

Perceived Stress, Anxiety and Depression Among Undergraduate Students: An Online Survey Study

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Abstract

Introduction: The current generation of youth is the largest the world has ever known, estimated in 1.8 billion young women and men. Yet, young people's health continues to be a neglected issue that demands more attention and effective strategies. Particularly, mental health disorders are a health priority in this group because half of all mental illnesses begin in this age. Although the presence of depression and anxiety has been linked to life stress in both children and adult populations, the association between stress and common mental health disorders is not yet clear among young adults.

Methods: Questionnaires including the Perceived Stress Scale (PSS-10), the Generalized Anxiety Disorder Scale (GAD-7) and a reduced version of the Patient Health Questionnaire (PHQ-9) were sent via email to the students of Universitat Autònoma de Barcelona. A statistical study was made for all three scales for the whole sample and subgroups based on gender and symptoms severity.

Results: Our sample consisted of 4301 students with a range age from 17 to 30 years. For the PSS-10 scale, the 25% of the participants with the highest scores presented values of 26 or above out of 40, and the highest mean score was 20.9 in females versus 18.4 in men. Regarding the GAD-7 scale, 50.2% of our sample presented clinical levels of anxiety symptoms and thus were potential cases (40.27% of men and 53.82% of women). Lastly, in the PHQ-7 scale, 47.18% of our sample presented clinical levels of depression symptoms and thus were potential cases (39.87% of men and 49.83% of women). The correlations between scales were 0.76 for PSS and GAD scales, 0.72 for PSS and PHQ scales, and 0.69 for GAD and PHQ scales.

Discussion and Conclusion: Given the high proportion of students who score above clinical levels of anxiety and depression, along with high levels of perceived stress, young adults may be more vulnerable than the general population, to the perception of stress and to the development of anxiety or depression. This finding supports the need to implement specific programs for the prevention, detection and treatment of these common mental illnesses in young people.

Keywords: Anxiety; Depression; Stress; Students; University; Questionnaires

Introduction

By the year 2008, the population of young people aged between 10 and 24 years was the largest that the world had ever seen, comprising an estimated 1.8 billion people [1]. In spite of this size of population, the health status of young people receives little attention. This situation of neglect is particularly precarious with regard to mental health, as roughly half of all mental disorders in adulthood begin by the age of 14, and three quarters of them begin between 20 and 30 [2]. In fact, mental disorders affect 10-20% of young people worldwide and have become the leading cause of years lost because of disability (YLDs) in young people [3].

Depression and anxiety are two of the most common mental disorders in the population. Depression affects some 300 million people worldwide, and anxiety has a global prevalence of 3.8%, according to the World Health Organization data [2]. In addition, these figures have risen in recent years, and these disorders have established themselves among the most common diseases of the twenty-first century, in young people as well as in the general population [4]. The juvenile population may be particularly vulnerable to the appearance of affective disorders because, at the neurobiological level, youth is a period characterized by the dynamic development of the brain and a strong interaction with the social environment. This combination of factors helps to shape the abilities that an individual will have in his/her adult life, and it underlies the alterations that characterize some mental disorders [5]. One of the environmental factors that interacts with the development of the nervous system, and

can therefore cause alterations, is stress. In children and adults, stress has been related to the presence of depression and anxiety [6], but in the case of adolescents and young people this relationship is not yet entirely clear.

Exposure to stressful situations is a decisive factor that increases the risk of suffering from mental disorders, and in this sense, the pressure experienced during the years of university studies can be particularly stressful for many young people [7]. In order to develop effective prevention strategies, it is important to identify both the presence of mental health disorders among young people, as well as the perception and management of stress in this population. In the present study, we aimed at detecting symptoms of depression and anxiety and their relationship with perceived stress in young people between 17 and 30 years of age.

Methods

Inclusion criteria comprised being a student at Universitat Autònoma de Barcelona, and age between 17 and 30 years old. An online survey was sent via email on November 2017 to all students at Universitat Autònoma de Barcelona using the University's registry, following the local guidelines and in compliance with the General Data Protection Regulation (GDPR) (European Union, 2016/679). The total student population at this University comprised 46,738 undergraduate or master's degree students (Estimated 60% women among university students). Only the responses of students aged 17 to 30 years old were included in our analysis.

The survey included questions regarding age and sex, and three questionnaires

1. The Perceived Stress Scale (PSS-10, Cohen [8]). This scale evaluates the respondents' perceptions of the level of stress they experience in specific situations. 10 questions are presented so that individuals express the extent to which they find their lives unpredictable, uncontrollable and overwhelming. The maximum score on this scale is 40, since each question has five possible answers ranging from 0 to 4 points.

2. The Generalized Anxiety Disorder Scale (GAD-7, Spitzer [9]) identifies probable cases of Generalized Anxiety Disorder and assesses symptom severity. The scale consists of seven questions that evaluate worry, nervousness and unease, with four possible answers (0, 1, 2 and 3 points) and a maximum score of 21 points. The scale provides clinically defined cut-off points of 5, 10, and 15 points, which indicate four levels of symptom severity: "No symptoms" (0- 4 points), "Mild" (5-9), "Moderate" (10-14) and "Severe" (15 or more).

3. The Patient Health Questionnaire (PHQ, Kroenke [10]) presents a series of criteria for diagnosing major depression and other related mental disorders, and for assessing their degree of severity (0 to 3 scoring). We used a reduced version of the questionnaire that excluded the items referring to suicide ideations due to ethical considerations; thus, the maximum score in our study was 21.

Statistical analysis

The statistical analysis of the data was performed in IBM SPSS Statistics software (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.). We first obtained a description of the characteristics of the complete sample and the distribution by age and sex. Following, the PSS-10, GAD-7 and PHQ

scales were explored for frequency distribution and cut-points were available. We examined group differences using Student's t-test, Chi-square test and Pearson's correlation analysis as appropriate.

Results

Characteristics of the sample

In all, 4564 students responded to the survey. This represents approximately 10% of the total students at the university. 93.40% of the group were aged between 17 and 30, and therefore analyses were run excluding students over 30 years old. The majority of respondents were women (73.36%).

The participants were assigned to age groups up until the age of 30. The frequency of men and women in all age ranges are shown in Table 1. Women were more numerous in all categories.

Variables		Age group			Total
		17-20	21-25	26-30	
Sex	Male	494	509	105	1108
	Female	1491	1451	211	3153
Total		1985	1960	316	4261

Table 1: Age and gender distributions in the sample of participants under 30 years.

Analysis of the questionnaires

Perceived Stress Scale (PSS-10): The mean score in our study was 20.29 (SD=7.13). As expected, the PSS scores showed a normal distribution. Provided that this scale does not present with previously established cut-points, we calculated quartiles in our sample.

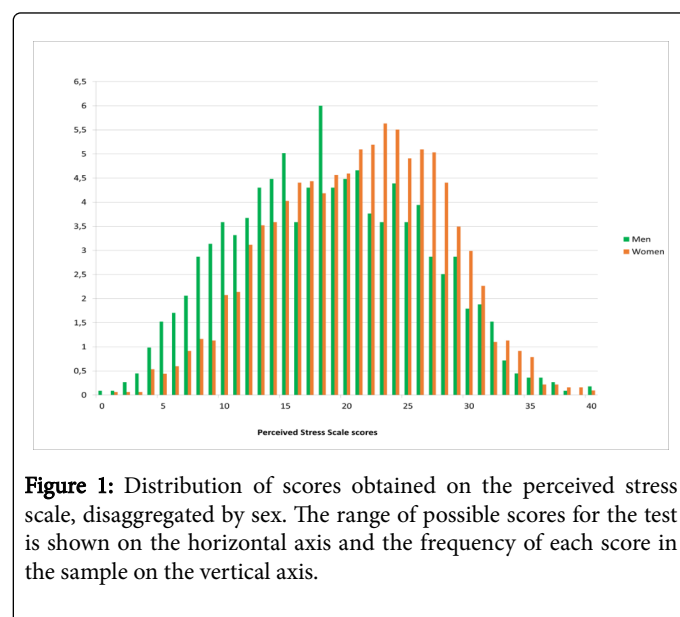


Figure 1: Distribution of scores obtained on the perceived stress scale, disaggregated by sex. The range of possible scores for the test is shown on the horizontal axis and the frequency of each score in the sample on the vertical axis.

The highest scoring quartile (25% of the sample) had scores of 26 or more and comprised 1116 people. The mean score in this group was 29.11 (SD=2.86). Women were overrepresented in this group (80.02%

in contrast to 19.80% of men). The statistical differences of the mean scores between sexes were confirmed in a t-test analysis ($p < 0.005$) (Figure 1).

Previous researchers have reported the presence of two factors on the PSS: the “Perceived Helplessness Factor” and the “Perceived Self-Efficacy Factor” [11]. The scores for these factors, which can be considered as sub-scales, range between 0 and 4. In our sample, the Perceived Helplessness Factor presented a mean score of 2.22 ($SD = 0.81$), while the Perceived Self-Efficacy Factor presented a mean score of 1.74 ($SD = 0.73$). 21.30% of the sample presented a high perception of inability to cope with stressful situations, while only 12.9% considered that they had a high control over stressful situations. Group differences according to sex showed a higher proportion of women than men in the group of high Perceived Helplessness (23.56% women, 14.87% men), while the proportion of men was higher in the group of high Perceived Self-Efficacy (19% men, 10.88% women).

Generalized Anxiety Disorder (GAD-7): The mean score was 9.69 ($SD = 4.27$). In a population where anxiety is unusual, we would expect most of the population to have low scores and a minority to have high scores, and the distribution to be asymmetrical. However, the scores showed a normal distribution in our sample of university students. According with previously established cut-points in this scale, 50.22% of all subjects in the sample showed moderate to severe levels of anxiety symptoms (scores=10 and over).

When results were disaggregated by sex, women showed higher scores than men (mean=10.05, $SD = 4.16$, while men mean=8.01, $SD = 3.91$; $p < 0.005$) and were overrepresented in the group of subjects with moderate or severe anxiety symptoms=53.82% women (Figure 2). Using the Student’s “t” test to compare means between groups, and with a significance level of $\alpha = 0.005$, the differences observed between men’s and women’s mean scores were statistically significant.

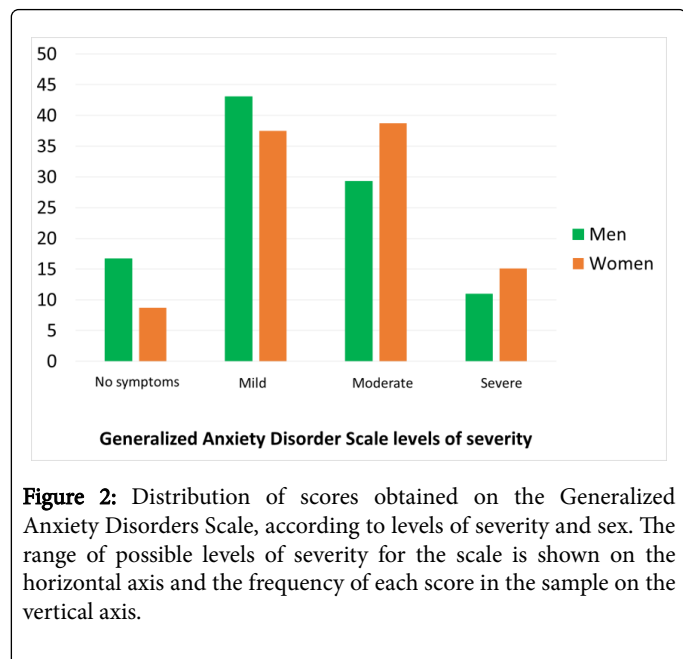


Figure 2: Distribution of scores obtained on the Generalized Anxiety Disorders Scale, according to levels of severity and sex. The range of possible levels of severity for the scale is shown on the horizontal axis and the frequency of each score in the sample on the vertical axis.

Patient Health Questionnaire (PHQ): The mean score in our sample was 9.42 ($SD = 4.46$). As was the case for anxiety symptoms, although we had expected to find a larger frequency of low-scoring cases, the scores showed a normal distribution. 47.18% of the subjects presented

scores that were classified in the moderate to severe levels of depression and therefore were potential cases of clinical depression.

Higher scores were found among women, who presented a mean score of 9.67 ($DS = 4.42$) while men’s mean score was 8.72 ($SD = 4.51$; $p < 0.005$). According to this scale, 49.83% of women present moderate and severe symptoms of depression, compared with 39.87% of men (a difference of 10%) (Figure 3).

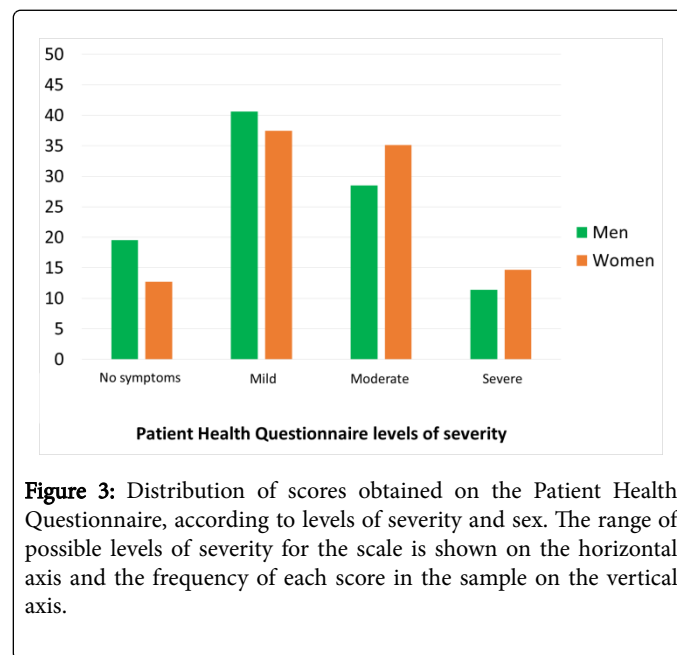


Figure 3: Distribution of scores obtained on the Patient Health Questionnaire, according to levels of severity and sex. The range of possible levels of severity for the scale is shown on the horizontal axis and the frequency of each score in the sample on the vertical axis.

Correlations between symptoms and perceived stress: Lastly, the correlations between scales were calculated in order to determine whether individuals with high scores on one of the scales also tended to score high scores on any of the other scales. Results showed high correlations, suggestive of a trend: $r = 0.76$ for the association between PSS and GAD, $r = 0.72$ for the association between PSS and PHQ. The correlation between the GAD and PHQ scales ($r = 0.69$) is slightly lower than between the previous two scales, but still high, since it is common for a person who develops one of the pathologies to present symptoms of the other. All correlations were statistically significant at a level of 0.005. To confirm these trends, we calculated the number of respondents who presented this association between scales: 676 had high scores for PSS and GAD, 695 for PSS and PHQ, and 695 also for GAD and PHQ. Finally, 500 respondents had high scores on all three scales at the same time, and 1516 people with high scores on the PSS scale exhibited probable symptoms of anxiety or depression.

Variables	Total Samples		Men		Women	
	PSS	GAD	PSS	GAD	PSS	GAD
GAD	0.76	-	0.78	-	0.75	-
PHQ	0.72	0.69	0.73	0.71	0.71	0.68

Table 2: Correlations between scales, all correlations were statistically significant.

The same correlations were calculated separately in men and women, following the same structure as in the previous analyses. In both genders the correlations were very similar to each other and to

those of the complete sample: the highest correlation was between PSS and GAD, followed by PSS and PHQ and finally GAD and PHQ in all three cases (Table 2).

Discussion

The results of this study show the high frequency of symptoms of anxiety and depression in the university population in our context. About 50% of the people consulted showed symptoms of moderate and severe anxiety and depression, a percentage much higher than expected for the general population: 4.1% for anxiety, 5.2% for depression in the Spanish population, according to the World Health Organization [12]. In addition, the ESEMeD-Spain study (European Study of Epidemiology of Mental Disorders) found the most frequent mental disorder in the country to be major depressive episode, with an annual prevalence of 3.9% and a lifetime prevalence of 10.5% [13]. The percentages found in our study, however, are in line with other studies in similar samples of university students.

For example, a study at the Universidad Católica San Antonio de Murcia (Spain) reported that 47.1% of the 700 students consulted had symptoms of anxiety disorders, and 55.6% of depression [14]. Since the university where the study was held is also located in Spain, as it is our case, the factors affecting the students are likely to be similar and the study appears to be a useful reference point for ours. It should be stressed, however, that the authors used a different instrument to diagnose anxiety (Goldberg's Anxiety and Depression Scale). In 2015, another study of anxiety among university students conducted at the University of Santo Tomás (Colombia) reported a prevalence of 58% [15]. Also, in a population of 2279 students using the same scales as in our study, Evans et al. [7] reported a prevalence of 41% for anxiety and 39% for depression. Thus, studies confirm that the university population must be considered a vulnerable group to experience symptoms of anxiety and depression. Within university students the men-women rate seems to reflect what is commonly found in the general population. Indeed, women are reported to be at an increased risk of suffering from some of these disorders than men, as suggested by our study and others [12,16].

In view of the high proportion of university students who achieve scores above the clinical levels of anxiety and depression, along with the high levels of perceived stress, it is possible that this population of young adults is more vulnerable than the general population to the perception of stress and, with it, the development of anxiety or depression. This might be surprising, as youth is a time full of energy, projects and dreams, and is usually considered the healthiest and happiest moment of a person's life. Even though new studies are needed to confirm more accurately the existence of greater vulnerability to anxiety and depressive disorders in this specific age group, our preliminary data reinforce the need for the development of specific prevention, detection and treatment programs of these common mental illnesses in youth. Indeed, the priority should be finding and working on the factors that might be responsible for the increased stress perception in young population to stress and the increased vulnerability to anxiety and depression.

Regarding perceived stress, there are no established cut-point scores and therefore, we are interested in comparing mean scores with previous studies of similar populations (university students) which have used the same scale to measure stress. For example, in a study conducted in Turkey of university students aged between 17 and 37 (mean age 21.18, with 94% aged between 18 and 23 years old), and

with a higher participation of women than of men (as in our case), the mean score was 30.5 (SD=6.10) [17]. In another study with students at universities in the south-eastern US, with an age range between 17 and 60 but a mean age of 23.8 (similar to our population), and with a high participation of women (225 out of 285), the mean score was 12.09 (SD=4.72) [18]. The comparison of our mean score in perceived stress (M=20.29) with those of the two other studies indicates considerable differences, due perhaps to the fact that students are from different countries. All countries have educational models, socioeconomic factors, cultures and lifestyles of their own, and in these areas' countries like Turkey, Spain and the United States have relatively little in common. These factors have a decisive influence on the way young students perceive the situations they encounter and, therefore, determine to a significant extent whether or not these situations are perceived as stressful. Our review of the literature indicates substantial differences between perceptions of stress among students from different countries, and this is a topic that deserves further examination in future research.

Further factors should be considered when interpreting these findings. In the social domain, there is evidence that indicates that social feedback, including heightened reactivity to exclusion and blunted response to social reward, may be related to depression vulnerability in youth [17]. Also, factors considered as stressful can change depending on the level of studies we are looking at. For undergraduate students, leaving home and starting in a new city away from their parents [19], facing a new way of organization and being responsible for their own life can be the main ones. For PhD students work roles, workload demands, job insecurity, balance between work/personal life and financial difficulties are the most frequently examined characteristics [20]. Moreover, it is important to consider the fact that some students need to work while studying because of their socio-economic status, so here it could rise a stressful situation with a double source, job demands and schedule, plus the financial difficulties they might be facing. Lastly, combining these two activities requires a lot of organization and spending time moving by public transport or car, where there are usually find big masses of people and schedule changes. Together, all these factors should be included in future research on mental health in youth.

The high correlations between symptoms of anxiety and depression and perceived stress levels indicate a common mechanism between mental health disorders and stress confrontation. This finding is not unexpected because the Perceived Stress Scale allows us to assess whether individuals feel stress due to situations that occur in their everyday lives; if these situations are indeed stressors, they may be the starting point for showing symptoms of anxiety or depression. The high levels of perceived stress can be reduced to two key factors: the perception of helplessness, and the perception of control. In this sense, these factors may be potential targets in the development of strategies for the prevention of anxiety and depression symptoms in the university population. Interestingly, studies in other countries such as Turkey [17] and the United States [18] have obtained divergent results in the assessment of the PSS scale in university population. It is possible that these divergences are a consequence of differences in educational models, as well as in socio-economic factors and lifestyles, and therefore future studies that directly compare these differences are necessary.

Conclusion

This study is not without limitations, the most important of them related to the fact that the survey included only students of one university and therefore data from other populations should be further considered. Also, massive online assessment, although highly efficient, may entail data of a lower quality than that obtained by face-to-face interviews. Despite these limitations, our study provides further evidence for a clear trend of a large presence of symptoms of anxiety and depression among the young population, which must be explored in depth as a target of preventive interventions in the area of mental health disorders. Lastly, we must point out the differences in terms of gender. On all scales evaluated, women presented a response profile associated with greater vulnerability than men. Specifically, they showed higher scores of symptoms of depression and anxiety, increased perception of helplessness to deal with stressful situations, and less perception of control than men. In this sense, women should be considered a particularly vulnerable group, and therefore highly relevant to benefit from future programs for the prevention of mental illness.

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