

## Academic stress symptoms in students of higher education and the relation with variable sex

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### Abstract

The objectives of this research are: to establish the descriptive profile of the presence of the symptoms of academic stress in high school students, and to determine the relation between the symptoms of stress and the variable sex in the students of upper secondary education. To achieve these objectives, a correlational, transectional and non-experimental study was carried out through the application of the Stress Symptom Inventory, Version Two (SSI-VD) to a sample of 223 students of Escuela Preparatoria Diurna de Universidad Juárez del Estado de Durango. The results indicate that the most frequent symptoms are: "Excessive concern", "Hard to concentrate" and "Restlessness and nervousness". While those that occur less frequently are: "Heart palpitations", "Difficulty to swallow or breath," "Smoking a lot," and "Nervous tics"; on the other hand the correlation analysis indicates that the variable, sex influences in the symptoms of stress, being the women that present them with a greater frequency.

**Keywords:** symptoms, stress and sex

### 1. Introduction

In 2007, Barraza <sup>[4]</sup> develops a state of the art on academic stress, where he emphasizes that sex is one of the most studied sociodemographic variables in relation to academic stress; however, he underlines that the reported results are basically contradictory. Some studies support the non-difference between sexes in relation to academic stress, while others affirm that females present higher levels of academic stress.

Through the literature review for this investigation, in search of the background, three different situations can be identified in this respect:

1. Some authors still maintain that it is women who present a higher level of stress (De Mesquita, Aline, Dos Santos & Amaral, 2014; Ghazanfar, *et al.* 2016; Hamza, Abdulaziz, Ebrahim, Gominda & Eiad, 2011; Lizardo, Ferreira, De Souza, Barros & De Oliveira, 2013; Machado, Da Silva & De Souza, 2011; Martín, Trujillo & Moreno, 2013; Patkar, Patkar & Patil, 2016; Sambasiva & Kumar, 2016) <sup>[11, 14, 16, 21, 22, 24, 33, 34]</sup>.
2. Other authors mention that sex does not effect on academic stress, that is, it is presented similarly in both sexes (Allen & Smith, 2012; Andrade, Vasconcelos, Nakagaki, Borges, Pereira & Rogatto, 2013; Nieves, Otero, Mabilia, Malonda & Guimbi, 2014; Viana, Andrade, Back & Vasconcellos, 2010) <sup>[1, 2, 28, 40]</sup>.
3. While others affirm the prevalence in either sex, depending on certain conditions: a) García, Pérez and Fuentes (2015) <sup>[13]</sup> recognize the presence of higher levels of stress in women, exclusively on their way of joining or beginning their university studies; Oliveira, Carvalho, Almeida and Figueredo (2015) <sup>[30]</sup> argue that women who have a job and study are more stressed than those who only study; Nieves, *et al.* (2014) <sup>[28]</sup> report that in the moderate level of stress, the greater number of subjects are women; Marín, Álvarez, Lizalde, Anguiano and

Lemus (2014) <sup>[23]</sup> state that academic stress occurs more frequently in female students, in the last period of the career and during clinical practices, b) Oliveira, *et al.* (2015) <sup>[30]</sup> conclude that men who only study are more stressed than those who have had a job and also study; Machado, *et al.* (2011) <sup>[22]</sup> found differences in the comparison between women and men with the interpersonal factor (that is related to the interaction of social background, friends, family and affective relationships), men are the ones who present greater stress at this point; Nieves, *et al.* (2014) <sup>[28]</sup> establish that at the mild and deep levels of stress, male students are predominant.

As it can be observed, the contradictions, in the show results, about the relation between academic stress and variable sex are maintained. The explanation for this variability can be attributed to multiple hypotheses that would deal with contextual aspects (i.e. type of institution or career), to how to measure variables (i.e. symptom inventory or stressor scale). In the present research, the way of conceptualizing stress is considered as the central element of this variability; in this regard, we must remember that in the last decades, stress studies have been discussed under the following perspectives (in terms of Travers & Cooper, 1997) <sup>[37]</sup>, alternative approaches (in terms of Kyriacou, 2003) <sup>[17]</sup> or conceptions (in terms of Trianes, 2002) <sup>[38]</sup>:

1. Stress as a dependent variable. In this perspective, researchers have focused their attention on the physiological and psychological reactions of the individual towards unpleasant backgrounds (symptoms).
2. Stress as an independent variable. From this perspective, the studies have focused on the background characteristics that affect the subject in a disruptive way, causing changes in him (stressors).
3. Stress as an intervening variable. This perspective, of an

interactive nature focuses its attention on the way subjects perceive the situations that are imposed on them, and their way of reacting to them.

Due to this conceptual variability, Barraza, in 2006<sup>[3]</sup>, makes an effort of synthesis and integration, based on the idea that stress is a complex concept that demonstrates a field of study that encompasses a series of concepts related to each other, as would be the case of stressors, stress response, etc. (Labrador & Crespo, 1993; Lazarus, 1966; and Valdés & Flores, 2004)<sup>[18, 19, 39]</sup>, present a theoretical conceptual model of stress that leads them to identify three systemic procedural components of stress: stressors, symptoms and coping strategies.

This conceptual distinction is important, not only to clarify the scope of some results of previous research, but also to determine the relevance of the different theoretical hypotheses that explain the prevalence of greater stress in the females, since the three components involve differentiated cognitive and contextual processes.

This research shows, in particular, the study of the symptoms of stress and its relation to sex. Regarding this point, Barraza and Barba (2012)<sup>[7]</sup> point out that the variable sex is the one that most influences the symptoms of stress, and it is the woman presenting them more frequently, while Mustafa, Pimentel, Fernandes, Mustafa and Oliveira (2009)<sup>[26]</sup> report that female students showed higher levels of stress symptoms than male students.

These two previous investigations, and specific in the symptoms of stress, allow to establish as a research hypothesis that women present a higher level of presence in the symptoms of academic stress. In order to contrast this hypothesis, it is proposed as the central objective of this investigation: to determine the relation between the frequency of stress symptoms and the variable sex in upper secondary students. To complete this study, a second objective is formulated in the following terms: to establish the descriptive profile of the frequency of the symptoms of academic stress in high school students.

## 2. Materials and Methods

The participants, of this investigation, were the students of Escuela Preparatoria Diurna of Universidad Juárez del Estado de Durango. The selection was made by non-probabilistic sampling. 223 questionnaires were applied and the distribution of the students, according to the three variables investigated in the background, is presented below:

- 34.2% correspond to male students and 65.8% correspond to female students.
- 22.4% of students are 16 years old, 50.7% of students are 17 years old, 23.8% of students are 18 years old and 3.1% of students are 19 years old.
- 45.7% of students are in the fourth semester and 54.3% of students are in the sixth semester.

This study can be characterized as correlational, transectional and non-experimental. The survey technique was used to collect the information, and as an instrument, the second version of the Stress Symptom Inventory (Barraza &

Gutiérrez, 2011);<sup>[6]</sup> this inventory, originally, consists of 44 items where each one states a symptom in the particular; the items are organized in three dimensions: physical symptoms (20 items), psychological symptoms (16 items) and behavioral symptoms (eight items). These items can be answered in a Lickert scale of four values: Never, Almost Never, Sometimes, and Almost Always. This inventory originally had the following psychometric properties:

- A reliability of .95 in Cronbach's Alpha and .88 reliability by halves according to the Spearman-Brown formula.
- Evidence of validity based on the internal structure, from the procedure identified as validity of internal consistency and the results showed that all items are positively correlated (with a significance level of .00) with the overall score obtained by each respondent.
- Evidence of validity based on the internal structure, from the procedure called analysis of contrasted groups, and the results showed that all the items allow to discriminate (with a level of significance of .00) among the groups that reported a high and low level of presence of the different symptoms of stress.

Due to the absence of a factorial analysis that confirmed the three-dimensional structure of the inventory, it was decided to perform the factorial analysis as a complement to its validation process. The results that were obtained led to the elimination of 14 items of the inventory due to problems in the estimation of commonalities or the presence of ambiguous saturations. In the end, the inventory was constituted with 30 items and this version was denominated Inventory of Symptoms of Stress Version Two (ISS-VD). The psychometric properties of this version are presented below:

- It was obtained a reliability of .93 in Cronbach's Alpha and .84 in the reliability by halves according to the Spearman-Brown formula.
- In the internal consistency analysis, the results showed that all the items are positively correlated (with a significance level of .00) with the overall score obtained by each respondent, with the lowest correlation coefficient of .21 and the highest of .68.
- In the analysis of contrasted groups, the results showed that all the items allow to discriminate (with a level of significance of .00) among the groups that reported a high and low level of presence of the different stress symptoms.

The results that were obtained in the exploratory factor analysis were as follows: the Bartlett sphericity test was significant in .000, and the KMO sample adequacy test reached a value of .918. Also, an estimation of the commonalities of the items, constituting this second version of the inventory, was made, by using the extraction method, called principal components; their results can be observed in Table 1. In order to carry out the present analysis, those that presented commonalities above .3 (Pardo & Ruiz, 2002)<sup>[32]</sup> were considered as acceptable items, which as we can see were all.

**Table 1:** Commonalities by ítem

Symptom	Initial	Extraction
Sleep disorders (Insomnia, nightmares, etc.)	1,000	.348
Heart palpitations	1,000	.441
Chest tightness	1,000	.624
Difficulty to swallow or breath	1,000	.520
Muscle tension	1,000	.356
Digestive problems (indigestion, diarrhea, constipation)	1,000	.322
Fatigue or chronic tiredness	1,000	.379
Hyperventilation (rapid breathing)	1,000	.476
Shortness of breath or feeling of suffocation	1,000	.576
Memory loss	1,000	.456
Frightened, fear or panic	1,000	.567
Restlessness and nervousness	1,000	.604
Excessive worry	1,000	.565
Catastrophic thinking (everything is going to go wrong)	1,000	.564
Difficulty to concentrate	1,000	.430
Slowness of thought	1,000	.460
Feeling of insecurity	1,000	.529
Crisis of anguish or anxiety	1,000	.568
Irritability, anger, constant or uncontrolled rage	1,000	.486
Disoriented thinking	1,000	.500
Feeling of having an empty mind	1,000	.481
Mental block	1,000	.492
Desires to scream, strike or insult	1,000	.455
Constant mood changes	1,000	.423
Overeating or stop eating	1,000	.498
Drink alcoholic beverages	1,000	.480
Smoking a lot	1,000	.563
Tendency to go from one side to another	1,000	.468
Retreat or isolation of others	1,000	.451
Apathy in the way of dressing or grooming	1,000	.391

In the factor analysis, the Principal Components method with Varimax rotation were used to identify three components that explain 48% of the total variance, as

can be seen in Table 2. All items could be located in one of the components with saturations greater than .35 (Moral de la Rubia, 2006)<sup>[25]</sup>.

**Table 2:** Factor matrix

Symptom	Component		
	1	2	3
Sleep disorders (Insomnia, nightmares, etc.)		.491	
Heart palpitations		.654	
Chest tightness		.781	
Difficulty to swallow or breath		.698	
Muscle tension		.457	
Digestive problems (indigestion, diarrhea, constipation)		.451	
Fatigue or chronic tiredness		.491	
Hyperventilation (rapid breathing)		.664	
Shortness of breath or feeling of suffocation		.724	
Memory loss	.515		
frightened, fear or panic	.616		
Restlessness and nervousness	.630		
Excessive concern	.680		
Catastrophic thinking (everything is going to go wrong)	.705		
Difficulty to concentrate	.627		
Slowness of thought	.655		
Feeling of insecurity	.690		
Crisis of anguish or anxiety	.594		
Irritability, anger, constant or uncontrolled rage	.461		
Disoriented thinking	.551		

Feeling of having an empty mind	.628	
Mental block	.676	
Desires to scream, strike or insult		.530
Constant mood swings		.456
Overeating or stop eating		.532
Drink alcoholic beverages		.683
Smoking a lot		.745
Tendency to go from one side to another		.557
Retreat or isolation of others		.470
Apathy in the way of dressing or grooming		.495

The first component, which corresponds to the psychological symptoms, was constituted by 13 items that present a reliability in Cronbach's alpha of .90. The second component, which corresponds to physical symptoms, was constituted by nine items that present a reliability in Cronbach's Alpha of .83. The third component, which corresponds to the behavioral symptoms, was constituted by eight items that present a reliability in Cronbach Alpha of .80.

The background of the questionnaire was composed of three questions that analyzed the variables for this study: sex, age and semester.

The analysis of the results was carried out in two moments: at first, the descriptive analysis was carried out by using the mean and standard deviation as measures; in a second moment the correlation analysis was developed between the stress symptoms and the variable sex through t Student-statistic, with the decision rule  $p < .05$ . All the included analyzes, those of the psychometric properties of the instrument, were made with the program SPSS version 23.

In order to protect the participants, the following actions were taken: a) the participants were not asked for their names in filling out the questionnaire, and the confidentiality of the

results were assured during the presentation of the questionnaire, b) in the background, the participants were only asked for data regarding the variables for the study, and at no time, they were asked for any other information that could involve their anonymity, and c) the participants were informed their filling was voluntary and they were totally free to respond or not to do so during the presentation of the questionnaire. With these measures, confidentiality was assured to the participants and, in addition, their consent was obtained indirectly.

### 3. Results

The descriptive analysis is presented in three moments: symptoms (items), types of symptoms (dimensions) and level of presence of symptoms (general variable). At the first moment, the descriptive results are presented in table 3. As we can see, the symptoms that occur most frequently are: "Excessive worry", "Difficulty to concentrate" and "Restlessness and nervousness". While those that occur less frequently are: "Heart palpitations", "Difficulty to swallow or breath" and "Smoking a lot"

**Table 3:** Descriptive data of the questionnaire

Symptoms	Half	Standard deviation
Sleep disorders (Insomnia, nightmares, etc.)	1.33	.967
<i>Heart palpitations</i>	.63	.880
Chest tightness	.69	.914
<i>Difficulty to swallow or breath</i>	.59	.838
Muscle tension	1.25	1.057
Digestive problems (indigestion, diarrhea, constipation)	.89	.967
Fatigue or chronic tiredness	1.61	1.020
Hyperventilation (rapid breathing)	.68	.812
Shortness of breath or feeling of suffocation	.67	.898
Decreased memory	1.22	.964
Frightened, Fear, or panic	1.18	1.017
Restlessness and nervousness	1.41	1.009
Excessive concern	1.39	1.084
Catastrophic thinking (everything is going to go wrong)	1.25	1.021
Difficulty concentrating	1.48	.900
Slowness of thought	.95	.892
Feeling of insecurity	1.23	.980
Crisis of anguish or anxiety	1.17	1.036
Irritability, anger, constant or uncontrolled rage	1.25	1.040
Disoriented thinking	.92	.955
Feeling of having an empty mind	1.03	.974

Mental block	.98	1.018
Desires to scream, strike or insult	1.09	1.068
Constant mood swings	1.37	1.048
Overeating or stop eating	1.35	1,117
Drink alcoholic beverages	.65	.960
<i>Smoking a lot</i>	.39	.825
Tendency to go from one side to another	.82	.976
Retreat or isolation of others	.91	.998
Apathy in the way of dressing or grooming	.96	1.048

Note: the highest media are marked with bold and the lowest with italics

In the second moment, the descriptive data indicate that the physical symptoms present an average of .92 , the psychological ones of 1.1 and behavioral ones of .94. As we can observe, the most frequent symptoms are psychological symptoms. In a third moment, the analysis shows that the level of presence of stress symptoms, as a general variable, presents a mean of 1.0.

Correlation analysis was also done in three moments: relation of variable sex with symptoms (items), types of symptoms (dimensions) and level of presence of symptoms (general variable). The results that were obtained in the first moment (relation symptoms and sex) are presented in table 4.

**Table 4:** Significance level of the analysis of the relation between stress symptoms and the variable sex

Symptoms	sex
Sleep disorders (Insomnia, nightmares, etc.)	.09
Heart palpitations	.24
Chest tightness	.00
Difficulty to swallow or breath	.00
Muscle tension	.00
Digestive problems (indigestion, diarrhea, constipation)	.00
Fatigue or chronic tiredness	.00
Hyperventilation (rapid breathing)	.12
Shortness of breath or feeling of suffocation	.00
Memory loss	.06
Frightened, fear or panic	.02
Restlessness and nervousness	.00
Excessive concern	.03
Catastrophic thinking (everything is going to go wrong)	.00
Difficult to focus	.07
Slowness of thought	.01
Feeling of insecurity	.00
Crisis of anguish or anxiety	.00
Irritability, anger, constant or uncontrolled rage	.01
Disoriented thinking	.77
Feeling of having an empty mind	.10
Mental block	.00
Desires to scream, strike or insult	.14
Constant mood swings	.03
Overeating or stop eating	.twenty-one
Drink alcoholic beverages	.06
Smoking a lot	.03
Tendency to go from one side to another	.57
Retreat or isolation of others	.40
Apathy in the way of dressing or grooming	.53

Note: the values p <.05

As it can be observed, the variable sex influences 17 symptoms, in all of them, except for "Smoking a lot", and "Retreat or isolation of others", it is the woman who reports the highest frequency of these symptoms.

In the second moment of the correlational analysis, between the variable sex and the types of symptoms of stress, the results are shown in table 5.

**Table 5:** Level of significance of the analysis of the correlation between the types of stress symptoms and the sex variable

Type of symptoms	Sex
Physical	.00
Psychological	.00
Behavioral	.66

Note: the values p <.05 are highlighted in bold

As we observe, sex influences in physical and psychological symptoms; in both cases it is the woman who presents them more frequently. On the other hand, the analysis of stress symptoms (as general variable) with the variable sex; it was obtained a level of significance of 0.00, with women presenting them with a higher frequency.

#### 4. Discussion of results/Conclusion

Stress, which is generated for academic reasons, is often not visible to those affected. One way students realize they are stressed is because of the reactions or symptoms they present. For example, in this investigation, the most frequent symptoms are: "Excessive worry", "Difficulty to concentrate" and "Restlessness and nervousness"; the second symptom agrees with Barraza and Barba (2012)<sup>[7]</sup> and Simbolon (2015)<sup>[35]</sup>. While the less frequent occurrences are: "Heart palpitations", "Difficulty to swallow or breath", "Smoking a lot" and "Nervous tics"; regarding the last two symptoms, they coincide with Barraza and Barba (2012)<sup>[7]</sup>.

Here, it should be mentioned that the comparison with other investigations is limited because of the different research instruments used, and therefore, they analyze different symptoms, such as Palomino *et al.* (2015)<sup>[31]</sup> to mention only one author.

With regard to different types of symptoms, the present study reports the predominance of psychological symptoms, which coincides with Gutiérrez (2011)<sup>[15]</sup> and differs from that reported study by Bassols, Orgler, Laks, Marques, Smaniotto and Reche (2008)<sup>[8]</sup>; this result confirms the concept of stress as an essentially psychological state (Barraza, 2006)<sup>[3]</sup>.

In respect of symptoms, as general variable, the results indicate the prevalence with a mean of 1.0, that transformed

into percentage, by the simple three rule, indicates its presence in 33%; this result differs from that reported by Beltrán, Estrada, Martínez and Navarro (2010)<sup>[9]</sup> and Mustafa, *et al.* (2009)<sup>[26]</sup> reporting higher levels. This percentage, interpreted with a scale of three values (from 0 to 33%, slight, from 34% to 66%, moderate, and 67% to 100%, deep) indicates a slight presence of stress symptoms.

On the other hand, correlational analysis reports that the frequency of onset of symptoms of academic stress is influenced by sex, with women presenting them with greater frequency; this result, agrees with Barraza and Barba (2012)<sup>[7]</sup>, Calais, Carraras, Brum, Yamada and Oliveira (2007)<sup>[10]</sup> and Mustafa, *et al.* (2009)<sup>[26]</sup>. In order to explain this result, three theoretical explanations can be explained:

1. The physiological hypothesis: sex differences in the reactivity from cortisol to stress may be associated with the hormonal variation that occurs at the time of menstruation, as well as the influence of gonadal hormones that affect cognition and the response to stress (Hall, Chipperfield, Perry, Ruthig & Goetz, 2006; Sanders, Sjodin & De Chastelaine (2002)<sup>[27, 36]</sup>.
2. The sociolaboral hypothesis: the presence of greater stress in women has been caused by the practice of the triple day (home / work / study), under this hypothesis, which alludes to the number of social roles played by women, it can be said that they: a) perform household tasks and assume greater responsibilities at home, b) are incorporated into the labor market, and c) have to study as another student (Lipp & Tanganelli, 2002)<sup>[20]</sup>.
3. The psychosocial hypothesis: the reason women report greater stress than men is due to socialization patterns, that is, women and men are educated differently to respond to stressful situations since their childhood (Escobar, Blanca, Fernández-Baena & Trianes, 2011)<sup>[12]</sup>. This third hypothesis, which is the one of interest for the present investigation, it is explained by the fact that has been found a greater use of the ruminant coping style in the face of stressful situations in women (Nolen-Hoeksema, 1994; Wisco & Nolen-Hoeksema, 2008)<sup>[29, 41]</sup>, which allows them to develop a greater perception of stress and its consequences in them. This situation was already noticed by Witkin (1995)<sup>[42]</sup> who stated that "men ignore the symptoms of stress too often, denying the potential consequences of stress, and avoid having to identify the causes of stress" (p 244).

Under this theoretical hypothesis it can be said that it is not a question of women presenting a higher level of stress, but, unlike men, they realize that they are stressed and report it. Therefore, it is relevant that this difference is present, specifically, in the symptoms of stress that is the perceivable part of stress for the individual himself.

The situation described above leads Barraza (2009)<sup>[5]</sup> to think of a new line of research that could be called "alexithymia of stress in men"; this hypothesis is proposed by the author as follows: the cultural disposition of women to report their stress due to the patterns of socialization, to which they were exposed in their childhood, and the presence of stress alexithymia in men, in counterpart of women and due to the same causes; determine, in the present study, on the symptoms of academic stress that women report a higher level of

presence of stress symptoms.

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