

## Perception of stress and work fatigue in workers of a maquiladora company in the state of Nuevo León, Mexico.

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### Abstract

Nowadays in the organizations there are different changes, such as the demands, the fulfillment of objectives or the new tendencies of processes, in this sense the workers are affected by these changes, which are manifested in symptomatology that in the same way affects the organization, in this study two psychosocial phenomena were taken into account, which are Stress and Work Fatigue. It was carried out under a non-experimental, expository and transversal design, in a maquiladora organization, with a representative sample of 190 male and female employees, of different levels of schooling and positions. The instruments used were: The Symptomatic Stress Scale (ESS) of Seppo-Aro (1980), and the Subjective Patterns of Fatigue Questionnaire (PSF), elaborated by H. Yosithake (1978). The results of the sample were broken down into three sections: gender, type of contract and hierarchical level. The general objective was to identify the prevalence of work stress and fatigue perceived by the human capital of this organization, and the specific objectives were to identify whether there is a difference in the prevalence of work stress and fatigue in terms of hierarchical levels, both operational and administrative, and a second specific objective was to identify the prevalence of work stress and fatigue in terms of gender, female and male within this organization.

**Keywords:** Job fatigue, job stress, gender, negative effects, job.

### Introduction

Organizations wanting to be more competitive in the markets in which they are inserted, as well as the same demands of these in terms of the constant changes that occur, and advances whether technological, processes or work methodology, generates within employees a feeling of demand that is conducive to the occurrence of different phenomena such as Mobbing, Burnout, Job Stress, Work Fatigue, among others, product of the person perceive that their capabilities are exceeded and results in a psychological imbalance in the worker.

Stress and work fatigue specifically are phenomena at least in our country that generate a serious problem both socially and economically since the physical and mental health of the worker is detrimental to be exposed to it, consequently, this affectation will permeate both in his professional life as in his working life as he will have to adjust remain stable in their relationships.

In economic terms, organizations will be affected by the fact that failure to achieve the goals set will be reflected in their profits. According to a study by the ILO (International Labor Organization), this could result in losses of between 0.5% and 3.5% of the countries' GDP. Although there is no statistical data on the economic losses caused by stress and fatigue at work in Mexico, such estimations suppose an approximate loss of between 5,000 and 40,000 million dollars (USD), an average of 0.3 billion Mexican pesos per year. ("estreslaboral.INFO", 2015).

An example of this is the data provided in 2013 by the World Health Organization (WHO), which indicates that, compared to other countries, Mexico ranks first in stress index, and of the 75 thousand heart attacks registered annually, 25% are related to fatigue and work pressure, such data is alarming since it exceeds the records of the United States and China (Universia Mexico, 2013). Stress and work fatigue are some of the negative consequences manifested by workers, either due to inadequate working conditions, overwork, lack

of training and training to perform the task or demands that exceed the capabilities of employees, lack of adequate rest, etc.

Understanding stress as the "set of physiological reactions that prepares the body for action", as described by the World Health Organization (WHO, 2002). And describing fatigue as "an indicator that something needs to be attended to, either in us, or in the working conditions or in its organization", "manifested as a feeling of weakness and exhaustion accompanied by discomfort, even pain and inability to relax" (Universidad Complutense Madrid [UCM], Rector's Delegation for Health, Social Welfare and Environment, Directorate of the Occupational Risk Prevention and Occupational Medicine Service, 2013, p. 03).

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On the other hand, Lazarus and Folkman (1986), consider stress as "a set of particular relationships between the person and the situation, being valued as something that exceeds the person's own resources and capabilities, which endangers his or her personal well-being" (Quoted by Mercado 2008, p. 17). Another author mentions that "stress refers to a natural and generalized response - mental or somatic - imposed on the body before any external demand, stimulus or stressor agent" (Seyele, 1982, quoted by Gabel-Shemueli 2012, p.275).

In this same sense it can be mentioned that this psychosocial phenomenon has two aspects, first is the so-called Eustress, which is the healthy, positive, productive and constructive response to threatening events, and there is the Distress which is to refer to the degree of physiological, psychological, emotional and behavioral deviation from the optimal and healthy functioning of the individual. (Gutierrez, 2012).

This phenomenon is perceived by the worker as a demand that exceeds his or her capabilities, which causes tension because it has negative consequences and provokes an imbalance. As mentioned by Karasek (1979), what makes a situation stressful for one person and not for another, depends on the lack of control over the situation, i.e., that their ability to cope with it is insufficient and therefore the worker perceives it as a stressful situation. (Karasek, 1979, cited by Peiró and Rodríguez, 2008).

The experiences that workers have had that generate stress or tension are called stressors or causes of stress.

Regarding work-related stressors, Peiró (1999) established eight categories, which will be mentioned below:

- - Stressors related to the physical environment, environmental risks and environmental conditions such as noise, temperature, available space, etc.
- - Stressors related to work organization, shifts, workload, etc.
- - Stressors focused on job content, such as control, complexity, opportunities for the use of skills, identity, and meaning of the task, task feedback.
- - Role stressors, such as role conflict, role ambiguity, role overload, etc.
- - Stressors derived from relationships and social interactions, for example: relationships with supervisors, peers, subordinates, clients, etc.
- - Stressors dedicated to aspects of job development, such as job change, promotions, career development and transition.
- - Stressors related to the characteristics of the organization, such as its technology, structure and social climate.
- - Stressors that address the interface between work and other spheres of life as sources of stressors, such as work-family, family-work conflicts. (Peiró and Rodríguez 2008, p. 69).

Regarding the symptoms that a person permanently exposed to this psychosocial phenomenon may present, the World Health Organization carried out a study in which it determined that workers may present the following symptoms.

- - Increased irritability and anguish.
- - Being unable to relax or concentrate.
- - Having difficulty thinking logically and making decisions.

- - Decrease their commitment to their work and their workmanship.
- - Feeling tired, depressed and restless.
- - Having difficulty sleeping.
- - Suffering physical disorders.

With regard to physical disorders, cardiovascular diseases, musculoskeletal disorders (back and limbs), psychological disorders; depression, suicidal ideas and exhaustion, accidents and injuries can also occur and finally, more seriously, cancer, gastrointestinal ulcers and some immunological alterations can occur (Chanes, Pérez & Castello, 2010). Likewise, this symptomatology can be presented at a motor level in workers of which the manifestations can be the following: tremors, stuttering, haste to act, overeating or otherwise lack of appetite, nervous laughter, emotional outbursts.

On the other hand, work fatigue is manifested by injuries, illnesses, difficulties at work related to effort, but also lack of motivation, job rotation and absenteeism (Universidad Complutense Madrid [UCM], Rector's Delegation for Health, Social Welfare and Environment, Directorate of the Occupational Risk Prevention and Occupational Medicine Service, 2013).

According to Kroemer and Grandjean (2000), they classify fatigue in two categories: physical and mental, the first is defined as "the subjective and objective changes that occur in some areas of the body and that are the result of sustained or repeated efforts or exercises" (Carranza and Vallejo 2004, p 8).

In the second classification, which is mental fatigue, the following characteristics are described: a) it is not easy to control experimentally, b) it is not applicable to only one level (psychophysiological, psychoendocrine, psychoimmunological, behavioral), c) it is not easily repaired by sleep and rest, d) it can be produced by understimulation (monotony) or overstimulation" (Kroemery Grandjean 2000, cited by Carranza and Vallejo 2004, p 10).

Other classifications of fatigue that have been identified are mentioned below, referring to the proposal made by Batarrita (1989) who categorizes it as follows:

- (1) 1. Psychic fatigue. "Considered as a non-reversible phenomenon, which is why it becomes a chronic process related to mental pathology, it appears as a consequence of the development of repetitive tasks, parceled and monotonous, as well as the coercion of authoritarian hierarchies and inadequate remuneration for work, etc." (Batarrita (1989) quoted by Useche 1992, p. 93).
- (2) 2. Physical fatigue. This type of fatigue affects the whole organism and presents symptoms of illness, and this can be of three types: general physical fatigue that also presents itself as fatigue up to a general physical exhaustion of the worker, localized physical fatigue at the sensory level and muscular fatigue. (Useche, 1992).
- (3) 3. Nervous fatigue. This author groups nervous fatigue as a common subjective syndrome of nervous fatigue; mood and character disorders; somatic and visceral disorders, as well as sleep disorders. (Useche, 1992).
- (4) 4. Professional fatigue. In this type of fatigue, attention should be paid when certain indicators are high, which may be: accidents present in greater recurrence, absenteeism by workers, etc. (Useche, 1992).

Regarding the causes that provoke fatigue in people who are in organizations performing a work function, it can be mentioned that it is not caused by one or very few causes, but on the contrary, it is multi-causal, as mentioned by Morales (1986), These vary depending on the type of work activity and makes the classification of three types of causes of fatigue that will be mentioned briefly (Carranza and Vallejo 2004), cause of fatigue from manual labor, cause of fatigue from work dominantly sensory, causes of fatigue from work dominantly cognitive or mental.

Other factors that influence in a general way, identified by some specialists in the subject of labor fatigue are: shift work patterns, lack of breaks, accelerated work rhythms and high control in ensuring the quality of processes and products, in addition to daily difficulties of the organization and work and other labor demands over which they have little or no control. (Nuñez, Panunzio & Molero, 2014).

The symptoms that occur due to work fatigue are also very diverse since they depend on the type of fatigue that the worker presents, as well as the relationship with the position or functions that he/she performs within the organizations. The most frequent symptoms indicative of the presence of labor fatigue are: Difficulty

concentrating, difficulty breathing, passivity, palpitations, exhaustion, shortness of breath, tense muscles, stiff joints, drowsiness, sweating, heaviness, pain, exhaustion, numbness, numbness, lack of interest.

On the other hand, the consequences of this phenomenon are: "There is greater absenteeism in fatigued workers, greater probability of work accidents in fatigued people, increased risk of cardiovascular diseases in those affected, decreased alertness even during day shifts, therefore, uncontrolled industrial fatigue becomes chronic fatigue syndrome of difficult medical management and frequent relapses that even cause a drop in the resistance of the immune system" (Carranza and Vallejo 2004, pag. 20).

## **Materials and Methods**

### ***Participants.***

The size of the sample taken for the application of this research was determined by the organization and its selection was random, this sample is made up of 191 employees, 47 female participants equivalent to 24.6%, and 144 male participants corresponding to 75.4%, the age range ranged between 18 and 55 years old, of which 4 have a basic schooling (primary), 91 have secondary schooling, 2 have a commercial career, 66 have a high school level, 21 have a university degree and 7 have a postgraduate level.

### ***Instruments.***

The instruments that were applied to carry out this research were, firstly, the Symptomatic Stress Scale (ESE) whose author is Sepo-Aro (1980), this scale allows us to know the perception of the factors that generate stress in their work area, this scale consists of 18 items that are associated with states of stress, psychosomatic, emotional or conative nature. "The answers are expressed on an ordinal scale of four frequencies, which are valued from 0 to 3, and it is considered that the person suffers from stress when it shows a value higher than 10 points" (Hernández 2003, p. 1059).

The second instrument used was the Subjective Patterns of Fatigue (PSF) questionnaire, developed by H. Yositate (1978), which is made up of 30 items and its responses are dichotomous. It allows the assessment of Fatigue (PSF) in three types: Type 1 corresponds to mixed work, i.e. both physical and mental, called monotony and bottleneck, Type 2 corresponds to demands or mental work and is determined by "Difficulty of concentration" and Type 3 refers only to physical work and is called "Physical Impairment". This instrument is divided into three dimensions: Mixed fatigue are items 1 to 10, Mental fatigue are items 11 to 20 and physical fatigue corresponds to items 21 to 30 (INSAT, 1987).

### ***Procedure.***

First of all, informed consent permission was requested from each worker to answer the instruments for this research, after which they were informed of the purpose of this study that is being carried out to those who agreed to participate in answering the instruments, clarifying that the information will be treated confidentially and therefore their anonymity will be protected. Based on this acceptance, we proceeded to program the application of the instruments in which the organization provided an adequate area, that is, with optimal lighting and temperature, as well as comfortable chairs and tables.

To carry out the application, the heads of each department programmed and sent the workers to the room assigned for the application, which was carried out during working hours of the departments, for this reason the application was contemplated in different shifts and different days.

At the end of the dates agreed for the application, the answered instruments were fed into a database in the SPSS statistical program.

### ***Data analysis***

It will be carried out with the use of the statistical package SPSS and Excel, with which descriptive data such as measures of central tendency and dispersion, analysis of sample behavior, correlation analysis and design of graphs representative of the results obtained were obtained.

## **Results and Discussion**

Returning to Specific Objective 1: To identify the levels of stress and labor fatigue perceived by the human capital of a manufacturing company in the state of Nuevo Leon. The following results were obtained:

Table 1: Descriptive statistics of the Symptomatic Stress Scale (SSS) and Subjective Patterns of Fatigue Questionnaire (PSF).

Scale	N	Minimum	Maximum	Average	Median	Mode	Standard deviation.	Variation
Symptomatic Stress scale		0	35	6.89	5.00	2	6.326	40.021
Subjective Patterns of Fatigue Questionnaire		0	24	6.43	5.00	0	5.493	30.171

Observing the descriptive statistical analysis in Table 1. on the overall values of the sample, the overall mean of the Symptomatic Stress Scale was 6.89 with a standard deviation of 6.32 with values as minimum 0 to 35 as maximum.

For the Subjective Patterns of Fatigue Questionnaire the mean was 6.43 with a standard deviation of 5.49 with values from a minimum of 0 to a maximum of 24.

To have a visualization of the results, the following general graphs of the levels obtained in percentages of both scales are shown.

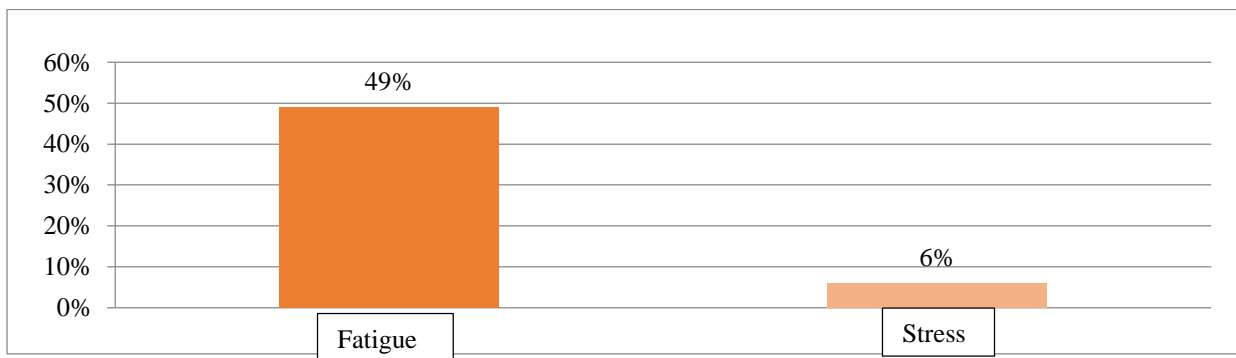


Figure 1. General levels of the sample. In general, the sample reports a higher level of fatigue with 49% compared to the level of stress which reports 6%. This shows that both factors are present and although the levels are not critical in the presence of stress, attention should be paid to the result, since it can lead to an increase in accidents at work, low productivity, absenteeism, turnover, etc., which will result in the failure to meet organizational objectives, economic losses for the company and low competitiveness globally. On the other hand, almost half of the sample shows a high level of fatigue, which indicates that there could be a lack of energy or motivation on the part of the personnel.

Continuing with Specific Objective 2: To identify whether there is a significant difference between the levels of stress and fatigue in relation to the hierarchical level (operational and administrative) of a manufacturing company in the state of Nuevo Leon. The following results are presented for consideration.

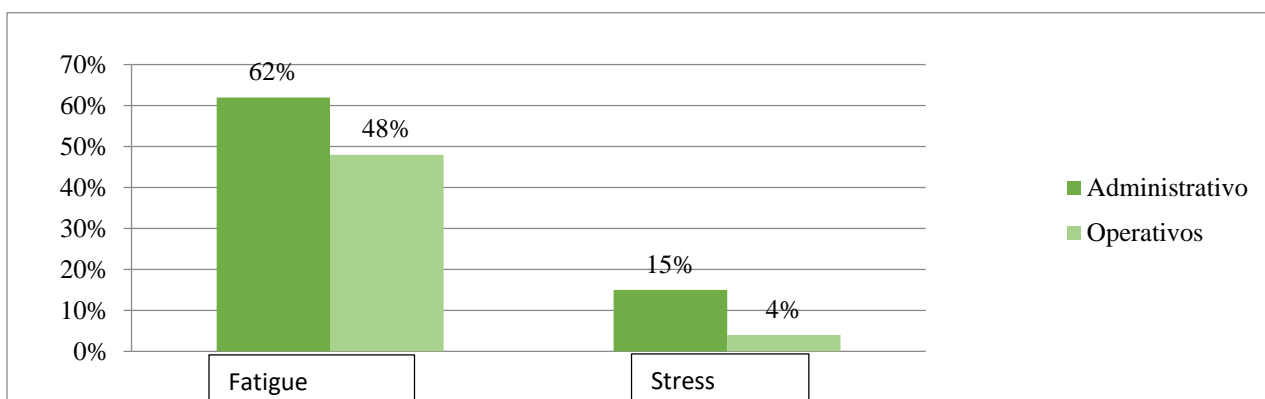


Figure 2. levels of fatigue and stress by hierarchical rank. The above shows that there is a higher level of fatigue in administrative employees with 62% compared to operating employees with 48%, these results merit the attention of the organization because according to the standards recommended by INSAT (1987), for the qualification and application of the PSF instrument, denotes that operating employees are at the limit of the

presence of labor fatigue, however, administrative employees do show fatigue, since this standard mentions that a state of fatigue is presumed if it reaches 23% and 20% for men and women respectively. (INSAT, 1987). As for stress, as in the case of fatigue, there is a difference in the levels reported, with 15% for administrative workers and 4% for operators; as in the previous case, administrative workers report a higher level which, although not high, merits the attention of top management to prevent future consequences that may have repercussions on the psychological well-being of the workers.

In order to determine the significance of the difference in Stress and Fatigue, a comparison analysis of groups (operational and administrative) was carried out with the Mann-Whitney U statistical test as shown in the following table.

Table 2. Group comparison analysis with Mann-Whitney U test

Operatives - Administrative	U	Significance level
Escala Sintomática de Estrés (ESE).	1337.000	.005
Cuestionario de Patrones Subjetivos de Fatiga (PSF).	1526.000	.052

Table 2. shows specifically that there is a significant difference in terms of stress between the operational and administrative groups, reporting a statistic of  $U=1337$  ( $p=.005<.050$ ), which shows that the hierarchical level is a determining factor for perceiving stress differently. On the other hand, in relation to the levels of work fatigue, a statistic of  $U=1526$  ( $p=.052>.050$ ) was obtained, which shows that there is no significant difference between the organization's operatives and administrators in the perception of work fatigue.

Therefore, specific objective 3 consists of: To identify whether there is a significant difference in terms of the graphs representing stress and fatigue as a function of gender.

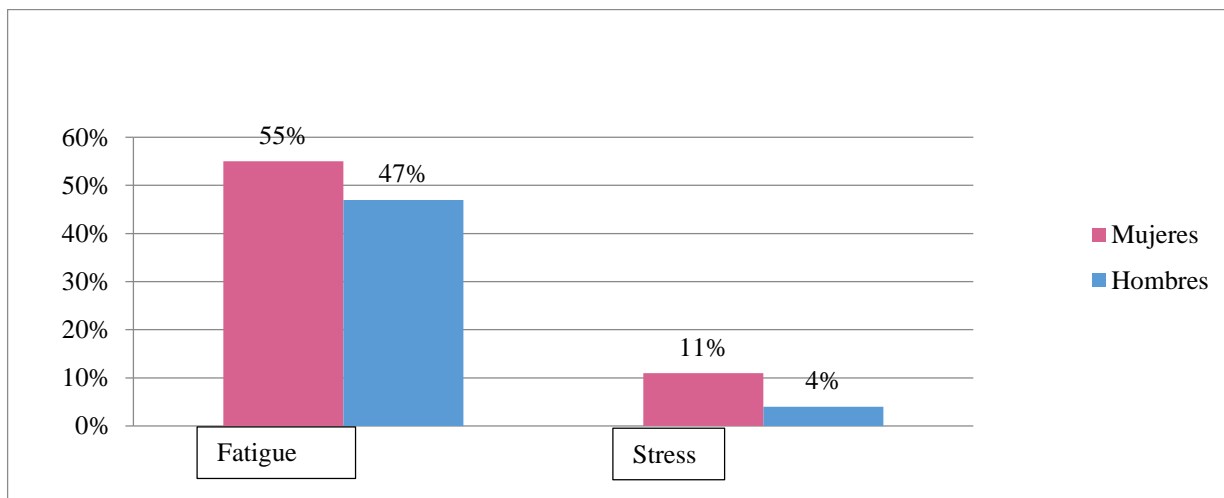


Figure 3. Levels of fatigue and stress by sex. Observing the previous graph, a variability in the levels of stress and work fatigue in relation to gender was obtained, on the one hand, in stress 4% was obtained in men and with a higher level in women with 11%, this difference may be related to the multiple roles played by women, the characteristics of the task and the masculinization of the organization since most of them are men. Likewise, in terms of work fatigue there is also a difference since women are fatigued reporting 55% and men 47% are at the limit to present work fatigue, as mentioned by INSAT, and also related to what some authors mention in reference to women being more prone to work fatigue than men. (INSAT, 1987).

Table 3. Table Mann-Whitney U test.

Men - Women	U	Significance level
Symptomatic Stress Scale.	2445.500	.012

Subjective Patterns of Fatigue Questionnaire (PSF).	2639.000	.075
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Table 3. Table Mann-Whitney U test. shows specifically that there is a significant difference in terms of stress between the group of men and women, reporting a statistic  $U=2445.500$  ( $p=.012<.050$ ), which shows that gender is a determining factor in perceiving stress differently. On the other hand, in relation to the levels of work fatigue, a statistic of  $U=2639.000$  ( $p=.075>.050$ ) was obtained, which shows that there is no significant difference between men and women in the organization in the perception of work fatigue.

**Discussion.**

The results of this investigation denoted a low presence of stress and, on the other hand, a high presence of work fatigue, reporting a standard deviation of 6.32 and 5.49, respectively. However, it is interesting when analyzing the maximum values reached, since values far below were reported. above the average that range up to 35 in the case of stress and 24 in the case of fatigue, this dispersion may be due to the fact that in some workers the conditions in which they carry out their work are not the most appropriate and require attention to promote better health not only physical but mental, it was identified that in some cases the levels are zero or very low and in others very high, which makes us wonder if it has to do with the habits and customs of the workers with greater seniority? That they are probably used to performing their function under certain weather conditions (such as heat or cold) and for others it is of importance and that is why they do manifest it.

**Conclusions**

The organizational dynamics may be playing a very important role, since the rotating shifts that are available (especially in the highest peaks of production) are exhausting, as well as it is important to talk about the working conditions in which they work. find, for example: in the assembly area it was observed that it does not have climate, therefore it works in high season with temperatures of more than 40° centigrade, likewise they use antistatic protective sleeves that generate more heat, in addition the assembly is carried out the standing operator, and the rest periods are few, since it was observed that they are not the most adequate.

Administrative staff are more concerned with recognition and self-realization and this may be the reason for presenting the highest rates of stress and work fatigue according to the sample of this study. The above found may be related to the type of task performed by the worker as well as the degree of demand in meeting organizational demands, this being a possible reason why the percentage is higher in the administrative staff.

On the other hand, what other researchers say regarding gender should be taken into account, which they have identified in their studies regarding work stress and fatigue, as reported by Allmiral (2013), who in his research entitled "Stress and fatigue in the hospital environment: a study with a gender approach", he made the comparison and the results led him to the affirmation that there are significant differences, with the female sex being more affected. It can be assumed that the different roles that women play, such as being a mother, wife, student, daughter, worker, etc., and at the same time being immersed in a competitive and masculinized work environment, lead her to present high rates of both factors that are the object of study of this research. (Allmiral, 2013).

**Ethics approval and consent to participate**

This research work was reviewed by a research committee of the institution.

Studies involving animals must include a statement on ethics approval. **NOT APPLICABLE.**

**Data Availability**

The data and findings obtained from this research work will be available by sending an email to the authors to forward it to them.

## Conflicts of Interest

"The authors declare that there is no conflict of interest with respect to the publication of this article."

## Funding Statement

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## Authors' contributions.

**NM.** He participated in the construction of the referential framework to give theoretical support to this investigation, as well as participated in the elaboration of the Discussion of this study.

**VH.** His first contribution was in the elaboration of the reference framework of this research, together with another author, as well as he participated in the Discussion of this article after the analysis of the results obtained.

**MG.** The contribution by this author in this research work was in the statistical analysis of the data obtained through the SPSS software, this was worked together with another author of this study, after analyzing the results, I worked together with other authors. in the discussion of the same.

**MC.** The collaboration of this author was in the construction of the theoretical support of this study, as well as in the development of the Conclusion of this research work, this after having the results of this research.

**JP.** This author contributed to the data analysis using the statistical software SPSS, along with another author, after the analysis of results, contributed to the Conclusion of this research study.

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