 0.01$) and stress resistance ($r = -0.298$, $p < 0.01$).

These findings suggest that higher levels of pessimism, stress, and perceived stress (both overwhelming and lack of resistance) are associated with lower levels of subjective happiness. Individuals who tend to exhibit higher levels of pessimism, experience elevated stress, and perceive stress as overwhelming or lack resistance may have reduced levels of subjective well-being and happiness.

The results underscore the importance of addressing and managing pessimistic thinking and stress to enhance subjective happiness. Interventions focused on promoting optimism, stress reduction techniques, and enhancing stress coping skills may be beneficial in improving individuals' overall well-being and subjective happiness. It is crucial to prioritize psychological well-being alongside other aspects of health in clinical and therapeutic interventions.

Satisfaction with life demonstrated a significant positive correlation with subjective happiness ($r = 0.686$, $p < 0.01$), indicating that individuals who reported higher levels of satisfaction with life tended to also experience higher levels of subjective happiness. This finding suggests that overall life satisfaction plays a crucial role in promoting subjective well-being. Furthermore, satisfaction with life exhibited positive correlations with sleep quality ($r = 0.431$, $p < 0.01$), mindfulness ($r = 0.415$, $p < 0.01$), self-esteem ($r = 0.545$, $p < 0.01$), and activity ($r = 0.245$, $p < 0.05$).

Individuals who reported higher satisfaction with life also tended to have better sleep quality, are more mindful, possess higher levels of self-esteem, and participate in more active lifestyles. These findings suggest that cultivating positive experiences and attitudes in multiple domains, such as sleep, mindfulness, self-perception, and physical activity, may contribute to greater life satisfaction and subjective happiness.

Additionally, satisfaction with life displayed significant negative correlations with negative body image ($r = -0.458$, $p < 0.01$), pessimism ($r = -0.563$, $p < 0.01$), stress ($r = -0.574$, $p < 0.01$), as well as the stress subscales of stress overwhelming ($r = -0.467$, $p < 0.01$) and stress resistance ($r = -0.416$, $p < 0.01$).

These findings indicate that individuals with higher levels of satisfaction with life tend to experience better body acceptance, exhibit reduced pessimistic thoughts, and report lower levels of

stress. Specifically, the negative associations observed with stress overwhelming and stress resistance highlight the adverse effects of stress on overall life satisfaction. Individuals who perceive stress as overwhelming and struggle with coping mechanisms may face challenges in maintaining high levels of life satisfaction. These results emphasize the importance of addressing negative body image, managing pessimism, and implementing effective stress management strategies in order to enhance overall life satisfaction and subjective happiness.

Sleep quality

Sleep quality displayed a positive correlation with mindfulness ($r = 0.359$, $p < 0.01$), indicating that individuals with better sleep quality tend to exhibit higher levels of mindfulness. Moreover, a positive association was found between sleep quality and self-esteem ($r = 0.348$, $p < 0.01$), suggesting that individuals with better sleep quality also tend to report higher levels of self-esteem. On the other hand, sleep quality exhibited a negative correlation with negative body image ($r = -0.413$, $p < 0.01$), indicating that individuals with better sleep quality tend to have a more positive perception of their body image. Furthermore, significant negative correlations were observed between sleep quality and stress ($r = -0.307$, $p < 0.01$), pessimism ($r = -0.355$, $p < 0.01$), as well as the subscales of stress overwhelming ($r = -0.269$, $p < 0.01$) and stress resistance ($r = -0.434$, $p < 0.01$), highlighting that higher levels of sleep quality are associated with lower levels of stress, lower levels of pessimistic thoughts. These findings underscore the importance of addressing sleep quality as a key factor in promoting mindfulness, self-esteem, body image, and overall stress education.

The significant correlations observed between sleep quality and these variables highlight the importance of good sleep habits and their potential influence on various aspects of well-being. Enhancing sleep quality may contribute to increased mindfulness, higher self-esteem, improved body image, reduced pessimism, and lower stress levels. These findings emphasize the significance of prioritizing and addressing sleep quality in interventions aimed at promoting psychological well-being.

Mindfulness

Positive correlations were observed between mindfulness and self-esteem ($r = 0.341$, $p < 0.01$), indicating that individuals with higher levels of mindfulness tended to have higher self-esteem. Conversely, negative correlations were found between mindfulness and negative body image ($r = -0.285$, $p < 0.01$), pessimism ($r = -0.412$, $p < 0.01$), stress ($r = -0.520$, $p < 0.01$), overwhelming subscale ($r = -0.419$, $p < 0.01$) and resistance ($r = -0.384$, $p < 0.01$). These findings suggest that mindfulness is associated with greater self-esteem, reduced negative body image, decreased pessimism, and lower levels of perceived stress and stress overwhelming and resistance. The results highlight the potential benefits of mindfulness practices in promoting positive psychological well-being and stress management.

Self-esteem and body acceptance

Self-esteem exhibited significant relationships with several psychological factors. Negative body image showed a strong negative correlation with self-esteem ($r = -0.751$, $p < 0.01$), suggesting that individuals with lower self-esteem tended to have more negative perceptions of their own physical appearance. Self-esteem also displayed a positive correlation with activity ($r = 0.382$, $p < 0.01$), indicating that individuals with higher self-esteem tended to engage in more active behaviors. Additionally, self-esteem showed negative correlations with pessimism ($r = -0.596$, $p < 0.01$). Moreover, self-esteem was negatively correlated with perceived stress ($r = -0.498$, $p < 0.01$), stress overwhelming subscale ($r = -0.399$, $p < 0.01$) and resistance subscale ($r = -0.370$, $p < 0.01$), suggesting that individuals with higher self-esteem tended to experience lower levels of pessimism, perceived stress, and stress resistance/overwhelming. These findings emphasize the detrimental impact of low self-esteem on body image, pessimistic thinking, and stress levels.

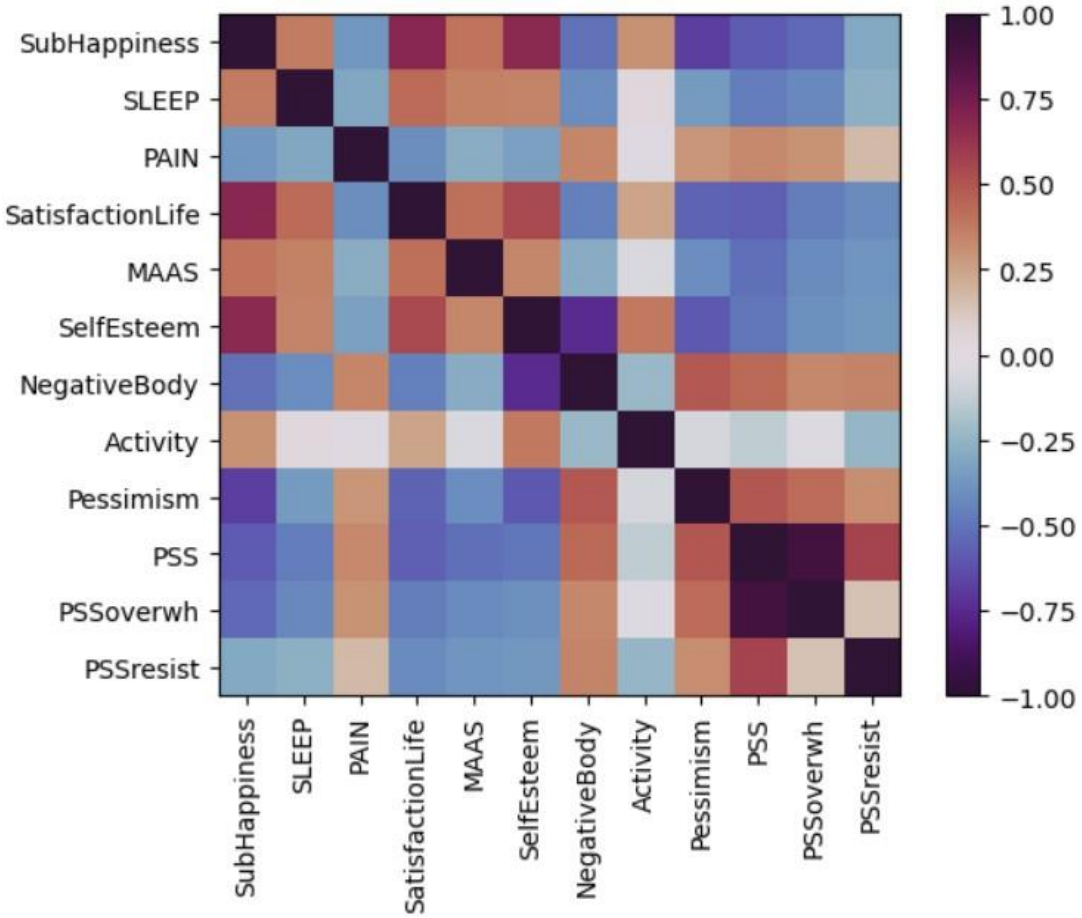
Negative body image was found to be significantly associated with pessimism ($r = 0.491$, $p < 0.01$), suggesting that individuals with higher levels of pessimism tended to have more negative perceptions of their own physical appearance. Additionally, negative body image showed positive correlations with perceived stress ($r = 0.434$, $p < 0.01$), stress overwhelming ($r = 0.336$, $p < 0.01$), indicating that individuals with greater dissatisfaction regarding their body self-image also reported

higher levels of perceived stress and feelings of being overwhelmed by stress. Furthermore, body image was positively correlated with the stress resistance subscale of the PSS ($r = 0.345$, $p < 0.01$), suggesting that individuals with negative body image tended to exhibit lower levels of resilience in coping with stress. These findings highlight the interconnectedness between body image and psychological factors such as pessimism and stress experiences, emphasizing the importance of addressing body image concerns in promoting well-being.

Activity and negative affect (pessimism)

Pessimism was found to be significantly associated with stress ($r = 0.496$, $p < 0.01$), indicating that individuals with higher levels of pessimism tended to experience higher levels of perceived stress. Moreover, pessimism displayed positive correlations with the stress overwhelming subscale of the PSS ($r = 0.426$, $p < 0.01$), suggesting that individuals with a pessimistic outlook were more likely to feel overwhelmed by stressors in their lives. Additionally, pessimism was positively correlated with the stress resistance subscale of the PSS ($r = 0.316$, $p < 0.01$), indicating that individuals with higher levels of pessimism may have lower resilience in dealing with stress. These findings highlight the detrimental impact of pessimism on individuals' psychological well-being and stress levels, underscoring the importance of addressing pessimistic thinking patterns in interventions aimed at promoting resilience and stress management skills.

Activity demonstrated a significant positive correlation with self-esteem ($r = 0.382$, $p < 0.01$), subjective happiness ($r = 0.309$, $p < 0.01$) and no other variables, indicating that individuals who engaged in higher levels of activity tended to have higher self-esteem. This suggests that being physically active and participating in regular exercise or recreational activities may contribute to a more positive perception of oneself. By incorporating activity into daily routines, individuals can potentially experience improvements in their self-esteem and well-being.



Picture 1 - Warmth diagram of pain, stress and mindfulness indicators and their interrelations with well-being components (N=106).

The warmth diagram on Picture 1 illustrates interrelationships between pain, stress, mindfulness indicators, and their associations with components of psychological and physical well-being. The diagram consists of squares or cells, each representing a specific correlation between two variables. By examining the colors in the diagram, you can see insights into the strength and direction of these associations.

To depict negative correlations, the color scheme ranges from white to dark blue shades. The intensity of blue corresponds to the strength of the negative correlation. The darker the shade of blue, the stronger the negative correlation between the variables.

On the other hand, positive correlations are depicted using white to dark brown shades. Similar to negative correlations, the intensity of brown indicates the strength of the positive correlation. The darker the shade of brown, the stronger the positive correlation between the variables.

4. DISCUSSION

The results of the present study revealed significant correlations between various psychological factors. First, pain was negatively correlated with subjective happiness, satisfaction with life, sleep quality, mindfulness, and self-esteem. These findings indicate that higher pain levels are associated with reduced well-being and highlight the need to address both the physical and psychological aspects of pain management. Furthermore, pain showed positive correlations with negative body image, pessimism, stress, and the stress overwhelming subscale, underscoring the adverse impact of pain on psychological factors.

Regarding subjective well-being, positive correlations were observed between subjective happiness and satisfaction with life, sleep quality, mindfulness, self-esteem, and activity. These results suggest that individuals with higher levels of subjective happiness cope good enough with related factors. Additionally, subjective happiness was negatively correlated with negative body image, pessimism, stress, and the stress subscales of overwhelming and resistance, emphasizing the importance of addressing these factors to enhance subjective happiness.

Similarly, satisfaction with life demonstrated positive correlations with subjective happiness, sleep quality, mindfulness, self-esteem, and activity. These findings suggest that individuals with higher levels of life satisfaction tend to experience greater subjective happiness and engage in positive behaviors and attitudes across multiple domains. Moreover, satisfaction with life was negatively correlated with negative body image, pessimism, stress, and the stress subscales of overwhelming and resistance, highlighting the need to address these factors to promote well-being.

Sleep quality exhibited positive correlations with mindfulness and self-esteem, indicating that individuals with better sleep quality tend to have higher levels of mindfulness and self-esteem. Additionally, sleep quality was negatively correlated with negative body image, pessimism, stress, and the stress subscales of overwhelming and resistance, underscoring the importance of addressing sleep quality in interventions aimed at promoting well-being.

Mindfulness demonstrated positive correlations with self-esteem and negative correlations with negative body image, pessimism, stress, and the stress subscales of overwhelming and resistance. These findings highlight the potential benefits of advancing mindfulness in promoting positive well-being and stress management.

Lastly, self-esteem was negatively correlated with negative body image, pessimism, perceived stress, and the stress subscales of overwhelming and resistance. These results emphasize the detrimental impact of low self-esteem on body image, pessimistic thinking, and stress levels.

Overall, the present findings provide valuable insights into the relationships between various psychological factors. They highlight the interconnectedness of pain, subjective well-being, sleep quality, mindfulness, and self-esteem with other variables such as negative body image, pessimism, and stress. The results underscore the importance of addressing these factors in interventions aimed at promoting positive well-being, stress and pain management. By targeting negative body image, pessimistic thinking, and stress management, individuals can potentially experience improvements in their quality of life.

5. CONCLUSION

In conclusion, this study examined the correlations between different factors, including pain, stress, subjective well-being, sleep quality, mindfulness, activity, negative affect, negative body image and self-esteem. The results revealed significant associations between these variables, highlighting the importance of considering both physical and psychological aspects of well-being. The findings emphasized the adverse impact of pain on subjective happiness and various psychological factors, underlining the need for comprehensive pain management interventions. Moreover, the study highlighted the positive relationships between subjective well-being and factors such as satisfaction with life, sleep quality, mindfulness, self-esteem, and activity. These associations suggest that promoting positive experiences and attitudes in these domains can contribute to greater subjective well-being. The results also shed light on the detrimental effects of negative body image, pessimism, and stress on subjective well-being, emphasizing the significance of addressing these factors in interventions aimed at enhancing well-being. By considering and addressing these psychological factors, healthcare professionals and therapists can develop more holistic approaches to support individuals' well-being. Interventions focused on pain management techniques, promoting optimism, stress reduction, and enhancing coping skills may be beneficial in improving individuals' overall well-being and subjective happiness.

Furthermore, the findings emphasize the importance of addressing sleep quality as a key factor in promoting mindfulness, self-esteem, body image, and overall stress reduction. Interventions that target sleep habits and promote healthy sleep routines may contribute to increased mindfulness, higher self-esteem, improved body image, reduced pessimism, and lower stress levels.

Moreover, the study highlights the significant role of self-esteem in various psychological factors. Low self-esteem was associated with negative body image, pessimism, perceived stress, and difficulties in coping with stress. Interventions that focus on improving self-esteem and promoting positive self-perception may have a positive impact on individuals' body image, pessimistic thinking patterns, and stress management abilities.

It is important to note that the present study's findings are based on correlations, which do not establish causality. While the results provide valuable insights into the relationships between psychological factors, further research is needed to understand the underlying mechanisms and causal pathways between these variables.

In conclusion, this research provides a valuable contribution to our understanding of the interplay between investigated factors. Theoretical advancements and practical implications derived from this study underscore the significance of adopting a comprehensive and integrated approach in addressing these interconnected variables. By recognizing physical and psychological aspects of individuals' experiences and the potential of mindfulness as a regulator, healthcare professionals and therapists can develop more effective interventions that promote the holistic well-being of individuals.

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