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Stress as a Regulatory Variable of the Training and Psychoso-cial Profile of Undergraduate Students in Post COVID-19 era: A Systematic Review

Lionel Sánchez-Bolívar[1], Sara Arenas Carranza[2], Fátima Zahra Rakdani-Arif-Billah2, Lindsay Michelle Vázquez[2]

[1]University of Isabel I. C. de Fernán González, 76, 09003 Burgos (Spain).
[2]University of de Granada. Facultad de Ciencias de la Educación. Dpto MIDE. Campus Cartuja s/n 18071. Granada (Spain)

Abstract

Stress is fundamental variable in human behavior. The aim of this systematic review is to carry out an analysis of the state of the art on stress in university students. To this end, a search was carried out in the Web of Science database for the descriptors "stress" and "undergraduate students". After applying the inclusion criteria, a total of 88 articles were selected. Interest in this variable has in-creased, motivated by the health situation derived from COVID-19. The results show stress interacts with socioeconomic variables, emotional intelligence, motivation and social skills of university students. Likewise, it is decisive in the face of addictions to mobile devices and narcotic substances.

Keywords*:* COVID-19; stress; students; revision; university.

Introduction

Since December 2020, an exceptional situation caused by the current pandemic derived from COVID-19 has been experienced worldwide, both at a health level and at a psychological and social level.

In the academic world, the impact has been produced simultaneously in all educational agents and at all levels, since it has implied the adaptation and radical trans-formation of the face-to-face or blended teaching-learning methodology to fully virtual teaching, which has derived in psychosocial problems, both in university students and in teachers, and the rest of university professionals (Pasion et al., 2021; Sánchez-Bolívar et al., 2023).

It should be highlighted that, usually, scientific texts that refer to stress do so from a negative conceptual point of view. When talking about this negative aspect of stress, reference is made to the feeling of overcoming and/or emotional psychological over-whelm that a situation or a social context causes in a person, that is, what is defined as negative stress or distress (Sánchez-Bolívar & Vázquez, 2022; Sies, 2020).

In addition, there is a positive response in people to stressful situations, that is, these moments exercise the activating role of people's psychosocial competencies, cushioning the feeling of improvement and providing a sense of achievement and training. This is what, as opposed to distress, is called positive stress or eustress (Sies, 2020).

On the other hand, and depending on the moment, stress can be episodic, if it occurs at a specific moment (it can be mild, moderate or acute, depending on the level of psychological and emotional stress that the person perceives);

chronic if the same pat-tern is repeated over time, indefinitely; and post-traumatic, if the stressful episodes occur when the individual has experienced a traumatic episode at a psychological lev-el and experiences high rates of distress when they relive that moment or associate it with some common activity in their life (Boamah et al., 2021; Christie & Matthews, 2019; McDuff et al., 2020)

Among the main reasons why students have experienced high levels of stress are the lack of social contact and technological resources, the haste of events and the limitation to access psychology professionals who offer psychosocial support (Shin & Hickey, 2021).

These elevated stress levels have led to burnout, mental illness, anxiety, depression, even suicide attempts. In this sense, social skills, emotional intelligence, motivation and resilience are psychological instruments necessary to combat stress that, due to the lack of social interaction, inactivity and the impossibility of moving outside the home, have reduced the level of these psychological tools and have raised, even more, the levels of stress and burnout of the students (Atkinson, 2020; Ke y Barlas, 2020; Sánchez-Bolívar & Escalante-González, 2021; Vázquez et al., 2024; Wang et al., 2019).

Therefore, given the importance and relevance that stress has, both in daily life and on the rest of the psychosocial variables of university students, this work of systematic review of the scientific literature is proposed in order to analyze the current state of the question about it, relating the stress of the students with the rest of the variables and with their educational and social profile.

Materials and Methods

To minimize the risk of bias and achieve greater scientific rigor, it has been chosen to follow the specifications of the PRISMA Declaration for systematic reviews and metanalysis (González et al., 2022).

Procedure

For this systematic review, the Web of Science (WoS) scientific database was used, and the search was carried out during the month of March 2021, in "All databases". The aforementioned database has been selected for the prestige and recognition it holds in the scientific and academic field, as well as for the impact and scope it has at the international level.

The search was limited to the English and Spanish languages and the descriptors "stress" and "undergraduate students" were used, combining them with the Boolean operator "AND", discarding the operators "OR" and "NOT", selecting the field "Topic" and establishing a time interval of the last five years (2017-2021).

Sample

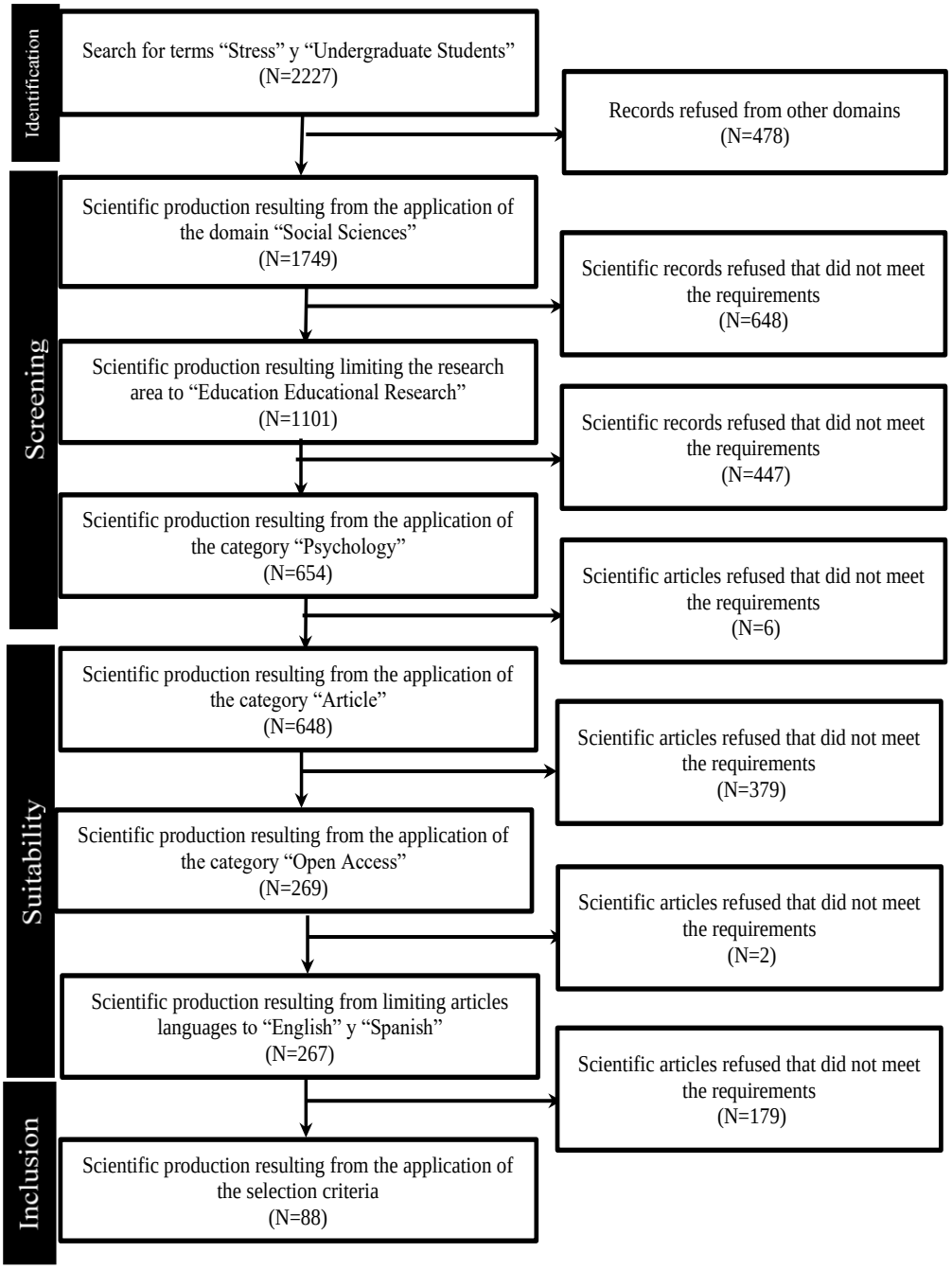
A total of 2227 records were obtained from the search. Subsequently, it was re-fined, selecting the research domain "Social Sciences", establishing the resulting re-sources in 1749. After this, the sample was reduced, limiting the research area to "Education Educational Research", resulting in a total of 1101 works and, later, to "Psychology", through which scientific resources were reduced to a total of 654.

For the selection of the format, the category “Article” was used, obtaining a total of 648 articles. After this, the search was limited to works that were in open access, using the “Open Access” category, reaching a total of 269 works. Finally, articles writ-ten in English and Spanish were selected, limiting the resulting articles to 267.

The inclusion criteria used to establish the sample were: 1) studies on stress in university students, excluding other educational stages and any non-student population (teachers, workers, etc.); 2) quantitative descriptive, cross-sectional or longitudinal studies (excluding bibliometric and systematic reviews and meta-analysis).

From the application of these selection criteria, a definitive sample of 88 articles was obtained.

Figure 1. PRISMA flow diagram for the inclusion of the records under study



Results

In the five-year period 2017-2021, as shown in graph 1, there is a gradual increase in scientific production on stress in university students. This trend is increasing until 2019 (n=71), the year with the highest number of publications. In 2020 it remained the same as 2019 (n=70), until today. In 2021 there are a total of 7 articles published on this subject.

Graphic 1.

Population and sample of scientific production Stress in University Students in the period 2017-2020

The selected sample, as can be seen in graph 1, remains stable. In this sense, the peak of scientific production on stress in university students, which meets all the established criteria, is 27 articles. There was a drastic

decline in 2018 (n=13) that continued in 2019 (n=15). However, in 2020 (n=26) the scientific community experienced a clear interest in the subject, which is reflected in the current production of 7 articles published to date.

As we can see, table 1 shows that the country with the highest scientific production on stress in university students is the United States (N=25), representing 28.41% of the sample, that is, practically a third of the world's scientific production on this subject. It is of American origin.

Likewise, countries such as China (N=9), making up 10.23% of the sample Australia (N=5; 5.68%), Germany (N=5; 5.68%) and Spain (N=5; 5.68%), or India (N=4; 4.55%), show great interest in this psychological construct in the university population. Regarding the language of publication, practically all the resources (97.73%; N=86) were in English, except for 2 of the documents (2.27%), written and published in Spanish.

Table 1. Distribution of articles by country where the study was carried out

Country	N	%	Country	N	%
United states	25	28,41	Canada	1	1,14
China	9	10,23	Switzerland	1	1,14
Australia	5	5,68	Finland	1	1,14
Germany	5	5,68	Austria	1	1,14
Spain	5	5,68	Thailand	1	1,14
India	4	4,55	Tanzania	1	1,14
Brazil	3	3,41	Ghana	1	1,14
Ethiopia	3	3,41	Nepal	1	1,14
Malaysia	3	3,41	Belgium	1	1,14
Saudi Arabia	3	3,41	Sri Lanka	1	1,14
England	2	2,27	Singapore	1	1,14
Nigeria	2	2,27	Indonesia	1	1,14
Ireland	2	2,27	Israel	1	1,14
France	2	2,27	Turkey	1	1,14
Lebanon	2	2,27			

Discussion

Given the breadth of levels and areas that stress encompasses in the life of university students, the results of this review will be discussed around five major aspects of it: stress and its relationship with other psychological variables; stress and coping strategies, and academic performance; stress and addictions in university students; post-traumatic stress; and stress caused by the COVID-19 pandemic. It should be clarified that, in all the articles analyzed and discussed, the term “stress” is used in its negative aspect, distress.

Stress and other psychological variables: relationship and psychophysiological and social effects

There are gender differences when analyzing the strategies for coping with dis-tress in university students. Women are subjected to higher levels of stress than men and have a higher level of development and a broader repertoire of coping and avoidance strategies (Abu-Kaf & Khalaf, 2020).

The socioeconomic level of the students acts as a modulator of stress. In this sense, the lower the student's family purchasing power, the higher the stress levels to which they are subjected. Women in more advanced educational stages and with less income experience higher levels of stress than men or women with a higher socioeconomic level (Adere et al., 2017; Aslan et al., 2020; Maharajan et al., 2017; Mboya et al., 2020; Ribeiro et al., 2020; Siller et al., 2017; Stetler & Guinn, 2020).

Taking into account all the above, the profession that the students are studying acts as a stress regulator. There is a significant increase in its levels in health professions, such as medicine, nursing, physiotherapy, and so on. The students of these degrees experience higher levels of stress and a greater tendency to burnout, manifesting attitudes of maladaptive and poorly focused perfectionism, cognitive distortions, impostor syndrome and negative feelings such as shame or social discomfort (Aslan & Ochnik, 2020; Atkinson, 2020; Saif et al., 2018; Geoghegan et al., 2017; Halboub et

al., 2019; Loda et al., 2020; McKerrow et al., 2020; Nama et al., 2017; Paudel et al., 2020)

The culture or religion of the students influences their level of stress and the way they cope (Abu-Kaf & Khalaf, 2020). In this sense, culture acts as a modulator of this. Cultural dogma causes an increase in average stress values, since individuals do not want to be excluded from the society in which they are inserted (Adere et al., 2017; Aldalur & Schooler, 2018; Stetler & Guinn, 2020).

High degrees of stress are related to poorer body image and eating disorders in female university students. Therefore, the feeling of belonging, integration and social inclusion reduces stress levels and, therefore, the risk of suffering from eating disorders. On the contrary, higher levels of social anxiety are manifested in higher levels of perceived stress (Adere et al., 2017; Aldalut & Schooler, 2018; Martínez-Rubio et al., 2020; Siegel et al., 2018).

Also, the stress indexes of students experience a rise in the face of negative educational events or experiences or negative learning outcomes. This negative stress, dis-tress, is related to weight problems, gastrointestinal problems and alterations in the production of cortisol. Therefore, it is associated with overweight and a higher obesity rate in populations with high levels of distress (Chen et al., 2020; Chowdhury et al., 2017; Almeida et al., 2018; Dworkin et al., 2018).

Consequently, the feeling of belonging causes an increase in stress levels in the population, simultaneously increasing the mean values of anxiety and the prevalence of moderate depression in the population (Aslan et al., 2020; Lohanan et al., 2020).

The state of health of people affects the stress they perceive, so the worse the state of health, the higher the degree of stress they perceive and suffer. Therefore, stress is a regulator and fundamental factor in depressive states, being related to higher levels of stress and a greater tendency to depression (Abu-Kaf & Khalaf, 2020; Alpizar et al., 2018; Saif et al., 2018).

In this sense, moderate physical activity improves health, reduces stress rates and prevents depressive states. The drastic decline in sports practice increases levels of stress, anxiety and causes an increase in generalized anxiety and depression disorders (Aslan et al., 2020; Basudan et al., 2017; Borsari et al., 2018; Saif et al., 2018; Uddin et al., 2020; Valero-Chillerón et al., 2019).

Stress acts as a regulator of the psychosocial well-being of university students, with high levels of stress being related to a sensation of psychosocial discomfort, while students who manifest higher psychosocial well-being have a lower degree of stress (Aslan et al., 2020; Keech et al., 2018).

Stress is associated with low resilience and low social ability to resolve conflict. In this sense, the higher the resilience, the lower the stress perceived by the students, while the less resilient students are subjected to higher rates of stress. Therefore, there is a negative correlation between perceived stress and resilience (Abdollahi et al., 2018; Chow et al., 2018; Rinehart et al., 2017; Sahu et al., 2019; Sheridan et al., 2019; Silva et al., 2019; Van Hoek et al., 2019; Whatnall et al., 2019; Houpy et al., 2017).

Another psychological variable that interacts with student stress is the level of social skills that the student body has. Students with a good level of proactivity, empathy, assertiveness and communicativeness, experience lower levels of stress than students than those with a lower development of social skills (Keech et al., 2018; Vyas et al., 2017; Wang et al., 2019).

Likewise, and related to all of the above, the emotional intelligence and emotional development that university students have are fundamental factors in the evaluation of perceived stress. In this sense, they act as a buffer for distress (de la Fuente et al., 2020; Gupta et al., 2017; Ke & Barlas, 2020; Lu et al., 2019; Ranashinghe et al., 2017).

High levels of stress are accompanied by an increase in negative emotions and a decrease in positive ones, with the consequent loss of psychosocial well-being. There-fore, stress is a

predictor of negative emotions, with negative emotions being related to distress and positive emotions to eustress (de la Fuente et al., 2020; Gupta et al., 2017).

All these variables, having stress as the link and epicenter, will determine the coping strategies that students will adopt in stressful situations and, therefore, in their academic performance.

Stress and other psychological variables: relationship and psychophysiological and social effects

Perceived stress is altered depending on the assessment that the person makes of the stressful event and the tools and ways they have to overcome it, that is, coping strategies. University students naturally develop these strategies, with the aim of alleviating the psychophysiological effects that it causes in the individual (Basudan et al., 2017; Saif et al., 2018; Okide et al., 2020; Perni et al., 2020).

Poor development of coping strategies implies an increase in stress levels and greater difficulty for university students to overcome the stressful situation. Adaptive strategies reduce stress indices, while maladaptive ones increase it (Ered et al., 2018; Garett et al., 2017; Liou et al., 2020; Zyauya et al., 2017).

Among the factors that influence academic performance, stress plays a central role and as a connecting link between all of them. This concern, as well as its performance, highly worries university students, causing increased stress and sleep disturbances and depression. Lack of sleep acts as a risk factor for stress. Insomnia causes an elevation in stress levels (Ered et al., 2018; Kötter et al., 2017; Lind et al., 2017).

University students are more prone to stress than the rest of the population and do not seek help because they believe that stress will improve on its own, due to lack of knowledge about mental health. To avoid this, it is advisable to create intervention supports to help them with stress, as well as with their mental problems (Liu et al., 2019; Negash et al., 2020).

The more progress is made in the educational stage, the greater the degree of stress that the students endure. Therefore, the academic year in which it is found is a predictor of student stress, therefore, the higher the educational level or the more progress has been made in the degree, the higher the stress index to which it is submitted (Adere et al., 2017; Howland et al., 2017).

Self-efficacy, self-esteem and self-concept are found as stress buffers, to consolidate good academic performance and keep academic performance stable. Students with a high index of self-efficacy, self-esteem and self-concept, experience lower levels of stress than the rest (Bosch et al., 2017; Hailu et al., 2020; Heinen et al., 2017; Huhn et al., 2018; Lew et al., 2019; Lew et al., 2020; Lin et al., 2020).

Stress and addictions in university students

Stress is related to a high level of alcohol consumption in women, but not in men. This is because women consume more alcohol when stressed, but men consume the same amount of alcohol whether or not they are subjected to stressful situations (Perrotte et al., 2018).

Consequently, distress is associated with the use of neurodepressant substances such as alcohol, tobacco or synthetic drugs. Students consume these substances as coping strategies in the face of stressful events, a fact that explains, in part, the addiction of students to them. Therefore, providing students with psychological tools to face stressful situations can prevent, to a certain extent, addictions among this population (Borsari et al., 2018; El Ansari et al., 2020; Richardson et al., 2017; Soltis et al., 2017; Tavolacci et al., 2018; Tembo et al., 2017).

There is a strong relationship between academic level, the degree of stress suffered by university students, and drug use. The higher the academic level, the higher the stress index to which the students are subjected, increasing the possibility of consuming substances such as tobacco or alcohol (Adere et al., 2017; James et al., 2017; Jordan et al., 2018; Opoku-Acheampong et al., 2017).

As a modulator of these stressful situations and the consumption of neurodepressant or

psychoactive substances, culture acquires a determining role. There are African religious cultures, along with the Muslim religion, in which there is an accepted social tradition of consuming this type of plant-based substances (marijuana), while not consuming alcohol. In Christian culture there are higher levels of alcohol intake than other religious cultures, but a lower consumption of plant psychotropic substances, as well as a lower use of these as a stress-coping strategy (Adere et al., 2017).

As the main stress-absorbing factor, social support reduces the levels of this and, therefore, the consumption of psychoactive substances (Dworkin et al., 2018). However, this social support can also act as a factor that favors the consumption of socially accepted sub-stances, in university students, such as alcohol (Basudan et al., 2017).

At present, the addiction that most worries the scientific community, among the population, specifically among university students, is the addiction to technology, and specifically, the addiction to the mobile phone. They experience high rates of distress at times when the mobile device is not at their disposal or if the battery runs out. This is called nomophobia, fear of running out of battery or without a mobile device (Matar & Jaalouk, 2017).

Post-Traumatic Stress Disorder (PTSD)

One of the main sources of stress in university students is the feeling of stress and discomfort caused by a traumatic event in the student's life, that is, post-traumatic stress disorder. Students with post-traumatic stress disorder tend to drug addiction as a strategy for coping with the stress caused by the reminiscence of the traumatic (Dworkin et al., 2018).

Students with post-traumatic stress disorder caused by school or sexual harassment, sexual abuse or poly-victimization, experience high levels of stress, manifesting itself in a considerable increase in cortisol levels, causing an increase in anxiety and weight (Christie & Matthews, 2019).

Stress derived from the health situation and confinement caused by COVID-19

The COVID-19 pandemic has raised the levels of stress and anxiety in university students, with humanities students having the highest scores, and they are also more likely to have mental illnesses. High levels of stress may be due to the negative impact on academic progress (Odriozola-González et al., 2020; Harries et al., 2021; Kalok et al., 2020; Wahjudi et al., 2020; Kecojevic ey al., 2020; Tang et al., 2020; Valekar et al., 2021; Wang et al., 2020; Elmer et al., 2020).

The fear of the disease, the social situation of alarm and the preventive confine-ment in the face of COVID-19 caused an increase in the global degree of stress, the main stressors being the limitation in the domestic space, the number of cohabitants and the lack of activity and social stimuli (Elmer et al., 2020).

In this sense, university students have experienced extra levels of stress, anxiety and greater tendencies towards depression, motivated by the distress generated by academic uncertainty, the lack of technological access as an educational platform, the difficulty and communication barriers derived from teletraining and the uncertainty that was presented to them in the face of the measures adopted by the health authorities for the presence or not of the selective tests and examinations (Elmer et al., 2020; Fawaz et al., 2021; Flaudias et al., 2020).

Conclusions

This work aims to establish and analyze the current state of the question about stress in university students as a regulatory variable of their psychosocial profile. From this systematic review study, it can be concluded that there is an interest in the scientific community for the study of stress.

This trend has remained stable over time, rebounding recently due to the exceptional situation that has been created by the pandemic caused by COVID-19, and there is worldwide interest in the study of this psychological variable, although there are countries such as

the United States or China that have been studying it continuously and constantly.

Stress is a variable influenced by gender, socioeconomic status, and educational level. Similarly, it is a psychological variable that is in continuous interaction with emotional intelligence, social skills, resilience and motivation of students. Those who do not have these psychological tools can find themselves doomed to addiction to sub-stances or even to technology.

Having been subjected to a traumatic situation causes, in students, extremely high stress peaks when recalling the traumatic episode, that is, post-traumatic stress disorder, in which social support acts as a modulator of it.

Finally, the main limitation that has arisen is that post-pandemic studies have not yet been published in order to establish a comparison, given that the globalized alarm situation persists. A possible line of future research would be a comparative study of stress before and after the pandemic.

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