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Diet, Sport Practice and Academic Stress in Female University Students

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Abstract

Aim: To analyze the academic stress and the level of physical activity on junior students at the University of Alicante and determine the relationship between physical activity and eating habits.

Methods: Descriptive, correlational and transversal study was performed in a sample of 207 female students. The measuring instruments are; the consumption frequency questionnaire (FFQ) and an academic stressors questionnaire (A-CEA, R-CEA, E-CEA).

Results: There are no statistically significant differences in the scale of stress, neither in the response to stress nor in the academic stress questionnaire depending on whether the women do physical activity or not. Correlational analysis shows an association between the dimensions of academic in 4 of the 17 established food groups, being significant in some cases. In terms of stress response dimensions, this association it's seen in 6 food groups.

Conclusion: There are no differences in the dimensions of stressors nor in the responses to stress depending on whether women are active or inactive. The consumption of fruits and vegetables correlated significantly with active women.

Keywords: Academic Stress; Food Habits; University Students

Introduction

Enrollment in university is a time of changes in life, in which many students move out of their family homes and live on their own for the first time **[1]**. The stress unique to this life period may, at least in part, contribute to the high incidence of depressive disorders reported by this group. Females are disproportionately affected; 9.0% of female youth have been diagnosed with depression in the past year compared with 5.3% of males in the same age group **[2]**.

Stress can affect both; health and academic performance. Among other health risks, it may result in increased blood pressure, a stress related condition leading to an elevated risk of disease **[3]**.

When it comes to explain the academic stress three dimensions can be differentiated: 1) Academic stressors or stimulation of the educational environment that are experienced by the student, as excessive pressure; 2) The consequences of academic stress on the student's health and psychological well-being, cognitive and socio-affective functioning, academic performance, etc.; 3) Modulatory variables, or stress mediators, among which are factors of a biological nature (sex, age), personal (social support, anxiety trait, type A behavior pattern, locus of control, self-efficacy, self-esteem), social (social support, emotional support), psychoeducational (type of studies, course) and socioeconomics (place of residence, scholarships, income level, family members etc.) **[4]**. Healthy physical habits, such as sports practice or following a proper diet, acquire great prominence in order to avoid non-adaptive behaviors and to promote good academic performance **[5]**.

Young adults enrolled in a four year university or college are subjected to high levels of stress from a number of factors that can lead to maladaptive coping mechanisms such as convenience eating in the form of eating out at fast food establishments and ordering food for delivery. This form of convenience eating offers: more calories, high in saturated fat, and processed options that promote an increase on weight along with other deleterious health outcomes.

The Mediterranean diet (MD) is one of the basic elements that should be promoted at this stage **[6]**. This dietary model is rich in natural antioxidants and it is characterized by foods with few saturated fats. It is also based on the consumption of fruits, vegetables, fish, nuts, olive oil and legumes. Additionally, it includes a moderate intake of meat, egg and dairy products, and a low consumption of red meat and sausages **[7]**.

Other basic element in the promotion of a healthy lifestyle is the practice of physical activity (PA). PA has been shown to have a multitude of health benefits at a physical level (improving body composition or reducing the risk of cardiovascular disease); at a cognitive level (improving self-esteem, decreasing stress or greater attention capacity); or at a social level (constructing social relationships or developing values) **[8]**.

The university student who is used to a lifestyle regulated by the family and school must undergo many changes. Moving away from home, increasing the hours devoted to study, having a night schedule for recreational activities, the lack of facilities or time to do physical activity, an increase on the stress due to pressure from work or from study and the increase in responsibilities **[9]**. Cannot be forgotten the presence or absence of a high quality physical and sports offers from universities adapted to students, both regarding the features of the programs on offer and the existing facilities. This is important since it has been proved that the proximity of these facilitates promotes and increases the sport and physical practice.

The aim of the study is to evaluate the academic stress in junior female students of Alicante University and the influence with the alimentary habits according to the level of physical activity that they realize.

Materials and Methods

The study was carried out during the academic year 2013-2014 at University of Alicante. Prior the study, all subjects were informed about the purpose of the project. All of them were students of Human Nutrition and Dietetics or Nursing who were studying the subject of Psychology. They completed an in-formed consent and were informed about the objective of the study, as well as the anonymity and confidential treatment of the data. All of this happened following the ethical guidelines dictated in the Helsinki Declaration of the World Medical Association for research with human beings.

Sample

In this cross-sectional study 207 females participated (20, 9±4, 2 years). All the variables studied were collected through a self-completed questionnaire by the university students, in the classroom where the subject was taught. During the data collection process, there were professionals in nutrition from the research group present and providing advice.

Measurement

Information was collected using a questionnaire consisted of four different categories: 1) Objective and instructions of the study, data socio demographic (age, sex, nationality, family) and anthropometric (weight and height); 2) Food Consumption frequency Questionnaire (CFQ); 3) Stress Questionnaire; 4) Frequency of Physical activity.

Food Consumption Frequency Questionnaire were developed and validated by Vioque et al. **[10]** for Alicante population was used to measure the nutritional habits. With the intention of facilitating easier participants were taught the food plates and rations. This

questionnaire consists of 93 foods which were grouped into 15 food groups for analysis and includes 9 rating categories; 1) never or less than once a month, 2) 1-3 times a month, 3) once a week, 4) 2-4 times a week, 5) 5-6 times a week, 6) once a day, 7) 2-3 times a day, 8) 4-5 times a day and 9) more than 6 times a day.

The academic stress was measured by the Academic Stress questionnaire prepared by Cabanach, et al., **[11]** which includes three scales, two of them were used for this work: 1) academic stressors (E-CEA) which includes 54 items that aim to measure different situations related to the academic environment that are perceived as a real danger or threat to well-being, 2) stress response (R-CEA) with a total of 22 items that attempt to measure symptoms related to cognitive, behavioral and somatic components. The options for responding to each of the items consist of five alternatives (from never to always).

For collecting data for the frequency of sport practice, subjects responded voluntary to the Minnesota questionnaire **[12]**. Questions were also asked about the number of training sessions per day and per week, and the daily hours of training. Regarding the psychometric properties of the questionnaire, the reliability of this questionnaire was 93% (kappa = 0.89). Thus, its validity and reliability could be verified (CCI = 0.96 and CCI = 0.97, respectively).

Statistical Analysis

Data were analyzed using IMB SPSS Statistics Version 21. Descriptive statistics (mean and standard deviation) were used for describing the sample and analyzing both eating habits and factor considered as academic stressors. The differences in eating habits and academic stressors, according to frequency of sporting activity also analyzed. The scores obtained were verified to comply the criteria of normality, independence and homogeneity of variances. In the evaluation of the relations between food consumption and the different states of stress, correlations were made between the different foods and the scales that make up the academic stress questionnaire; as well as with the frequency of sports practice. A significance level of $p<0.05$ was set.

Results

Physical activity

(Figure 1) shows the results of the total number of females who do physical activity (51, 21%), as opposed to those who do not (48,79%).

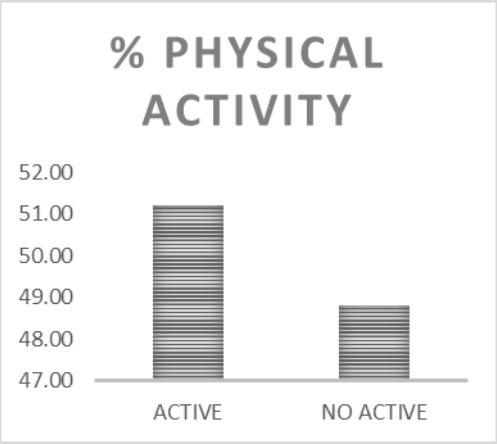

Figure 1: Sample distribution according to physical activity.

Intake by Food Groups

(Table 1) shows that comparing the average consumption by food group. There are significant differences ($p<0.01$) in the food groups of fruits and vegetables, with higher consumption in who engage regular physical activity. All these differences are significant at the level of $p<0.05$ in all cases, except for egg consumption, which is significant at the level of $p<0.01$.

	Inactive Females n=101		Active Females n=106		p
	Mean	SD	Mean	SD	
Cereals	161.4	± 93.9	168.1	± 91.7	0.607
Patatoes	49.1	± 42.7	47.0	± 49.6	0.737
Fruits	341.8	± 262.6	497.8	± 457.7	0.003
Vegetables	275.0	± 194.8	407.7	± 296.2	0.00
Dairy	348.4	± 243.9	372.0	± 258.3	0.5
Fish	69.9	± 42.6	94.9	± 132.4	0.067
Birds	52.7	± 46.5	64.0	± 60.1	0.134
Meat	57.5	± 33.0	63.8	± 63.2	0.367
Eggs	19.3	± 16.9	19.4	± 12.4	0.946
Sausage	40.4	± 28.5	46.9	± 54.4	0.284
Legumes	42.5	± 40.9	45.3	± 47.3	0.648
Olives_nuts	19.5	± 24.6	25.9	± 55.2	0.279
Oils	55.6	± 51.1	61.7	± 50.1	0.383
Sweets	91.5	± 63.0	112.9	± 150.3	0.18
Alchoholic beverages	43.1	± 81.6	58.1	± 127.1	0.315
Noalcohbev	296.2	± 252.2	353.2	± 330.6	0.166
Miscellany	34.8	± 34.5	40.6	±47.4	0.313

Table 1: Mean and standard deviation of food consumption according to physical activity.

Stress Scale (E-CEA)

The means obtained in the scale of academic stressors not presented statistically significant differences between active or inactive subjects.

Scale of Stress Response (R-CEA)

(Table 2) shows the results of stress, the dimension "Physic exhaustion" are higher and statistically significant ($p<0.01$) in subjects who do not perform physical activity. The rest of the dimensions do not report significant differences.

	Inactive Females n=101		Active Females n=106		p
	Mean	SD	Mean	SD	
Methodological deficiencies of the teaching staff	36.5	±10.4	35.6	±10.3	0.558
Student overloading	26.7	±8.0	26.5	±7.6	0.824
Public interventions	17.3	±4.9	16.2	±5.2	0.118
Unhealthy social relations academic context	10.5	±4.4	10.1	±3.9	0.531
Lack of control over one's own academic performance	10.8	±4.4	11.4	±4.2	0.311
Lack of value of contents	7.3	±3.0	7.7	±2.7	0.307
Low academic self-esteem	11.2	±4.2	11.5	±4.6	0.655
Exams	12.7	±3.7	12.2	±3.8	0.336
Impossibility makes decisions about academic work	5.8	±2.7	5.7	±2.2	0.741
Physical exhaustion	14.5	±4.9	12.8	±4.2	0.009
Sleep difficulties	9.8	±3.9	9.5	±3.6	0.615
Irascibility	8.5	±3.4	8.2	±2.8	0.532
Negative thoughts	9.0	±4.2	9.3	±3.9	0.629
Agitation	8.0	±3.2	8.0	±3.0	0.894

Cogniti vereappraisal	23.7	±6.6	24.7	±7.0	0.319
Social support	23.0	±6.2	23.2	±6.4	0.891
Planning	18.8	±5.1	19.6	±5.7	0.294

Table 2: Descriptive analysis for the scale of academic stressors and stress response according to physical activity level.

Academic Stress Questionnaire (A-CEA)

In terms of academic stress, there are not significant differences (p<0, 05) in the scales according to physical activity practice.

Association between Food Consumption and the Scale of Academic Stressors

The association bivariate is shown in **(Tables 3)**. Associations exist in all dimensions, but only in 10 of the 17 established food groups it is statistically significant.

In the case of cereals, there is a positive and statistically significant relationship (p<0.01) in the dimension of "Methodological deficiencies of the teaching staff". Fruit consumption is associated positively and statistically significant (p<0.05) in the dimension of "Examinations". For the dairy group there is a negative and significant association at the level p<0.01 in the dimension of "Lack of value of learning and study contents". Finally, for the group of non-alcoholic beverages such as soft drinks, fruit juices, coffee and tea, a positive and significant relationship is observed in the dimension of "Negative social climate".

Food/Stressors	Methodological Deficiencies	Student Overloading	Public Interventions	Unhealthy Social Relations Academic Context	Lack of Control	Lack of Value Of Contents	Low Academic Self -Esteem	Exams	Impossibility makes decisions about academic work.	Physical Exhaustion	Sleep Difficulties	Irascibility	Negative Thoughts	Agitation	Cognitive Appraisal	Social Support	Planning	hAF/week
Cereals	0.213**	0.123	-0.081	0.044	0.04	0.078	0.035	0.007	0.014	.150*	0.118	.196**	0.009	.162*	0.092	0.075	0.132	0.047
Potatoes	0.045	0.095	0.069	0.074	0.073	-0.063	0.107	-0.015	0.053	.179**	.161*	.174*	0.072	0.118	0.005	-0.016	0.043	-0.012
Fruits	-0.026	-0.002	-0.042	-0.072	0.024	-0.019	0.013	.165*	-0.117	-0.013	0.066	-0.064	0.012	0.03	-0.012	-0.044	0.053	.154*
Vegetable	0.02	0.049	-0.121	0.002	0.031	-0.118	-0.004	0.121	-0.084	-0.044	0.087	-0.02	0.08	0.015	0.019	0.036	0.081	.239**
Dairy	0.005	-0.093	0.009	-0.027	-0.109	-.144*	-0.085	-0.07	-0.103	0.035	0.098	-0.06	-0.082	0.039	0.056	0.015	0.119	0.077
Fish	-0.013	0.076	-0.043	-0.059	0.034	-0.122	0.064	-0.038	-0.108	0.016	0.026	0.036	0.04	0.005	-0.05	-0.041	0.019	0.104
Birds	-0.066	0.015	-0.005	-0.066	0.041	-0.13	0.012	0.006	0.005	0.015	0.055	0.065	-0.02	-0.023	0.016	0.002	-0.023	0.117
Meat	-0.073	0.018	-0.026	-0.036	0.025	-0.087	-0.016	0.117	-0.078	-0.008	0.073	0.079	0.037	0.05	0.015	-0.015	0.017	0.137
Eggs	0.043	0.026	-0.053	-0.012	0.096	-0.098	0.011	0.017	0.006	-0.039	-0.07	-0.057	-0.084	-0.045	0.001	-0.046	-0.034	-0.02
Sausage	0	0.066	0.024	-0.033	0.059	-0.049	0.082	0.008	-0.108	.166*	.167*	.144*	0.103	.192**	-0.096	-0.106	-0.055	0.031
Legumes	0.101	0.1	-0.041	0.042	0.057	-0.068	-0.03	-0.015	0.03	0.047	-0.032	0.019	-0.098	0.032	0.055	0.022	0.032	0.009
Olives Nuts	0.082	0.091	-0.016	0.004	0.023	-0.08	0.083	-0.11	-0.037	0.075	0.03	0.065	0.003	0.061	0.034	-0.071	0.046	0.044
Oils	0.066	0.075	0.049	0.119	0.08	-0.071	0.04	0.04	0.034	0.085	0.077	0.113	0.068	0.055	-0.074	-0.039	-0.069	0.043
Sweets	0.104	0.121	0.031	0.081	0.046	0.024	0.118	-0.058	-0.045	.162*	0.092	.140*	0.091	.188**	-0.066	-0.009	-0.031	0.081
Alcoholic Beverages	0.062	0.095	0.022	0.03	0.09	0.015	0.126	-0.014	-0.017	0.071	0.108	0.054	.144*	0.098	-0.069	0.001	-0.059	-0.016
Non Beverages	0.041	0.118	-0.039	.154*	0.11	0.015	0.119	0.111	.184**	0.081	0.122	0.067	0.127	0.134	0.109	0.102	0.07	0.086
Miscellany	-0.057	-0.002	0.049	0.047	0.001	-0.036	0.01	0.073	0.008	0.023	-0.001	0.029	0.02	0.059	-0.058	0.056	-0.029	0.048
hAF/week	-0.013	0.02	-0.085	-0.083	0.038	0.039	-0.005	-0.063	-0.071	-.154*	-0.026	-0.005	0.032	0.035	0.011	0.024	0.118	1

**** Correlation is significant at the level of 0.01 (bilateral); * Correlation is significant at the level of 0.05 (bilateral).**

Table 3: Correlations between food consumption and the scale of academic stressors.

Association between Food Consumption and the Scale of Response to Stress

As can be seen in Table 3, food consumption in relation to the stress response scale shows a relationship in the different dimensions. The dimension of "Physical Exhaustion" and "Irascibility" are positively and statistically significant correlated with the food groups: cereals, potatoes, sausages and sweets. The consumption of potatoes and sausages are associated with the dimension "Sleep difficulties". Drinking alcoholic beverages are correlate with "Negative Thoughts". Finally, the dimension of "Agitation" is positively and statistically significant correlated with cereals, sausages and sweets.

Association between Food Consumption and Physical Activity

Fruit and vegetable consumption are positively and statistically significant ($p < 0.05$) associated with a higher number of hours per week of physical exercise.

Discussion

The present research aimed to analyze academic stress in active and inactive females and to evaluate the influence of these stressors on dietary decision-making. In this way, some studies with a similar line, both in the national and international context, are those carried out by Ramón Chacón-Cuberos, et al. **[5, 8]**, Shafiei F, et al. **[13]** and Beiter, et al. **[14]**. In all of them, the relevance of considering healthy habits for the improvement of academic stress is shown.

Considering the relationships between academic stress and the gender of the university students, Yang, et al. **[15]** were identified that females showed higher scores in the global factor and for the dimensions "academic obligations" and "communication of own ideas". This argument explains why women have a greater critical thinking, what make them more susceptible to the characteristics of the environment.

Because de PA increases the levels of endorphins (the happiness hormone) cortisol and norepinephrine levels which are linked to stress and anxiety **[16]**, it helps to improve depressive states and manage complex emotional processes. Additionally, it seems that the practice of PA helps to decrease energy levels giving an outlet to frustration and decreasing muscle tensions. Authors like Jones et al. **[17]** y Holmes et al. **[18]** highlighted that the levels of anxiety and stress decreasing when people practice physical activity.

However, the same conclusion cannot be reached in our study, as there have been no significant differences in stress scale scores and stress responses. Both women who perform PA and those who do not, have obtained the same scores. Only the "physical exhaustion" dimension changes, being greater in inactive women.

Some studies that analyses the associations between academic stress and different healthy habits, are those carried out by Tehrani, et al. **[19]** and Shafiei, et al. **[13]**. In both the relevance of considering healthy habits for the improvement of academic stress is shown. Long-term stress states can be linked to higher food intakes, which could be justified by alterations of the hypothalamus in the production of neurotransmitters to control appetite **[20]**. Specifically, states of anxiety will activate the sympathetic system, accelerating metabolism and altering appetite **[21]**.

In the present study, statistically significant correlations were observed between some dimensions of the stress scale and respond with some foods such as cereals, potatoes, fruits, dairy products, sausages, sweets and non-alcoholic beverages. It's important to follow a balanced diet because it could help reduce levels of stress, since the body will have the essential nutrients, and this will help to prevent imbalances in the production of neurotransmitters that could facilitate states of anxiety.

The adolescents who do more physical activity have greater adherence to the Mediterranean diet. In this sample the different groups of food have not been related to the practice of PA. Except for the consumption of fruits and vegetables, which is statistically significant and have a greater difference for active women, but there were no differences in food consumption depending on whether women are active or not.

There are some limitations such as; the study design is descriptive and cross-sectional so that cause–effect relationships cannot be established, and the sample it's not representative even though many subjects were part of the study.

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