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Perceived Academic Stress and Its Association with Student Characteristics

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Abstract

The first aim of the study was to identify academic stress in the different categories of the students such as demographic, education, health behavior and health status categories. A secondary aim was to examine the relation between the students' characteristics and their perceived stress. The sample of the analysis included 187 students, of which 70% were females. The participants answered a questionnaire. The results showed that the respondents, on the average, had moderate levels of stress; only 12% of the sample reported a high level of stress. The most common physical symptom of academic stress was headache; depression and anxiety were the most frequent psychological symptoms of the stress. High academic stress was more prevalent among the women, student with overweight or obesity, nursing students, and students with low physical activity and poor health status. There were associations between students' perceived stress and gender, physical activity and subjective health status. It seems that female students with subjective poor health status and low physical activity tend to experience the highest stress.

Keywords: university students, academic stress, individual characteristics

1 Introduction

Emotional challenges, mood disorders and relationship problems among

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university students have been discussed in several studies [1, 2 and 3]. For instance in a study from Singapore [4] it has been reported strong stress during education period in a half of university students. Academic stress can be a risk factor that influences quality of life and health in university students [5]. The stress can also lead to poor academic performance and feelings of dropping out of the course [2]. Such stress can also change harmfully the students' dietary, lifestyle and living environments [6].

In the literature we could find many studies with documentation about the prevalence of various health complaints in university students. The health complaints accompanying to academic stress have been reported with a wide range of symptoms such as neuroticism [7], depression and anxiety [8], sleep disorders [1], menstruation disorders [9], pain in arm, neck and shoulder [4], musculoskeletal disorders [10], and headache or back pain or gastrointestinal pains with irritable bowel syndrome [7, 12 and13]. There is less research about relationships between such health complaints and the stress perceived by students during their education years and there are also few studies about relationships between the perceived stress in university students and the individual characteristics like gender, age, year of study, education program, marital status, weight status, general health status, sleep and eating habits, physical activity, smoking and alcohol consumption etc.
The purpose of this study was to identify academic stress in the different categories of the students such as demographic, education, health behavior and health status categories; and also investigate the possible associations between the students' characteristics and their perceived stress.

2 Materials and methods

2.1 Survey instrument

In studies about stress in university students it has been used a wide variety of survey instruments and very few studies used the same survey instruments more than once. The questionnaire used in this study consisted of several parts: modified version of the Perceived Stress Scale (PSS), claims regarding social relationships, stress symptoms and stress-related situations, public health issues with questions about eating and sleep habits, physical activity, alcohol and smoking, questions about the study situation, and demographic questions.
PSS is a rating scale which has been developed to measure perceived stress [14]. Modified version of PSS in this study consists of ten items, measuring the extent to which situations in students' life is perceived as unpredictable, uncontrollable, and overloading. The instrument also covers the stress as a consequence of long-standing and ongoing stressors of anticipation next stressors. The answers are given on a five-point Likert scale (never=0, almost never =1, sometimes = 2,

often=3 and very often = 4). Depending on the nature of positive options or negative meaning, the values can be converted (never = 4, almost never = 3, sometimes = 2, often = 1 and very often = 0). The result of this measurement tool gives a number between 0 and 40 ($0 \leq \sum$ PSS scores≤ 40), where a low number indicates a low level of individual stress and a high number indicates the opposite. PSS has high reliability, which has been shown in several studies. The other survey questions in this study were of a different nature which range issues went from 0 to 4 or 5 where "zero" represented "total disagreement" and "four" or "five" showed "total agreement". Some questions had definite answer while the others gave the opportunity to select multiple options. The questionnaire also included a number of questions with "yes" and "no" options.

2.2 Procedure

To get in touch with the participants of this study some teachers at five universities in Sweden were contacted by telephone and e-mail. Time and date of the distribution of questionnaires were determined in compliance with the interested teachers. It was informed that participation in the survey was voluntary for the students but that the data collection would be facilitated if a large group of students were available at the same time. Survey distribution took place in six different classes of the social and nursing sciences at these universities, and the classes were at different education levels. The participants were also informed that the collected data would be handled with confidentiality and used only in the current study. The questionnaire took no more than 20 minutes to complete and filed survey was counted as consent.

2.3 Sample

Two hundred and twenty nine surveys were recorded but 52 surveys were not tabulated because of much missing information. Statistical analysis was completed with a sample field of 187 students.

2.4 Statistical Analysis

The data were numerically scored and quantified. These quantitative scores were entered into a computer for analysis using SPSS version 22.0. Descriptive and inferential statistical tests were performed. Descriptive statistics were used to express categorical data as frequencies and percentages. The categorical data were analyzed using Chi squared test. The sample was also categorized into four quartiles based on measuring of perceived stress by PSS. The first quartile (Q1) represented the students with the lowest perceived stress scores and the last quartile (Q4) represented the students with the highest perceived stress scores. Spearman's rank-order correlations were used to describe the magnitude and direction of the relations between all categorical variables of interest in the study. Regression models were also used to explore the association between student parameters and academic stress. Probability values ≤ 0.05 were considered statistically significant.

3 Main Results

3.1 Individual characteristics of the sample

All characteristics of the subjects have been described in Table 1. One hundred and thirty one female students (~70%) and fifty six male students (~30%) were included in this study. About two-thirds of the students were less than 24 years. The students included 106 first-grade students, 24 second-grade students, and 56 third-grade students. Sixty seven students study nursing and 120 students study humanities or social sciences such as language, literature, philosophy, religion and sociology. Approximately 55% of the students were Swedish and the others were either not born in Sweden or had parent(s) with other ethnicities. Almost 20% of the sample was overweight or obese. Less than a half of the sample was single. Over 20% of the students smoke or drink a lot of alcohol. Surprisingly a lot of the respondents reported good/fairly good health status or satisfied with their social relationships (Table 1).

Table 1: General characteristics of the students

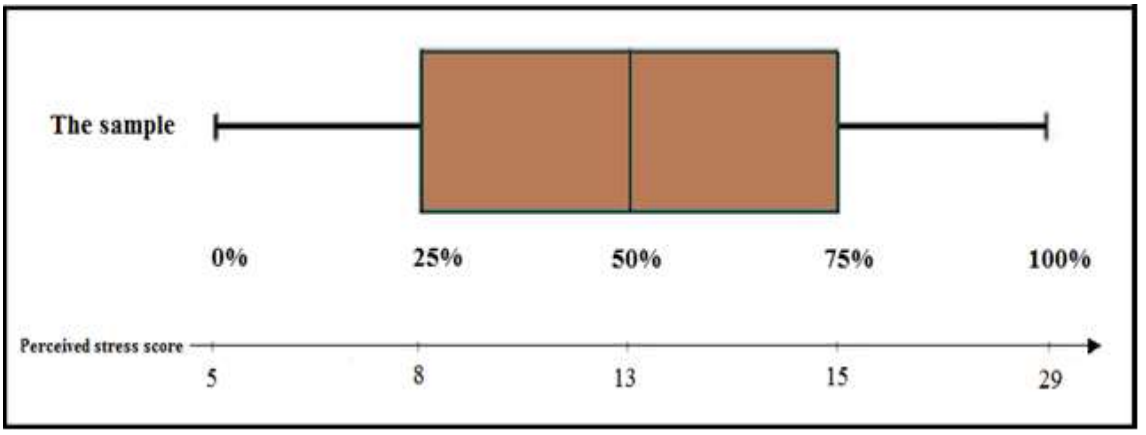
Variables		**N (%)**
Gender	Female	131(70.1%)
	Male	56 (29.9%)
Age	<24 year	122 (65.3%)
	25-35 year	46 (24.6%)
	>35 year	18 (9.6%)
Ethnicity	Swedish	102 (54.5%)
	Non Swedish	83 (44.4%)
BMI	Underweight (BMI < 18.5 kg/ m2)	17 (9.1%)
	Normal weight (18.5 ≤ BMI ≤ 24.9 kg/m2)	127 (67.9%)
	Overweight/obesity (25.0 ≤ BMI ≤ 29.9 kg/m2 or BMI ≥ 30.0 kg/m2)	38 (20.3%)
Marital status	Single	87 (46.5%)
	No single	98 (52.4%)

Study program	Nursing Science	67 (35.8%)
	Humanities/social sciences	120 (64.2%)
Year of study	1st	106 (56.7%)
	2nd	24 (12.8%)
	3rd	56 (29.9%)
Self-study activity	Low (< 20h /week)	75 (40.1%)
	Moderate (20-40 h/week)	81 (43.3%)
	High (>40 h/week)	25 (13.4%)
Bursary and study loan	Yes	156 (86.7%)
	No	24 (13.3%)
Regular eating habits	Yes	87 (46.5%)
	No	94 (50.3%)
Regular sleep habits	Yes	111 (53.9%)
	No	71 (38.0%)
Physical activity	High/moderate	127 (67.9%)
	Low	55 (29.4%)
Smoking	Yes	40 (21.4%)
	No	140 (74.9%)
Alcohol consumption	Heavy	38 (20.3%)
	Moderate	97 (51.9%)
	No	47 (25.1%)
Self-reported health status	Good/Fair	160 (85.6%)
	Poor	21 (11.2%)
Perception of social relationships	Good/Fair	169 (90.4%)
	Poor	12 (6.4%)

3.2 Distribution of the perceived stress scores among the sample

The below box and whisker plot (Figure 1) display the distribution of data about academic stress based on the five number summary: minimum (0%), the lower quartile or Q1 (25%), median (50%), the upper quartile or Q3 (75%), and maximum (100%). The figure shows a minimum of five and a maximum of 29 for the perceived stress scores in the observed sample. The figure also shows that 25% of the sample has perceived stress scores between 5 and 8, median is 13, and perceived stress scores in 50% of the sample are between 8 and 15; 25% of the sample also has perceived stress scores over 15 up to 29.

Figure 1: The distribution of the perceived stress scores (∑ PSS scores) among the students using a box-and whisker plot



3.3 Self-reported symptoms in relationship with academic stress

The most common physical symptom of stress in the students could be headache; more than 45% of the students reported that they would suffer from headaches during a stressful education period. In a stressful situation, percentage range of suffering from stomach pain, sweating, colds, respiratory disorders, menstrual disorders or high blood pressure was 15% to 25% (Figure 2). Depression could be the most common mental health disorder in relationship with academic stress; about half of the students reported that they suffered from depression symptom in a stressful education period (Figure 3).

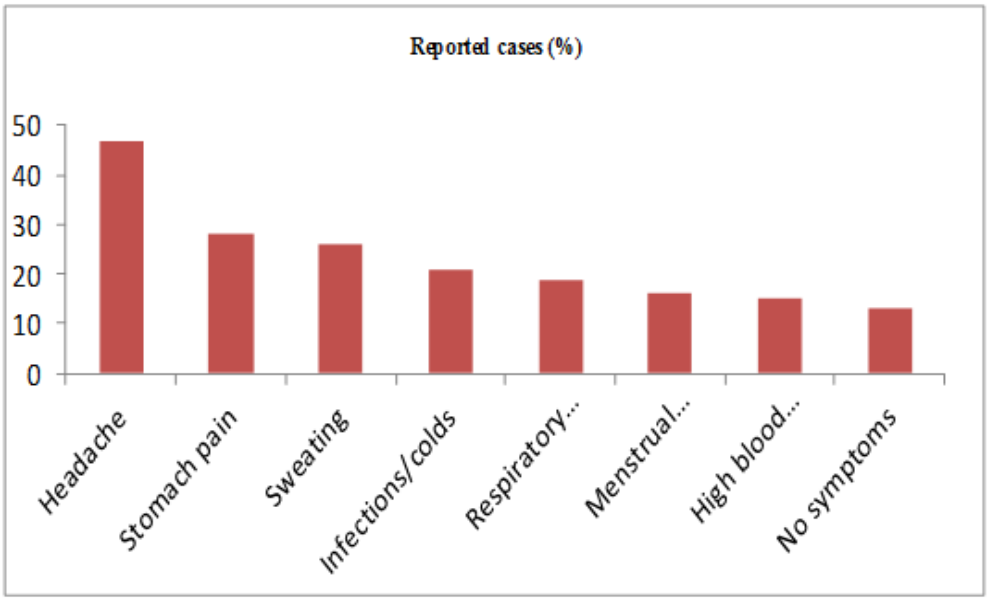


Figure 2: Percentages of self-reported physical symptoms related to academic stress in the observed students

Education related anxiety may affect more than 45% of the students. Irritation, sense of panic, easy weeping, passivity, sadness and sleep difficulty could also be common symptoms of academic stress in the percentage range from 30% to 40% (Figure 3).

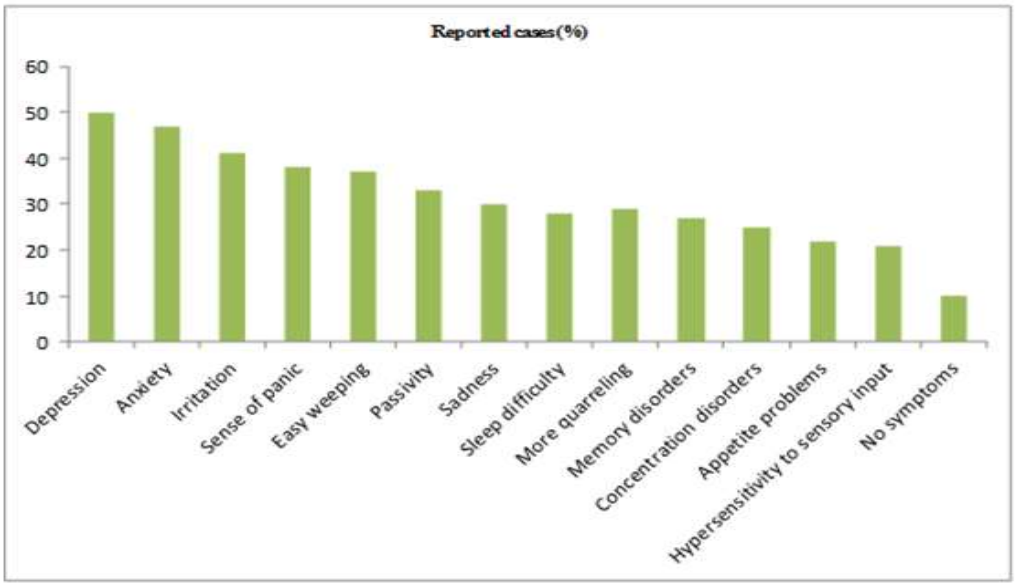


Figure 3: Percentages of self-reported psychological/emotional symptoms related to academic stress in the observed students

3.4 Prevalence of high stress by the individual characteristics of the sample

Table 2 shows the students in various categories which have reported the experience of high stress (i.e. ∑ PSS scores ≥20). A significant difference was obtained between the females and the males for perceived stress. High stress was more prevalent among the women than the men. In percentage terms students with overweight or obese had significantly more stress. Among nursing students high stress was significantly more prevalent in comparison with students of human sciences. High stress was also significantly more common among students who reported to have less physical activity. It was found that students with high stress were more common among students with reported poor health status, compared with students who reported good/fairly good health status.

Table 2: Prevalence of high stress (∑ PSS scores ≥20) by student variables

Categories		**Students with high stress*** N (%)	**p-value**
Gender	Female	21 (16.0%)	
	Male	2 (3.6%)	0.03
Age	18-24 years	15 (12.3%)	
	25-35 years	4 (8.7%)	N.S.
	>35 years	4 (22.2%)	
Ethnicity	Swedish	12 (11.8%)	
	Non Swedish	11(13.3%)	N.S.
BMI	Underweight (BMI < 18.5 kg/m2)	3 (17.6%)	0.01
	Normal weight (18.5 ≤ BMI ≤ 24.9 kg/m2)	10 (7.9%)	
	Overweight/obesity (25.0 ≤ BMI ≤ 29.9 kg/m2 or BMI ≥ 30.0 kg/m2)	10 (26.3%)	
Marital	Single	14 (16.1%)	N.S.

status	No single	9 (9.2%)	
Study program	Nursing science	13 (19.4%)	0.05
	Humanities/social sciences	10 (8.3%)	
Year of study	1st	16 (15.1%)	N.S.
	2nd	4 (16.7%)	
	3rd	3 (5.6%)	
Self-study activity	Low (<20h/week)	9 (12%)	N.S.
	Moderate (20-40 h/week)	9 (11.1%)	
	High (>40 h/week)	5 (20%)	
Bursary and study loan	Yes	20 (12.8%)	N.S.
	No	3 (12.5%)	
Regular eating habits	Yes	8 (9.2%)	N.S.
	No	15 (16.0%)	
Regular sleep habit	Yes	10 (9.0%)	N.S.
	No	13 (18.3%)	
physical activity	High/moderate	6 (4.7%)	<0.0001
	Low	17 (31.0%)	
Smoking	Yes	7 (17.5%)	N.S.
	No	16 (11.4%)	
Alcohol consumption	heavy	8 (21.1%)	N.S.
	moderate	8 (8.3%)	
	No	7 (14.9%)	
Self-reported	Good/Fair	9 (5.6%)	<0.0001

health status	poor	14 (66.7%)	
Perception of social relationships	Good/Fair	19 (11.2%)	N.S.
	poor	4 (33.3)	

Note: *Sum of PSS scores of 20 or higher was considered as a high stress; N.S. =no significant

3.5 Significant associations between the perceived stress and the individual characteristics

Spearman's rank-order correlations for the associations between the major study variables are presented in Table 3. As can be seen in this table, perceived stress had first-order associations with several variables of interest such as gender, weight status, eating and sleep habits, physical activity, self-reported health status and perception of social relationships, but some of these variables were significantly inter-correlated, suggesting that they may not make independent contributions to perceived stress in the observed students. Therefore the researcher focused on independent effects of each variable on the perceived stress, which determined by multiple linear regression analysis, commenting real effects only them showing multivariate effects. Table 4 shows the final result of our regression analyses. It was found that only gender, physical activity and self-reported health status were significant predictors of perceived stress in the sample.

Table 3: Inter-correlations between the variables of interest in the sample

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sum of PSS														
2. Gender (Female)	**0.22**													
3. BMI	**0.24**	0.11												
4. Age	-0.16	-0.01	**0.22**											
5. Ethnicity	0.11	0.06	0.11	0.03										
6. Marital status	0.12	0.04	0.05	-0.09	0.03									
7. Study program	-0.06	0,12	0.04	0.01	0.07	0.06								
8. Year of study	0.04	0.06	0.10	0.11	0.09	0.03	0.02							
9. Regular eating habits	**-0.25**	0.08	-0.11	0.05	0.04	-0.02	0.03	0.01						
10. Regular sleep habit	**-0.27**	0.09	-0.12	-0.04	-0.03	0.01	0.04	-0.02	**0.20**					
11. physical activity	**-0.24**	0.14	-0.08	0.01	0.01	0.03	0.03	0.03	**0.17**	0.14				
12. Smoking	0.15	0.08	0.04	0.09	-0.02	0.02	0.09	0.04	**0.18**	**-0-19**	**-0.26**			
13. Alcohol consumption	0.16	**-0.28**	0.03	0.07	-0.04	-0.09	0.02	0.05	0.14	-0.09	0.09	**0.33**		
14. Subjective health status	**-0.31**	0.06	0.03	0.08	0,03	-0.08	0.04	0.01	**0.31**	**-0.39**	**0.40**	-0.15	0.09	
15. Perception of social relationships	**0.17**	0.07	0.05	0.05	-0.02	0.03	0.04	0.02	0.09	0.09	**0.18**	-0.08	0.07	**0.27**

Note: Bold numbers indicate significant correlation coefficients under 0.05.

Table 4: Significant predictors of perceived stress among the sample

x-variables		Subjective health status	Physical activity	Gender (female)
Perceived stress (y)	β	-0.23	-0.16	0.11
	p	**0.01**	**0.03**	**0.05**

4 Discussion

High education can be quite stressful and many studies all over the world show a higher level of stress in students than in the general population.

In terms of the stress levels, the respondents in this study, on average, reported moderate levels of stress rather than low or extreme levels. Fifty percent of the students had sum perceived stress scores between 8 and 15 ($8 \leq \sum$ PSS scores ≤ 15) (Fig. 1) and only 12% (n=23) of the students reported high stress expressed in $\sum$ PSS scores ≥ 20 (Table 2).

Physical stress in the form of headache symptom and psychological stress in the form of depression and anxiety symptoms were reported by the most part of the participants in this study.

Many studies repeatedly report gender differences about stress problem in students. The researches in several countries show higher prevalence rates of stress in female students in comparison with male students [15, 16, 17, 18 and 19]. This study even indicates the gender difference. Students with high levels of stress were seen significantly more among the women than the men (16.0% vs 3.6%, p=0.03, Table 2). Gender was generally also associated with perceived stress where female students were more likely to suffer from stress during the education period.

There were also significant differences between students with different weight status. High levels of stress were significantly more prevalent among the students with overweight or obesity than among the students with normal weight (26.3% vs. 7.9%, p=0.01, Table 2).

The sample consisted principally of the students of social sciences or humanities and nursing science. High levels of stress were significantly more prevalent among students of nursing science in comparison with the students of social sciences (19.4% vs. 8.3%, p=0.05, Table 2). In some studies [20 and 21] the researchers emphasize increased levels of stress in nursing students which are comparatively higher than students in other university programs.

Among students, who exercise moderately or very often, students with high levels of stress were less frequent in comparison with those who had lower physical activity (4.7% vs. 31%, $p<0.0001$, Table 2). Even it was found that physical activity predicted less perceived stress in the students (Table 4). In children and adolescents some studies [22 and 23] showed strong association between sports participation and lower scores on measure of psychological stress; it was also reported a moderately negative association between physical activity and education stress in university students [24], i.e. the students with higher levels of stress had lower levels of physical activity.

Students with high levels of stress were much more in student group who reported having poorer health status than students with self-reported good/fairly good health status (66.7% vs. 5.6%, $p<0.0001$, Table 2). It was also revealed a significant association between self-reported health status and perceived academic stress (Table 4), i.e. more healthy students had less academic stress.

This study has some limitations. First, the cross-sectional nature of the data limits the causal interpretation of the results. Second, the study based exclusively on self-reported data which can affect the overall quality of the data analysis. Third, the number of the participated students in the survey is relatively small and limited, which may have a negative effect on the external consistency of the results. Fourth, from the methodological point of view, the students have not been completely randomly selected and may not be generally representative of the students of nursing or social sciences in Sweden.

5 Conclusion

The study result suggests that subjective health status is linked to the experience of stress, and good activity habits can lead to a lower stress level. Therefore every type of physical activity should be carried out in several life domains such as at university, in household and leisure.

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