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Assessment of technological stress levels in university staff: case study

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Abstract

INTRODUCTION: Stress, a natural reaction of the body to challenging circumstances, can manifest itself in different ways and harm both an individual's physical and mental health. From a constant feeling of being overwhelmed to difficulties in concentration and decision-making, stress can undermine the overall quality of life. Physical symptoms such as headaches, digestive disorders and trouble falling asleep often accompany this condition, highlighting its negative impact on the body.
OBJECTIVES: The research aims to determine stress levels in teachers, workers, and university students.
METHODS: The stress test proposed by Dr. Gloria Villalobos was applied and complemented with sociodemographic variables. The population consisted of 224 teachers, 11 staff and 32 students.
RESULTS: The result found to be stress: 4.5% medium, 27.7% high, and 67.8% very high; The correlation is established employing Cramer's V between the variables and the applied test that the results do not influence the phenomenon investigated
CONCLUSION: It concludes the significant presence of medium - high - very high stress in the sample analyzed with serious consequences for health being necessary emerging measures to prevent diseases in university staff.

Keywords: Stress, Higher Education, Preventive Measures, Statistical Analysis, Technology Stress

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1. Introduction

Job stress is a recurring factor for most university teachers, resulting from the intense workload, mental-emotional fatigue, and educational reforms that many people find difficult to adapt to (1). This issue affects not only teachers but also students and workers, making it necessary to take measures to prevent and remedy it, as stress increases the risk of experiencing physical, emotional, social, and familial problems, among others (2).

All of this, combined with the integration of ICT (Information and Communication Technologies) in the educational field, would pose a challenge for both teachers and students. In line with this new technological era, it would be necessary to make new curricular adaptations to the educational system, requiring time and proper planning according to the educational level. (3)

According to several experts who study stress (4), before the eighteenth century, stress had different informal

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meanings, such as "hard work," "setback," or "sorrow." Subsequently, this term was adopted by physicists to describe a force applied to an object. In the nineteenth century, the concept of homeostasis was introduced, which denoted an internal state of balance, today because of the pandemic, new ways of doing work have been implemented such as teleworking with the use of digital display screens with excess permanence in these tools and useful, with high mental load, Overwork has generated stress and therefore musculoskeletal discomfort in the worker, among other symptoms.

Selye was the first to define stress as a generic, repetitive biological reaction to a stressor, manifested through changes in the nervous, endocrine, and immune systems (5). In the psychological field, stress implies an adjustment response to the conditions and demands of the environment during continuous interaction with it (6). It is considered an adaptive phenomenon fundamental to the survival of the individual, which contributes significantly to optimal performance and effective functioning (5).

According to the view of experts (7), stress encompasses a complex process that involves factors that lead the worker to feel that he or she cannot handle the critical or threatening demands of the daily work environment. These feeling triggers emotions such as fear, anxiety, anger, and frustration, which has an impact on their performance, causes conflicts, and, in some cases, leads to the appearance of occupational diseases and accidents at work.

Within the repercussions of stress, various types of effects are identified, which can be temporary or permanent, immediate, or long-lasting, and which influence health, causing physical, psychological, and behavioral disturbances. Stress-induced physical illnesses range in duration from short-term stomach pains to long-lasting gastric ulcers, and if they persist over time, they could lead to cardiovascular disease and other chronic bodily disorders (7). Those who suffer from stress often exhibit emotional symptoms such as nervousness, exhaustion, unsteadiness, depression, worry, and irritability.

Likewise, behaviors such as aggression, tobacco use, alcohol or drug abuse, absenteeism from work, and performance problems are associated with the behavioral domain (8). Therefore, the importance of maintaining a manageable level of stress in the work environment is recognized to prevent burnout and the onset of complications in both physical and mental health.

The lack of certainty, job instability, and increased responsibilities have generated both physical and psychological discomfort in the work community and in this case study teachers (9, 10). (11) highlight that the professional situation of university professors is worrying, identifying factors such as lack of motivation and stress as prominent risks. On the other hand, (12) establish significant links between precarious working conditions and the experience of work-related stress, which in turn is associated with complex medical problems such as depression and anxiety.

One of the most important areas of individual development is education. Anxiety is a very common issue among students, which can negatively impact their psychological state. Anxiety can affect students' learning processes, as quarterly exams, extensive homework, interdisciplinary projects, lessons, and reports can all be stressful situations for students. (13)

The university has experienced reductions in its funding, which has led to a gradual decline in the number of faculty, while student ratios have continued to rise. Lack of adequate infrastructure, and equipment, in addition to these conditions of work overload derived from teaching, university professors have the responsibility of performing other essential tasks, such as research, knowledge transfer, and administration (10, 14).

In addition to this, job instability and intense competition for achievement also contribute to conceiving university education as a profession that is affected by several circumstances that could increase work stress and, consequently, lead to the possible appearance of professional burnout syndrome (15). In this regard, uncertainty, fear of infection, and increased workload also play a role. Concern for one's own health and that of loved ones, as well as the constant pressure to provide quality care under challenging circumstances, can lead to high levels of stress and anxiety (16).

Consider teaching as meaningful work within the field in which it is carried out, given its social value and the substantial impact it has on the progress of society. Consequently, the stress associated with this work is significant and could influence the quality of the teaching-learning process, as well as family life, manifesting itself in limited communication, interpersonal tensions, and difficulties in balancing personal life with work responsibilities. (17; 18).

Currently, the university has several work components such as academia, research, linkage, technology transfer, management, and innovation. Some studies (12, 19, 20) state that precarious working conditions lead to chronic stress and burnout syndrome. According to (10) and (12), attention is required from the moment its first symptoms are perceived, causing demotivation and chronic stress.

The confinement due to the presence of Covid 19 has generated stress, so people must be attended to due to the presence of psychological factors in addition to the one investigated, the effects that these have caused on people's health must be analyzed. Therefore, social and health impact treatment initiatives must be generated to prevent the psychosocial effects of the pandemic, such as stress. (21-24)

The present research was born to evaluate the level of stress in university staff and to be able to mitigate or reduce psychosocial risk factors, so the following research problem is posed: To determine the stress levels of university staff and their impact on sociodemographic variables to implement prevention measures?

2. Method

2.1. Research Design and Type

The research was non-experimental, without manipulation of the variables, cross-sectional, it was analyzed in a single instant of time, descriptive as the phenomenon and incidence of stress in the university sector after the Covid-19 pandemic was presented, correlational since the relationship between the study variables of the stress test was determined employing Cramer's V and the sociodemographic variables raised, He used observation techniques in the university campuses surveyed.

2.2. Sample and Study Population

The survey population consisted of 224 teachers, 11 workers, and 32 students who answered the survey prepared in Google Forms, no sample was established, we worked with all the people in this research.

2.3. Methodology and instruments used.

For the development of the research, the quantitative methodology was used to analyze the stress information, for which the "Questionnaire for the evaluation of Stress-Third version of Villalobos, Gloria, Bogotá" was created in Google Forms with sociodemographic variables, which consists of 31 questions with a Likert-type response scale (always, almost always, sometimes, and never) (25).

Subsequently, the link created was disseminated through the computer system of the National University of Chimborazo, once answered, the Excel was downloaded to be programmed and exported to the SPSS V25 program to be programmed again, the results obtained allowed the corresponding analysis of the research.

The instrument design made it possible to evaluate the significant symptoms due to the presence of stress in university servers. The dimensions of the test are divided into four categories: according to the type of stress symptoms: a) Physiological b) Social behavior c) Intellectual and occupational d) Psychoemotional.

Table 1. Dimensions of the stress test

Dimensions	Questions
Physiological symptoms	1, 2, 3, 4, 5, 6, 7, 8
Symptoms of Social Behavior	9, 10, 11, 12
Intellectual and Occupational Symptoms	13, 14, 15, 16, 17, 18, 19, 20, 21, 22
Psycho-emotional symptoms	23, 24, 25, 26, 27, 28, 29, 30, 31

Fountain: (25)

Table 2. Symptoms of stress according to the factor

Stress level	Interpretation
Very low	Absence of symptoms of stress or very rare occurrence that does not merit the development of specific intervention activities, except for intervention actions or programs, to maintain the low frequency of symptoms.
Low	Low frequency of stress symptoms and therefore little impact on health status. It is pertinent to develop intervention actions or programs to maintain the low frequency of symptoms.
Middle	Indicative of a moderate stress response. The most frequent and critical symptoms warrant observation and systematic actions and intervention to prevent adverse health effects. In addition, it is suggested to identify psychosocial risk factors inside and outside the workplace that could have some relationship with the indicated effects.
High	The number of symptoms and their frequency of presentation is indicative of a high-stress response. The most frequent and critical symptoms require intervention within the framework of an epidemiological surveillance system. In addition, it is very important to identify psychosocial risk factors inside and outside the workplace that could be related to the indicated effects.
Very high	The number of symptoms and their frequency of presentation is indicative of a severe and health-damaging stress response. The most frequent and critical symptoms require intervention within the framework of an epidemiological surveillance system. Likewise, it is imperative to identify psychosocial risk factors inside and outside the workplace that could have some relationship with the indicated effects.

Fountain: (26) Prepared by: the authors.

Table 3. Stress Test Score

Denomination	Score
Very low	From 0 to 25 points
Low	From 26 to 50 points
Middle	From 51 to 75 points
High	From 76 to 100 points
Very High	From 101 to 124 points

3. Results and discussion

Applied research begins with the determination of the different sociodemographic variables proposed in the study:

Table 4. Sociodemographic variables of the study

Denomination	Values
Gender	Men: 60.3%, Women: 39.7%
Age	18 to 28 years old: 13.9%; 29 to 39 years: 24.7%; Ages 40 to 50: 33%; Over 51 years: 28.5%
Marital status	Single: 32.6%; Married: 53.2%; Divorced: 12.4%; Free Union: 1.9%
Type of Activity	Teacher: 83.9%; Worker/Employee: 4.1%; Students: 12%

The sociodemographic variables present a greater number of men, in age the highest percentage is from 40 years of age onwards, the marital status there are more married people than the others and regarding the type of activity the largest number surveyed is teaching.

The following table presents the results of stress due to symptoms present in the university staff investigated.

Table 5. Stress symptomatology of the study

Symptomatology	Results
Physiological symptoms	Low: 0.4%; 19.5% Medium; 80.1% High
Symptoms of Social Behavior	Low: 15%; 85% Medium
Intellectuals and Labor	Medium: 9%; High: 91%
Psycho-Emotional Symptoms	Medium: 8.6%; High: 91.4%

Regarding physiological symptoms, the highest percentage is between medium and high, they may present neck, back, gastrointestinal pain, ulcers, heartburn, colon, and respiratory problems, headaches, sleep disturbance, heart problems, loss of appetite, impotence, and sexual frigidity. The symptoms of social behavior are the highest percentage, which can lead to poor family and other relationships, isolation, and little interest. The intellectual and work aspects are between medium and high, so there may be a high workload, lack of concentration, high accidents, frustration, tiredness, little interest in work, and low productivity, as well as other factors that affect the organization. Psychosocial symptoms are medium-high, so loneliness, fear, irritability, negative thoughts, consumption of tobacco, alcoholic beverages, drugs, coffee, and negative coping may occur (25, 27, 28).

The following figure shows the different levels of stress found in the university staff analyzed.

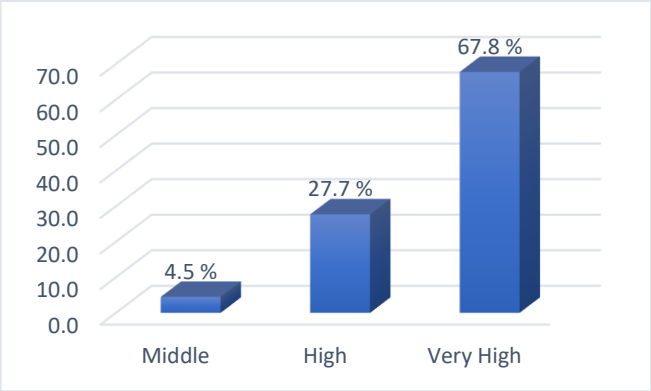

Figure 1. This is a legend. Caption to go below figure

When analyzing the results obtained from the surveyed university staff, it can be seen that the values range between medium, high, and very high, which requires immediate intervention to avoid health problems, these data can be compared with those of the company Pintulac in 2017 at the beginning of the Covid 19 pandemic, there is a low level of stress, however, there is the presence of Physical factors such as neck pain, gastrointestinal problems, headache, and sleep disorders, harm workers, this difference between the studies is due to the time of application The current study is post-pandemic and the working conditions of university professors in mental load have increased due to the different requirements requested in the university as the fulfillment of the task. (3, 29, 30).

Dr. Villalobos' stress test, despite being an adapted and validated test, is analyzed for reliability employing Cronbach's Alpha and reliability by KMO in the following tables:

Table 6. Instrument Reliability

Cronbach's alpha	N of Elements
0,948	31

Table 7. Instrument Reliability

KMO & Bartlett Test	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0,947

The reliability analysis gives a value of 0.948 and a reliability value of 0.947, so its applicability for this research environment can be concluded.

To determine the existence of a relationship between sociodemographic variables, dimensions, and levels of stress, the following table is presented.

Table 8. Correlation of Gender Variables and Stress Symptoms

Symptoms	Sociodemographic variable: Gender	Cramer's Frequencies and V	Interpretation
Physiological	Men	Medium: 28, High: 133 Cramer's V = 0.101	There is a weak relationship between the variables
	Women	Low: 1; Medium: 24; Height: 81 Cramer's V = 0.101	
Social behaviour	Men	Low: 24, Medium: 137 Cramer's V = 0.003	There is no relationship between the variables
	Women	Bass: 16; Medium: 90 Cramer's V = 0.101	
Intellectuals and Labor	Men	Medium: 15, High: 146 Cramer's V = 0.014	There is no relationship between the variables
	Women	Medium: 9; Height: 97 Cramer's V = 0.014	
Psycho-emotional	Men	Medium: 13, High: 148 Cramer's V = 0.024	There is no relationship between the variables
	Women	Medium: 10; Height: 96 Cramer's V = 0.024	
Stress	Men	Medium: 7, High: 44; Very High: 110 Cramer's V = 0.015	There is no relationship between the variables
	Women	Medium: 12; High: 30; Very High: 181 Cramer's V = 0.015	

The different symptoms of stress and the gender variable have a low correlation and do not influence the research; however, the frequencies vary from medium to very high, that is, both physical and mental problems are present in university servers.

Table 9. Correlation of Age and Stress Symptoms

Symptoms	Sociodemographic variable: Age	Cramer's Frequencies and V	Interpretation
Physiological	From 18 to 28 years old Ages 29 to 39 From 40 to 50 years old Over 51 years old	Medium: 9; Height: 28 Medium:15; High: 51 Low:1; Medium: 19; High:68 Medium:9; Height: 67 Cramer's V: 0108	There is a weak relationship between the variables
Social behaviour	From 18 to 28 years old Ages 29 to 39 From 40 to 50 years old Over 51 years old	Low: 12; Medium: 25 Low:6; Medium:60 Low:16; Medium:72 Low:6; Medium: 70 Cramer's V: 0232	There is a moderate relationship between the variables
Intellectuals and Labor	From 18 to 28 years old Ages 29 to 39 From 40 to 50 years old Over 51 years old	Medium:6; High: 31 Medium:7; High: 59 Medium: 9; Height: 79 Medium: 2; Height: 74 Cramer's V: 0.156	There is a weak relationship between the variables
Psycho-emotional	From 18 to 28 years old Ages 29 to 39 From 40 to 50 years old Over 51 years old	Medium: 8; Height: 29 Medium: 7; High: 59 Medium: 7; Height: 81 Medium: 1; Height: 75 Cramer's V: 0.225	There is a moderate relationship between the variables
Stress	From 18 to 28 years old Ages 29 to 39 From 40 to 50 years old Over 51 years old	Medium: 1; High: 21; Very High: 15 Medium: 5; High: 10; Very High: 51 Medium: 4; High: 28; Very High: 56 Medium: 2; High:15; Very High: 59 Cramer's V: 0.220	There is a moderate relationship between the variables

The different symptoms of stress and the age variable, their correlation ranges from low to medium influence the research, however, the frequencies vary from medium to very high, that is, both physical and mental problems are present in university servers that affect health and require medical and psychological attention.

Upon analyzing the age (31), it is found that there is a disparity in academic stress levels among students at different levels. The results indicate that students in their final year of study face a higher level of academic stress, amounting to 90.2%.

Table 10. Correlation of Marital Status and Stress Symptoms

Symptoms	Sociodemographic variable: Marital status	Cramer's Frequencies and V	Interpretation
Physiological	Bachelor Married Divorced Common-law marriage	Low: 1; Medium: 21; Height: 65 Medium: 21, High: 121 Medium:8; Height: 25 Medium: 2; Height: 3 Cramer's V: 0.116	There is a weak relationship between the variables
Social behaviour	Bachelor Married Divorced Common-law marriage	Low: 18; Medium: 69 Low: 14; Medium: 128 Low: 6; Medium: 27 Low: 2; Medium: 3 Cramer's V: 0.172	There is a weak relationship between the variables
Intellectuals and Labor	Bachelor Married Divorced Common-law marriage	Medium:10; High:77 Medium: 8; Height: 134 Medium: 4; Height: 29 Medium: 2; Height: 3 Cramer's V: 0.183	There is a weak relationship between the variables
Psycho-emotional	Bachelor Married Divorced Common-law marriage	Medium: 13; Height: 74 Medium: 4; Height: 138 Medium: 4; Height: 29 Medium: 2; Height: 3 Cramer's V: 0.254	There is a moderate relationship between the variables
Stress	Bachelor Married Divorced Common-law marriage	Medium: 5; High: 31; Very High: 51 Medium: 3; High: 31; Very High: 108 Medium: 2; High: 11; Very High: 20 Medium: 2; High: 1; Very High: 2 Cramer's V: 0.211	There is a moderate relationship between the variables

When establishing the comparison between marital status and stress symptomatology determined employing Cramer's V ranges from weak to moderate, there is incidence, however, the frequency of stress ranges from medium to very high, that is, there is the presence of stress, this may be due to the high demand of tasks that must be fulfilled in the university environment. there is still the fear of contagion of Covid 19 and other facts, these are the first factors in the environment that need to be analyzed to establish the root cause of the problem.

In this regard, (32) suggests that the family environment can have a significant impact on the ability to maintain focus on a task over time. A family atmosphere characterized by open communication, emotional support, and effective conflict resolution is associated with better development of sustained attention.

Table 11. Correlation of the variable's type of activity and symptoms of stress.

Symptoms	Sociodemographic variable: Type of Activity	Cramer's Frequencies and V	Interpretation
Physiological	Teacher Worker/Employee Student	Low: 1; Medium: 42; High: 181 Medium: 2; Height: 9 Medium: 8; Height: 24 Cramer's V: 0.041	There is no relationship between the variables
Social behaviour	Teacher Worker/Employee Student	Low: 28; Medium: 196 Low: 2; Medium: 9 Low: 10: Medium: 22 Cramer's V: 0.171	There is a weak relationship between the variables

Intellectuals and Labor	Teacher Worker/Employee Student	Medium: 16; High: 208 Medium: 3; Height: 8 Medium: 5; High: 27 Cramer's V: 0.164	There is a weak relationship between the variables
Psycho-emotional	Teacher Worker/Employee Student	Medium: 14; Height: 210 Medium: 1; Height: 10 Medium: 8; Height: 24 Cramer's V: 0.216	There is a moderate relationship between the variables
Stress	Teacher Worker/Employee Student	Medium: 9; High: 55; Very High: 160 Medium: 2; High: 1; Very High: 8 Medium: 1; High: 18; Very High: 13 Cramer's V: 0.195	There is a low relationship between the variables

By establishing the correlation between the variables of the type of activity carried out at the university and the symptoms of stress, it is determined that it ranges from low to medium with an incidence in the investigated phenomenon with the presence of significant symptoms that present pathologies, absenteeism from work, high mental load and therefore consequences in the health of the servant who requires immediate psychological first aid and a positive psychology program to face the present problem.

To cope with the stress generated, one can use medicines such as antioxidants and anti-inflammatory compounds (33). Alternatively, educators can employ learning methodologies based on the flipped classroom, among others (34-36), or even redesign the curricula (37).

CONCLUSIONS

The determination of Cronbach's Alpha and KMO values allowed us to determine the reliability and reliability of the test applied, despite being an instrument adapted by Dr. Gloria Villalobos that is valid, reaffirming that it applies to the research environment.

The levels of stress detected range from medium to very high, so it can be evidenced that physical factors such as neck pain, gastrointestinal problems, headache, and sleep disorders among others can occur with high frequency, affecting people's activities, this can cause changes in social behavior with difficulty in family relationships. Work overload and fatigue in intellectual work factors are very high so it can lead to feelings of irritability, anguish and not being able to handle problems properly.

The analysis Statistical analysis of the incidence of sociodemographic variables and dimensions of stress, as well as the phenomenon of stress in university staff as a whole. The results generally report its presence employing Cramer's V with a low correlation which means that there are other factors of the work and family environment that are the cause of stress and that can generate problems in the university server if prevention in occupational health and safety is not carried out.

Work-related stress can have detrimental effects on the health and performance of workers and in this case on university servers, so a more in-depth analysis of psychosocial risks must be implemented, a stress management program must be carried out, a work-life balance must be promoted, a positive work environment, Access to wellness resources, conflict management protocols, and effective communication of institutional changes and challenges.

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