ANXIETY AND DEPRESSION IN HIGHER EDUCATION STUDENTS: COMPARISON BETWEEN MEASUREMENT INSTRUMENTS

Ansiedade e depressão em estudantes do ensino superior: comparação entre instrumentos de medida

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ABSTRACT

BACKGROUND: There are several measurement instruments to evaluate anxiety and depression with differences in filling time and number of questions. This study aimed to verify the correlation between different measurement instruments in the evaluation of anxiety and depression symptoms in higher education students. **METHODS:** The sample comprised 148 students, being 108 (73%) female, aged between 18 to 54 years old (26.61±7.69). The measurement instruments included Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI) and Hospital Anxiety and Depression scale, which evaluated both anxiety (HADS-A) and depression (HADS-D). **RESULTS:** The Kappa value of 0.5 revealed a moderate strength of agreement between HADS-A and BAI. The majority (65.9%) classified with anxiety by HADS-A was also classified as anxiety by BAI. For the depression concordance, the Kappa value of 0.61 revealed a good strength of agreement. 50% of students who were classified with depression with the HADS-D and also classified as depressed by BDI. Spearman's Rho value was 1 for both anxiety and depression quantitative variables, which means a perfect positive correlation between these variables. Women having 2.46 (CI: 0.99-6.09; p=0.052) more chances of being anxious compared to men using both anxiety scales (BAI and HADS-A) and older students were 6.52 (CI: 13.8-30.92; p=0.018) more probabilities to develop symptoms of depression than younger ones, according to HADS-D. **CONCLUSIONS:** Data in this study revealed a good correlation between the measurement instruments that assess symptoms of anxiety and

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depression, suggesting that the researcher can choose the instrument that best suits the logistics of his/her research.

Key-words: Anxiety. Depression. Measure instruments. University students.

RESUMO

INTRODUÇÃO: Existem diversos instrumentos de medida para avaliar ansiedade e depressão, apresentando diferenças no tempo de preenchimento e na quantidade de questões. Este estudo verificou a correlação entre diferentes instrumentos de medida na avaliação de sintomas de ansiedade e depressão em estudantes do ensino superior. **METODOLOGIA:** A amostra foi constituída por 148 estudantes, 108 (73%) mulheres, idades entre 18-54 anos (26,61±7,69). Os instrumentos de medida incluíram Inventário de Ansiedade de Beck (BAI), Inventário de Depressão de Beck (BDI) e escala Hospitalar de Ansiedade e Depressão, que avalia ansiedade (HADS-A) e depressão (HADS-D). **RESULTADOS:** O valor de Kappa de 0,5 revelou uma concordância moderada entre HADS-A e BAI. A maioria dos estudantes (65,9%) classificados com ansiedade pela HADS-A também foram pelo BAI. Para a depressão, o valor de Kappa de 0,61 revelou uma boa força de concordância. 50% dos estudantes classificados com depressão pela HADS-D também foram pelo BDI. O valor Rho de Spearman foi 1 para as variáveis quantitativas de ansiedade e depressão, significando uma correlação positiva perfeita. Mulheres apresentaram 2,46 (IC:0,99-6,09;p=0,052) mais probabilidades de ficarem ansiosas em comparação aos homens usando ambas as escalas de ansiedade (BAI e HADS-A) e estudantes mais velhos tiveram 6,52 (IC:13,8-30,92;p=0,018) mais probabilidades de desenvolver sintomas de depressão do que os mais jovens, de acordo com a HADS-D. **CONCLUSÕES:** Os dados revelaram uma boa correlação entre os instrumentos de medida que avaliam sintomas de ansiedade e depressão, sugerindo que o investigador pode escolher o instrumento que melhor se adequa à logística de sua pesquisa.

Palavras-chave: Ansiedade. Depressão. Instrumentos de medida. Universitários.

1 INTRODUCTION

Mental health problems contribute to an increase in the global burden of disease, resulting in high health costs (KESSLER et al., 2009). Anxiety and depression are considered a group of mental disorders. Anxiety is characterized by feelings of anxiety and fear. Depression is characterized by feelings of sadness, loss of interest and pleasure, feelings of guilt, low self-esteem, disorders in appetite or sleep, feeling tired and lack of concentration (WORLD HEALTH ORGANIZATION, 2017).

The prevalence of these mental health problems is increasing in severity and number among university students, probably because this population group experiencing a critical transitory period in which developmental challenge of transition to adulthood occurs (HUNT; EISENBERG, 2010; TESHOME; DERESE; ABDETA, 2020).

There are several measurement instruments for the assessment of the severity of anxiety and depressive symptomatology that differ in terms of questions and completion time. Among the various instruments available to assess anxiety and depression only the Hospital Anxiety and Depression Scale (HADS), the Beck Depression Inventory (BDI) and the State Trait Anxiety Inventory (STAI) are validated for the Portuguese population.

The Beck Anxiety Inventory (BAI) consists of 21 items (JULIAN, 2011a) and it measures anxiety with a focus on somatic symptoms (JULIAN, 2011b). The Portuguese version of the Beck Anxiety Inventory (BAI) shows good psychometric quality (QUINTÃO; DELGADO; PRIETO, 2010). This measurement instrument requires approximately 5 to 10 minutes to complete (JULIAN, 2011b).

The Beck Depression Inventory (BDI) is a self-reporting questionnaire that has become one of the most widely used measures to assess the severity of depressive symptoms (CAMPOS; GONÇALVES, 2011; SMARR; KEEFER, 2011; GOMES-OLIVEIRA et al., 2012; JACKSON-KOKU, 2016); is commonly self-administered, and filling it takes about 5 to 10 minutes (BECK; STEER, 1987; SAJATOVIC; CHEN; YOUNG, 2015); The Portuguese version presents a good internal consistency (CAMPOS; GONÇALVES, 2011).

Hospital Anxiety and Depression (HAD) scale measures both the intensity of anxiety and depression in non-psychiatric environments and presents good sensitivity, specificity, and internal consistency in assessing anxiety and depression symptoms (MYKLETUN; STORDAL; DAHL, 2001). The HAD is divided into two scales: 7 items measure anxiety (HADS-A) and the other 7 measure depression (HADS-D). This measurement took less than 5 minutes to complete (JULIAN, 2011b).

All anxiety scales assess the symptoms that occurred in the last week (BOTEGA et al., 1995; JULIAN, 2011b) and the BDI measures symptoms of depression in the last 15 days (FALAVIGNA et al., 2012). The BAI and BDI require a longer time to be filled out compared to HAD, being less appealing for research purposes. Thus, this study aimed to verify the correlation between these measurement instruments in the evaluation of anxiety and depression symptoms in university students.

2 METHODS

This is a cross-sectional study approved by the Piaget Institute's Research Unit RECI - Research in Education and Community Intervention, and by School Direction. All students signed an informed consent form, agreeing to participate in the study and having been informed of its objectives.

2.1 Population

The studied population consisted of university students of all sexes and any age. The research inclusion criteria defined students enrolled in the academic year of 2019-2020 in academic courses of Nursing, Physiotherapy, and Osteopathy in Algarve, Portugal, who freely agreed to participate in the research and thus duly signed the informed consent form.

The population consisted of 168 students. The sample size was determined using an estimated mean injury prevalence of 50%, and assuming an error margin of 3% with a 95% confidence interval (CI). Using these assumptions, the minimum sample size contained 146 students.

2.2 Measures

2.2.1 Socio-demographics questionnaire

This questionnaire included questions about gender, age, relationship status, if they work, and physical activity practice.

2.2.2 Beck Anxiety Inventory (BAI)

The BAI presents 21 items on a 4-point likert scale and ranges from 0 (not at all) to 3 (severely) with a total score that ranges from 0 to 63 points. The scores of anxious symptoms for BAI are as follows: 0 to 7 – minimal anxiety; 8 to 15 - mild symptoms; 16 to 29 moderate anxiety; ≥30: severe anxiety symptoms (JULIAN, 2011a; JULIAN, 2011b).

2.2.3 Beck Depression Inventory (BDI)

BDI also presents 21 items, rated on a 0-to-3 ordinal scale, yielding total scores ranging from 0 to 63. Scores between 0 and 13 indicate minimal depression, between 14 and 19 mild depression, 20 to 28 moderate depression and 29 to 63 classified the individual as a severe depression (SMARR; KEEFER, 2011; SAJATOVIC; CHEN; YOUNG, 2015; JACKSON-KOKU, 2016).

2.2.4 Hospital Anxiety and Depression scale (HADS)

The HADS presents a total of 14 items divided into two scales: 7 items measure anxiety (HADS-A) and the other 7 measure depression (HADS-D). Each item is scored from 0 to 3, depending on the response, and the maximum score is 21 points for each scale. The sum of all the answers gives a final score for each scale and a score until 7 values indicate an absence of anxiety or depression, a score between 8 to 10 indicates possible anxiety or depression, and a score equal or more than 11 values indicates a presence of anxiety or depression (BOTEGA et al., 1995; MYKLETUN; STORDAL; DAHL, 2001).

2.3 Data analysis

The statistical analysis was performed with Statistical Package for Social Sciences, version 26.0. In a first approach descriptive statistics were made to all variables of this study. Kappa statistics were used to analyze the concordance between the HADS and BAI and between HADS and BDI qualitative variables. The normality of the data was tested through the Kolmogorov-Smirnov test. Spearman's coefficients were used to analyze

correlations between the measurements instruments obtained in their quantitative form.

Binary logistic regressions, based on the Enter methods, and the corresponding confidence intervals (CI) were calculated to assess the influence of the included variables on the anxiety and depression symptoms.

Statistical significance was set at 0.05.

3 RESULTS

The sample comprised 148 university students, being 40 (27%) male and 108 (73%) female, aged between 18 to 54 years old (26.61±7.69).

According to HADS-A classification, 27 (18.2%) students were classified with a possible case of anxiety and 17 (11.5%) with the presence of anxiety, totalling 44 (29.7%) cases of anxiety. By the BAI classification, 42 (28.4%) students were classified with mild anxiety, 37 (25%) with moderate anxiety and 7 (4.4%) with severe symptoms of anxiety. Considering only the moderate and severe symptoms of anxiety, the total presence of anxiety were 44 (29.4%).

The Kappa concordance statistic revealed that 14.4% of the students classified as having no anxiety by the HADS-A were classified as having anxiety by the BAI and 34.1% of the individuals who were classified as having anxiety by the HADS-A were classified as not having anxiety by the BAI and the majority (65.9%) classified with anxiety by HADS-A was also classified as anxiety by BAI. The Kappa value (0.5) revealed a moderate strength of agreement (Table 1).

Table 1: Concordance between HADS-A and BAI for classification of anxiety (qualitative variables)

BAI classification of anxiety	HADS-A classification of anxiety		Kappa	p-value
	Absence	Presence (possible case and presence)		
Absence	89 (85.6%)	15 (34.1%)	0.515	≤0.001
Presence (moderate and severe symptoms)	15 (14.4%)	29 (65.9%)		

source: author

Regarding depression with the classification of HADS-D, 8 (5.4%) students were classified with a possible case of depression and 4 (2.7%) with

the presence of depression, totalling 12 (8.1%) cases. Considering the BDI classification, 6 (4.1%) students presented mild depression, 4 (2.7%) moderate depression and 3 (2%) individuals were classified with severe depression, and including the moderate and severe symptoms of depression, the total was 7 (4.7%) students with depression.

For the depression concordance, only 1 (0.7%) students classified as having no depression by the HADS-D were classified as having depression by the BDI and 50% of the individuals who were classified as having depression by the HADS-D were classified as not having depression by the BDI and the same value (50%) was classified with depression with the HADS-D and also classified as depression by BDI. The Kappa value (0.61) revealed a good strength of agreement (Table 2).

**Table 2**: Concordance between HADS-D and BDI for classification of depression (qualitative variables)

BAI classification of depression	HADS-D classification of depression		Kappa	p-value
	Absence	Presence (possible case and presence)		
Absence	135 (99.3%)	6 (50%)	0.608	≤0.001
Presence (moderate and severe symptoms)	1 (0.7%)	6 (50%)		

source: author

The values of the Kolmogorov-Smirnov normality tests were p≤0.001. Spearman's Rho value was 1 for both anxiety and depression variables, which means a perfect positive correlation between the two variables analyzed (p≤0.001).
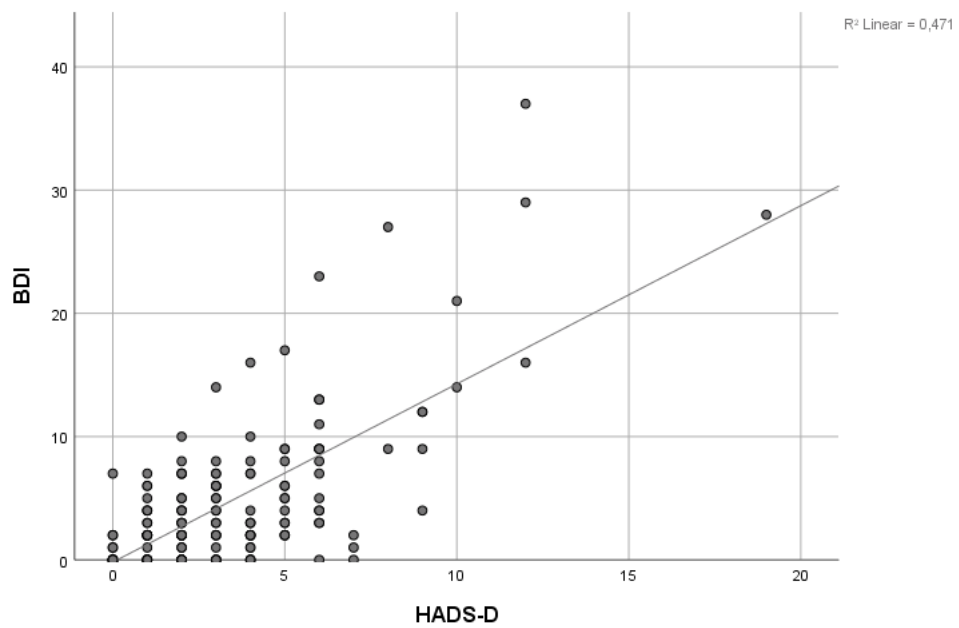
Figure 1 represents the graphs of the correlation between the classification scores according to HADS-A and BAI and Figure 2 shows the correlation between the depression classifications, according to HADS-D and BDI.

Figure 1: Correlation between the HADS-A and BAI
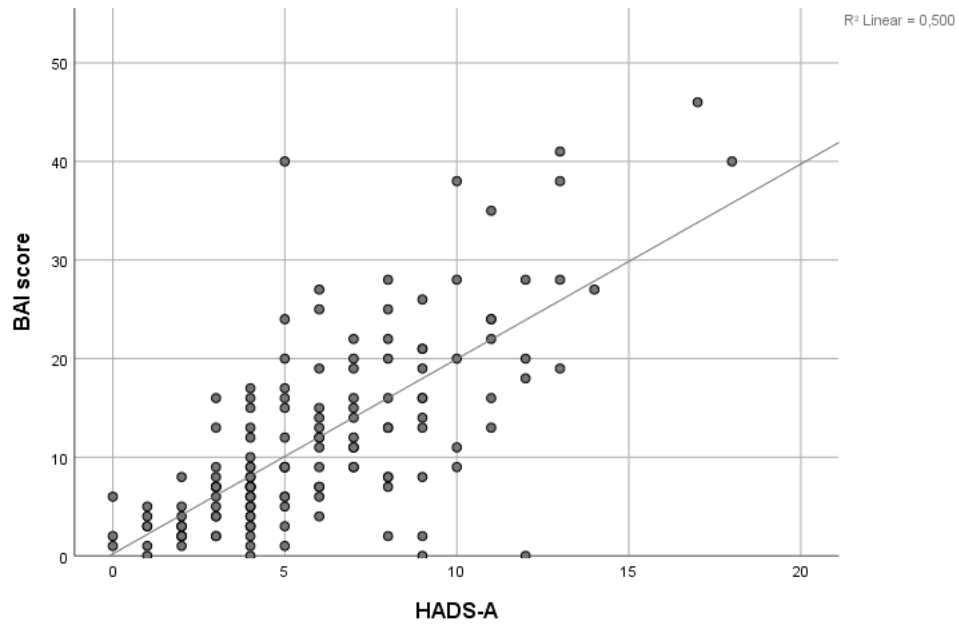
source: author

Figure 2: Correlation between the HADS-D and BDI

source: author

Table 3 shows the relationship between the anxiety and depression symptoms of all scales used in this study and the socio-demographic variables of this study.

Table 3: Relationship between the event presence of anxiety and depression (evaluated of all scales) and modifiable and non-modifiable risk factors

Variables	BAI	HADS-A	BDI	HADS-D
	OddsRatio$_{crude}$ (CI 95%); p-value	OddsRatio$_{crude}$ (CI 95%); p-value	OddsRatio$_{crude}$ (CI 95%); p-value	OddsRatio$_{crude}$ (CI 95%); p-value
Gender (male*) female	*2.46 (0.99-6.09); 0.052*	*2.46 (0.99-6.09); 0.052*	0.47 (0.10-2.22); 0.344	0.72 (0.20-2.54); 0.609
Age group (until 25 years old*) ≥ 26 years old	0.821 (0.40-1.67); 0.586	1.38 (0.68-2.80); 0.371	3.01 (0.57-16.03); 0.197	*6.52 (1.38-30.92); 0.018*
Worked (yes*) no	0.69 (0.34-1.41); 0.312	0.90 (0.44-1.83); 0.770	1.51 (0.33-7.02); 0.595	3.69 (0.96-14.22); 0.060
Practice of physical activity (yes*) no	1.38 (0.67-2.78); 0.387	1.56 (0.76-3.18); 0.222	1.28 (0.28-5.92); 0.754	2.00 (0.58-6.96); 0.276
Marital status (alone*) with another person	0.94 (0.34-2.59); 0.900	1.22 (0.45-3.26); 0.697	1001 (0.12-8.82); 0.994	1.23 (0.25-6.06); 0.798

* Class reference

source: author

4 DISCUSSION

The results of this study showed a good agreement between the measurement instruments that assess anxiety and depression. In this way, the researcher could have chosen any of these instruments for the assessment of these mental disorders.

The BAI and BDI are instruments that have many questions and take longer to complete compared to HADS. Adherence to filling out questionnaires is not well received by people and if the instrument requires more time to complete, it will probably be lower adhesion.

Regarding the assessment of anxiety symptoms, both scales (BAI and HADS-A) obtained an equal number of individuals classified with anxiety, however, when considering the assessment of anxiety by HADS-A, it was found that a significant percentage (34%) of students classified with anxiety were not classified with anxiety using the other scale (BAI) (false-negative cases) and

14% of the students classified as having no anxiety by the HADS-A were classified as having anxiety by the BAI (false-positive cases).

Quintão, Delgado and Pietro (2012) compared BAI with other scales (STAI-state, STAI-trait and Zung) and the data revealed that all evaluated scales showed good category functioning following Linacre's criteria.

When assessing depression among students, the difference in the number of students classified with a presence between the scales (BDI and HADS-D) was almost double. Considering the HADS-D there were 50% false-negative cases, but only one false-positive case (0.7%).

Falavigna et al. (2012) evaluate the accuracy of the HADS-D comparing it to BDI being applied to 156 patients undergoing spine surgery and the value of Spearman correlation tests was 0.7 (p<0.001), showing a strong correlation with BDI and good reliability.

The epidemiological results of this study revealed a high prevalence of students with anxiety (30% with HADS-A and 29% with BAI). Akhtar, Herwig and Faize (2019) evaluated 122 international students studying medicine in Germany, and the anxiety symptoms were present in 49% and Javadi et al. (2017) showed 15% of anxiety presence in 1,040 high school students in Qazvin, Iran, both studies used BAI. Another study that used a HADS-A (SOUSA; MOREIRA; TELLES-CORREIA, 2018) verified a prevalence of 21.5% for anxiety symptoms in 750 Portuguese students.

Regarding depression, prevalence of this was 8% using the HADS-D and 4% using BDI. This study considered the presence of depression in the individuals who were classified with moderate and severe symptoms. Tayefi et al. (2020) showed that 3.4% of Iranian students present depression using BDI. Javadi et al. (2017) present a higher prevalence of depression using BDI (31.8%). Sousa et al. (2018) evaluated the presence of depression using HADS-D and verified 3.7% of students with depression.

Minghelli, Morgado and Caro (2014) study evaluated 1,493 Portuguese students at Piaget Institute (involving more courses) and anxiety or depression was present in 30.5% of students, using HADS, and this present study shows a total of 37.8% of anxiety plus depression.

The factors that were associated with anxiety included gender (women having more probabilities). Similar data was obtained in others studies (Javadi et al., 2017). Regarding depression by BDI, the age was considered a risk factor, that older students present more chances to develop symptoms of depression than younger ones. Džubur et al. (2018) study did not find any association between BDI scores and age difference.

This study presents a limitation that is the fact that it wasn't used as a clinical sample. Besides that, the cutoff for anxiety and depression diagnosis in this survey was set as ≥16 points for BAI and ≥20 for BDI. An individual classified with minimal or mild were not classified as having anxiety and depression.

5 CONCLUSIONS

In conclusion, the results of this study revealed a good correlation between all measurement instruments, allowing the researcher to choose the one that best suits the logistics of his/her research. The HADS consists of a good alternative for screening depression and assessing its severity.

It is necessary to carry out epidemiological studies to identify cases of anxiety and depression in this type of population (university students) to create intervention strategies, promoting the health of these students and, consequently, improving their academic performance.

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