

**Cita: Figueiredo, M.C., Amendoeira, J., Rosa, M., Matos, R., Coelho, T., Silva, M., Gonzaga, L., & Chicau, C. (2023). Quality of life of higher education students at the Polytechnic Institutes of Santarem and Leiria during the COVID-19 pandemic. *Cuadernos de Psicología del Deporte*, 23(1), 141-157**

## Quality of life of higher education students at the Polytechnic Institutes of Santarem and Leiria during the COVID-19 pandemic

### Qualidade de vida dos estudantes do ensino superior dos Politécnicos de Santarém e Leiria no período da pandemia COVID-19

### Calidad de vida de los estudiantes de educación superior de los Institutos Politécnicos de Santarém y Leiria durante la pandemia del COVID -19

Figueiredo, Maria do Carmo<sup>1</sup>, Amendoeira, José<sup>1,2,3</sup>, Rosa, Marta<sup>1,2</sup>, Matos, Rui<sup>4,5</sup>, Silva, Mário<sup>1,2</sup>, Coelho, Teresa<sup>1,2</sup>, Gonzaga, Luís<sup>1,6</sup>, Chicau, Carla<sup>1,6</sup>

<sup>1</sup>Instituto Politécnico de Santarém, Centro de Investigação em Qualidade de Vida, Portugal; <sup>2</sup>Instituto Politécnico de Santarém, Escola Superior de Saúde, Portugal; <sup>3</sup>Universidade Católica Portuguesa, Centro de Investigação Interdisciplinar em Saúde, Portugal; <sup>4</sup>Instituto Politécnico de Leiria, Centro de Investigação em Qualidade de Vida, Portugal; <sup>5</sup>Instituto Politécnico de Leiria, Escola Superior de Educação e Ciências Sociais, Portugal; <sup>6</sup>Instituto Politécnico de Santarém, Escola Superior de Desporto de Rio Maior, Portugal.

#### ABSTRACT

**Objective:** This study aims to determine the quality of life of higher education students at the Polytechnic Institutes of Santarem and Leiria during the COVID-19 pandemic. **Methods:** The population consists of 6483 students attending higher education, from both Institutes. A total of 775 participants selected by convenience sampling, participated in the study. Study with a quantitative, descriptive, correlational character, aiming to describe phenomena and, in addition, identify and explore possible relationships between variables. The WHOQOL-Bref instrument adapted from WHO was applied. The data treatment and analysis were performed using descriptive, correlational, and inferential statistics. **Results:** Students' self-assessment about Quality of Life is globally superior to the self-assessment with their satisfaction with health, where the female students have lower average values than the male students. The WHOQOL-Bref domains referring to Quality of Life with higher values were the Physical and Environment domain, with the Social Relations and Psychological domains having the lowest values. **Conclusion:** The results point to the need for intervention to promote the Quality of Life of students, focusing on psychosocial factors, due to the conditions imposed during the confinement period, by the pandemic COVID-19.

**Keywords:** higher education students; COVID-19 pandemic; quality of life; WHOQOL-Bref

## RESUMO

*Objetivo:* Este estudo teve como objetivo determinar a qualidade de vida dos estudantes do ensino superior dos Institutos Politécnicos de Santarém e Leiria no período da pandemia COVID-19. *Métodos:* A população é constituída 6483 estudantes que frequentam o ensino superior, dos dois Institutos. Um total de 775 participantes selecionados por amostragem de conveniência participaram no estudo. Estudo de caráter quantitativo, descritivo-correlacional, visando descrever fenómenos e posteriormente identificar e explorar possíveis relações entre as variáveis. Aplicou-se o instrumento WHOQOL-Bref adaptado da WHO. O tratamento e análise dos dados foi realizado com recurso à estatística descritiva, correlacional e inferencial. *Resultados:* A autoavaliação dos estudantes relativamente à Qualidade de Vida é globalmente superior à autoavaliação com a sua satisfação com a saúde, sendo os estudantes do género feminino que apresentam valores médios inferiores aos estudantes do género masculino. Os domínios do WHOQOL-Bref referentes à Qualidade de Vida com valores superiores foram o domínio físico e meio ambiente, sendo os domínios das relações sociais e psicológico, os que apresentam valores menores.

*Conclusão:* Os resultados apontam para a necessidade de intervenção na promoção da Qualidade de Vida dos estudantes, com foco em fatores psicossociais, decorrente das condicionantes impostas no período de confinamento, pela pandemia COVID-19.

**Palavras-chave** estudantes do ensino superior; pandemia COVID-19; qualidade de vida; WHOQOL-Bref

## RESUMEN

*Objetivo:* Este estudio tuvo como objetivo determinar la calidad de vida de los estudiantes de educación superior de los Institutos Politécnicos de Santarém y Leiria durante la pandemia del COVID-19. *Métodos:* La población está formada por 6483 estudiantes de educación superior, de ambos Institutos. Participaron en el estudio un total de 775 participantes seleccionados por muestreo de conveniencia. Estudio cuantitativo, descriptivo, correlacional, con el objetivo de describir fenómenos y posteriormente identificar y explorar posibles relaciones entre variables. Se aplicó el instrumento WHOQOL-Bref adaptado de la OMS. El tratamiento y análisis de los datos se realizó mediante estadística descriptiva, correlacional e inferencial. *Resultados:* La autoevaluación de los estudiantes con respecto a la calidad de vida es globalmente superior a la autoevaluación de su satisfacción con la salud, siendo las estudiantes las que tienen valores promedio más bajos que los estudiantes. Los dominios WHOQOL-Bref referentes a la Calidad de Vida con valores más altos fueron los dominios físico y ambiental, siendo los dominios de relaciones sociales y psicológicas los de menor valor. *Conclusión:* Los resultados apuntan a la necesidad de una intervención para promover la Calidad de Vida de los estudiantes, con foco en los factores psicossociales, debido a las condiciones impuestas durante el período de encierro, por la pandemia COVID-19.

**Palabras clave:** estudiantes de educación superior; pandemia de COVID-19; calidad de vida; WHOQOL-Bref

## INTRODUCTION

In the context of the epidemic caused by the Coronavirus (SARS-CoV-2), whose disease is called COVID-19, the World Health Organization (WHO) met the Emergency Committee of the International Health Regulations on January 30 and declared a Public Health Emergency International Scope (Directorate General of Health, 2020).

After the WHO declaration, several countries had to implement measures to deal with the spread of infections (Reigal, Pastrana-Brincones et al., 2020;

Xavier et al., 2020). The 2019-2020 coronavirus pandemic has affected the systems around the world, leading, for example to the general closure of educational institutions (EI), schools were closed, non-essential activities had to stop, sports competitions were cancelled, among others (Zhang et al., 2020; Reigal, Pastrana-Brincones et al., 2020; Reigal, Páez-Maldonado et al., 2021).

The pandemic forced people to modify their usual routines, such as reducing social contact, using new strategies to communicate with family and friends, changing physical activity or eating habits, as well as

## Higher education students' quality of life during COVID-19 pandemic

the way they study and work (Belzunegui-Eraso & Erro-Garcés 2020; Zhang et al., 2020; Reigal, Pastrana-Brincones et al., 2020; Reigal, Páez-Maldonado et al. 2021). These changes affected their mental and psychological health.

COVID-19 affected people's health with other problems, such as: muscle weakness, respiratory and heart problems, cough, pain, fatigue, loss of smell or taste, cognitive changes, etc., affecting well-being and quality of life. Even those who did not suffer directly from the disease showed manifestations of stress, anxiety, and depression (Serviço Nacional de Saúde [SNS], 2021; Reigal, Páez-Maldonado et al., 2021). According to Xavier et al. (2020) "The first cases of COVID-19 in Portugal were recorded on February 26th, 2020" (p.2).

In Portugal, the Council of Ministers approved on March 12, 2020, the suspension of all teaching and non-teaching activities, as an extraordinary and urgent measure to respond to the epidemiological situation of the new coronavirus - COVID-19, in all EI with classes at distance (Ministry of Science, Technology and Higher Education, 2020). The state of emergency was declared in Portugal on 18th March by Decree nº 14-A/2020 (2020), and to defend the safety of the academic community and protect it from the risks of contagion, all face-to-face classes were replaced by teaching through digital platforms, similarly closing "libraries, study rooms, canteens, administrative services and other support services. All academic tests are now done online" (Ferrinho, 2021, p. 51).

This situation kept students and teachers at a social distance, communicating only by videoconference, with little time to adapt (Calado, 2020), as in other countries online platforms were an option for students to continue learning (Reigal, Pastrana-Brincones et al., 2020; Reigal, Páez-Maldonado et al., 2021). When the impact of COVID-19 on the Portuguese education system was analysed by Benavente et al. (2020), they concluded that higher education students decreased their attendance to online classes compared to face-to-face classes. Even when the closure of schools is temporary, it has high social and economic costs. The impact of the learning interruption causes stress and anxiety, as well as a decrease in economic productivity, as individuals and families are invited to isolation (Burns, 2020; United Nations Educational, Scientific and Cultural Organization [UNESCO], 2020a). "The application of these restraint initiatives can have a long-lasting and wide-ranging negative

psychosocial impact" (Antunes, Rebelo-Gonçalves et al., 2021). Schools are centres of social activity and human interaction. When they are closed, many young people lose social contact, which is essential for learning and development (UNESCO, 2020b). UNESCO (2020c) presented statistical data that showed that the schools and universities shut down, affected about 1.3 million students, in 195 different countries. The model of distance learning forced an "adjustment" on the part of the students, concerning "a change in attitudes and more attention" because the whole dynamics of the classroom was different and through a screen (Draft, 2020).

With the global development of COVID-19, public health quickly got worse, because of the psychological issues that accompany this pandemic (Torales et al., 2020).

The UNESCO National Commission (2020), through the message of its Director-General, warned that the global scale and speed of the current interruption in education is incomparable. Such suspension means a lack of access to the resources they usually have in schools.

The isolation of students has caused negative impacts on their mental health (Lee, 2020), due to the temporary closure of classroom activities in schools, for the implementation of distance learning (UNESCO, 2020b). A study conducted in Portugal with participants aged between 16 and 65 (plus) years of age, of both genders concluded that the restrictions to freedom and social interaction caused frustration and distress, with emphasis on the population aged 16-24 years, which revealed greater difficulties of adaptation (Magalhães et al., 2020). In another Portuguese study, higher education students showed levels of anxiety (48.8%), apathy (16.9%) and isolation (16.3%) (Benavente et al., 2020). According to Antunes, Frontini et al. (2020), " literature acknowledged several psychological effects of social isolation such as high levels of anxiety, stress, or fear that can persist beyond that period" (p.2). According to Antunes, Frontini et al. (2020), "literature acknowledged several psychological effects of social isolation such as high levels of anxiety, stress, or fear that can persist beyond that period" (p.2).

Concern with the quality of life (QoL) of students emerges during this period of confinement, defining QoL as the value that each citizen attributes to their social and individual status, in a society in which people relate and interact to satisfy their ambitions,

needs and expectations. This notion is based on the concept that global organizations influence the determinants of citizens' health, as mentioned by WHO. The concept's approach is multifaceted, complex, and multidisciplinary, intending to improve the conditions of social, psychological, and physical life (Rodrigues, et al., 2020).

In this study the focus was on determining the quality of life of higher education students. at the Polytechnic Institute of Santarem (IPSantarem) and the Polytechnic Institute of Leiria (IPLEiria), using the WHOQOL-Bref questionnaire, WHO, (The WHOQOL Group, 1995; 1998), validated for the Portuguese population by Vaz-Serra et al. (2006), which integrates the physical, psychological, social relations and environment domains.

We found several pieces of evidence about the QoL of higher education students, but not in a time of confinement, during the COVID-19 pandemic. In the study by Amadeu and Justi (2017), with dentistry students, the domain with the highest average was social relations ( $69.3 \pm 21.2$ ). The question that obtained the lowest score was the one that asked, "how satisfied you with your relations are (friends, relatives, acquaintances, colleagues)". The authors justify that this may indicate a reflection of the social situation in which people find themselves, more and more isolated. The psychological domain, with an average of  $64.3 \pm 12.2$ , was observed as being above the general average.

In the study by Abreu and Dias (2016), at the School of Education and Social Sciences of IPLeiria, the most scoring domain was psychological ( $77.5 \pm 11.8$ ), and the least scored the environment ( $72 \pm 10.74$ ).

Petrini et al. (2013) present the average allusive to medical students in daytime education, with the physical domain receiving the highest score and the environment one the least.

As for Chazan and Campos (2013), the average relative to medical students for the social relations domain was  $69 \pm 19.5$  and the lowest average was  $58 \pm 15.8$  for the environment domain. Additionally, the psychological domain was the only one where statistical difference between male and female students were significant, favoring boys.

Zhang et al. (2012) point out that the scores in the different academic years of medicine were significantly different in the psychological and social relations domains ( $p < 0.05$ ). Third-year students had

the lowest scores in the domains of psychological health ( $63.0$ ) and social relationships ( $62.5 \pm 2,34$ ).

The study by Silva and Heleno (2012) showed that the domain that presented the highest mean ( $15.23 \pm 2,88$ ) was social relationships and the lowest ( $12.87$ ) was the once again, like in previous presented studies the environment domain. Ramos-Dias et al. (2010) refer that the highest average relative to students of the first year of medicine, was in the physical domain ( $77.9 \pm 9.8$ ) and in the environmental one ( $67.7 \pm 11.7$ ). In the sixth-year students, the highest average score observed was  $77.8 \pm 14.5$  in the social relationship's domain and  $76.8 \pm 12.6$  in the physical domain. The comparison between the two groups showed a statistical difference only in the domain of social relations ( $p < 0.05$ ).

This study has the general objective to determine the quality of life of higher education students at the IPSantarem and IPLeiria during the COVID-19 pandemic, and as specific objectives: to verify if there are differences between students from institutes of the same level of education, located in different cities, regarding QoL; identify whether the sociodemographic factors are related to each domain of QoL.

## METHODS

### *Design*

This is an exploratory and descriptive-correlational study because it aims to describe phenomena, identify, and analyze possible relationships between variables (Grove, et al., 2013; Ato et al., 2013; Hill, M., & Hill, A., 2012).

### *Participants*

Subjects were recruited by convenience sample method, and those who attended the 2nd, 3rd or 4th year of the course were only eligible; if they were 18 years of age or older and had Portuguese nationality. Of a universe of 6483 students 12% participated in the study ( $n = 775$ ), corresponding to 20.7% of the total number of students at IPSantarem and 8.9% of the total number of students at IPLeiria.

### *Variables*

The participants in this study answered some information with a sociodemographic nature characterization: age, gender, marital status, children,

## Higher education students' quality of life during COVID-19 pandemic

children's age, student worker status, municipality of residence and with whom they live.

### Instrument

The data that gave rise to the shortest version was extracted from the field test of 20 centers in 18 different countries (WHOQOL Group, 1995).

The criterion for selecting the questions to constitute the WHOQOL-Bref was psychometric and conceptual.

At the conceptual level, The WHOQOL Group (1995; 1998) defined that the comprehensive character of the original instrument (the WHOQOL-100) should be maintained. Thus, each of the 24 facets that make up the WHOQOL-100 should be represented by a question. At the psychometric level, the question selected as the most highly correlated with the total score of the WHOQOL-100, calculated by the average of all facets. After this stage, the selected items were examined by a panel of experts, to establish whether they conceptually represented each domain from which the facets came. This instrument has been widely used in several studies. The coefficients were good for the physical health  $\alpha=0.82$ , for the psychological health  $\alpha=0.75$ , for the social relationship  $\alpha=0.66$  and for the environment  $\alpha=0.80$  (The WHOQOL Group, 1995; 1998), which indicates a good internal consistency (Oviedo & Campo-Arias, 2005).

In validating the instrument for the Portuguese population, Cronbach's Alpha was as 0.87 in the physical health, 0.84 in the psychological health, 0.64 in the social relationship and 0.78 in the environment (Vaz-Serra et al., 2006).

In table 1, we present the WHOOL-Bref in its reduced form.

Two questions are of the student's self-assessment about their QoL and their satisfaction with their health and the other 24 aim to evaluate the four domains: physical (seven questions), psychological (six questions), social relationships (three questions), middle environment (eight questions). All questions were formulated using answers like Likert, ranging from 1 to 5, with an intensity scale (nothing / extremely), capacity (nothing / completely), frequency (never / always) and assessment (very dissatisfied / very satisfied; very bad / very good). All results are presented on average in both domains and facets (Fleck et al., 2000). According to the same author, a

higher score means a better quality of life. Questions were added for sociodemographic characterization of the participants.

The calculation of domains is done according to the guidelines of the WHOQOL-Bref instrument (WHO, 1998; 2013), adding in each domain the values obtained in the respective facets and dividing by the total of the facets of that domain. The values are transformed on a scale that varies from 0-to 100, which are, respectively, the least and most favorable QoL values that allow comparisons of scores between domains with different numbers of items (The WHOQOL Group, 1995; 1998; WHO, 1998; 2013).

**Table 1.** WHOQOL-Bref questions (facets) by the four domains and order in which the questions appear in the instrument

Domains	Facets
Physical (Health)	1 Pain and discomfort
	2 Energy and fatigue
	3 Sleep and rest
	9 Mobility
	10 Activities of daily living
	11 Dependence on medication or treatments
Psychological (Health)	12 Work capacity
	4 Positive feelings
	5 Thinking, learning, memory, and concentration
	6 Self-esteem
	7 Bodily image and appearance
	8 Negative feelings
Social relationships	24 Spirituality, religion, and personal beliefs
	13 Personal relationships
	14 Social support
Environment	15 Sexual activities
	16 Physical security and protection
	17 Home environment
	18 Financial resources
	19 Health and social care: availability and quality
	20. Opportunities to acquire new information and skills
	21. Participation in, and recreation opportunities/recreation
	22. Physical environment: (pollution / noise / traffic / climate)
	23. Transport

### Procedures

It was requested authorization from the authors of the questionnaire validated for the Portuguese population. It was requested authorization from the presidents of the two Institutes were contacted and after their authorization, the directors of all schools were asked to collaborate and to indicate a reference lecturer.

After the opinion of the Ethics Committee of Research Unit of IPSantarem (112020Saúde), on October 26, 2020, and with the consent of the schools, the questionnaire was applied. It was provided with a link by the school directors on their institutional pages for free completion by students, who did it anonymously, via Microsoft forms.

All participants were duly informed of the objectives, procedures, and data analysis, signing the informed consent form before the study started. They were extensively informed about the nature of the study, the procedures for recording the data and the voluntary nature of their participation. The procedures followed the research standards by the Declaration of Helsinki. Its self-completion was done online, between November 20 and December 4, 2020, and took about ten to fifteen minutes.

Because filling in the WHOQOL-Bref was voluntary, the student had completed freedom to request his exclusion from the study at any time, without any prejudice. Thus, students who did not feel motivated to participate were excluded from the research.

### *Settings*

The IPSantarem and IPLeirira were selected because the study was developed within the scope of the Research Centre on Quality of Life of both Institutes. Within the scope of the action and activity of this Research Centre, there is an interest in studying the quality of life of students from these educational institutions. Thus, there is interest in studying and understanding possible differences in the quality of life of students, in the sense of establishing interventions directed to this specific population.

### *Data analysis*

After collecting the data, begins the treatment and analysis of these using the SPSS® program (version 27 for Windows).

The scores were transformed into a scale that varies from 0-100, which are respectively the least and most favorable QoL values (The WHOQOL Group,

1995;1998; WHO, 1998; 2013; Chazan & Campos, 2013; Zhang et al., 2012).

Descriptive statistics (means, standard deviation, and frequencies - absolute and percentage values) were used to describe the participants' perception of the different QoL domains. To compare the QoL perceived by students from IPSantarem and IPLeirira, in general, and in each of the different domains mentioned, we used, when possible, parametric inferential techniques (T-test for independent samples). When, in the sequence of tests to verify the normality of distribution of variables, such normality was not verified, non-parametric tests were used, specifically the Mann-Whitney U test. The same analysis previously mentioned was used in the comparison between male and female students, in general, and by Institute, in the different domains considered. To compare QoL in different domains, perceived by students from IPSantarem and IPLeirira as a whole and in each of the Institutes, as well as in general and by gender, we used, when possible, the ANOVA test for repeated measures, with the execution of the Tukey test a posteriori to check between which domains there would be significant differences. When, in the sequence of tests to verify the normality of distribution of variables, such normality was not verified, non-parametric tests were used, namely, the Friedman test, followed by Wilcoxon tests posterior.

To determine the effect sizes of any statistically significant differences found, Cohen's d (Cohen, 1988) was used when using parametric techniques and eta square when using non-parametric techniques.

## **RESULTS**

In the first part of the questionnaire, students answered questions related to sociodemographic characteristics - table 2.

Of these students, 570 are female (73.5%) and 205 males (26.5%). The age varies between 18 and 55 years of age (22.8 + 6.2). Regarding marital status, the majority are single or divorced (n = 716; 92.4%), with only 7.6% (n = 59) of students married and in a consensual union. Most students have no children (n = 726; 93.7%). About the district of residence outside the period of classes, 34.7% of the participants reside in the district of Leiria, 31.5% in the district of Santarem, 19.9% in the district of Lisbon, with the remaining students being redistributed by other

## Higher education students' quality of life during COVID-19 pandemic

districts (13.9%). Most of them mentioned that are living with their parents, friends, colleagues, or others ( $n = 760$ ; 98.1%). Of the 775 students, 389 (50.2%) attend the 2nd year, 292 (37.7%) attend the 3rd year and 94 (12.1%) attend the 4th year.

**Table 2.** General sample characteristics

Sociodemographic characterization	n	%
<b>Genre</b>		
Female	570	73,5
Male	205	26,5
<b>Age group</b>		
≤ 20 years	355	45,8
21-30 years	351	45,3
31-40 years	37	4,8
> 40 years	32	4,1
<b>Children</b>		
Without children	726	93,7
With children	49	6,3
<b>Residence District</b>		
Leiria	269	34,7
Santarem	244	31,5
Lisbon	154	19,9
Others	108	13,9
<b>Curricular year</b>		
2nd year	389	50,2
3rd year	292	37,7
4th year	94	12,1

### General Quality of life and General Health perceived by students

Regarding the questions “How would you rate your quality of life?” and “How satisfied are you with your health?”, it appears that, as can be seen on table 3, in the total sample, students self-assess their QoL in a significant superior way (58.65%) compared to satisfaction with their health (41.10%). Female students have significantly lower mean values (39.96%), regarding satisfaction with their health than male students (44.27%). Comparing the responses between Institutes, regarding these two questions, there are no significant differences. In both Institutes, self-assessment of QoL has significant higher values about than self-assessment with own health, with large effect sizes. The same can be verified in each gender. Contrary to what was verified on the total sample, at IPSantarem, the self-assessment of the QoL of female students has significantly lower mean values (58.20%) than male students (63.64%), despite the small effect size. About health satisfaction, and contrary to what happened with total sample, where female students, revealed lower values than male ones, in IPSantarem this was not the case, since there were no significant differences between female and male students. In contrast, at IPLeiria there are no differences between students of both genders, in any of these questions.

**Table 3.** General Quality of life and General Health perceived by students with WHOQOL-Bref

Total Sample (IPLeiria + IPSantarem)	Comparison	p	effect size
How would you rate your quality of life (58.65±23.46)	How satisfied are you with your health? (41.10 ±27.66)	< 0.001	0.12 (eta square)
Total Male Sample (IPLeiria + IPSantarem)	Total Female Sample (IPLeiria + IPSantarem)	p	effect size
How would you rate your quality of life (60.85±24.28)	How would you rate your quality of life (57.85±23.12)	0.106	-
How satisfied are you with your health? (44.27 ±29.20)	How satisfied are you with your health? (39.96 ±27.03)	< 0.001	0.004 (eta square)
Students IPLeiria	Students IPSantarem	p	effect size
How would you rate your quality of life (57.61±24.06)	How would you rate your quality of life (59.90±22.68)	0.165	-
How satisfied are you with your health? (39.86 ±26.75)	How satisfied are you with your health? (42.59 ±28.70)	0.392	-

<b>Students IPLeiria</b>	<b>Comparison</b>	<b>p</b>	<b>effect size</b>
How would you rate your quality of life (57.61±24.06)	How satisfied are you with your health? (39.86 ±26.75)	< 0.001	0.242 (eta square)
<b>Students IPSantarem</b>	<b>Comparison</b>	<b>p</b>	<b>effect size</b>
How would you rate your quality of life (59.90±22.68)	How satisfied are you with your health? (42.59 ±28.70)	< 0.001	0.229 (eta square)
<b>Male students IPLeiria</b>	<b>Comparison</b>	<b>p</b>	<b>effect size</b>
How would you rate your quality of life (57.63±23.37)	How satisfied are you with your health? (42.90 ±29.55)	< 0.001	0.189 (eta square)
<b>Female students IPLeiria</b>	<b>Comparison</b>	<b>p</b>	<b>effect size</b>
How would you rate your quality of life (57.60±24.29)	How satisfied are you with your health? (38.98 ±25.87)	< 0.001	0.257 (eta square)
<b>Male students IPSantarem</b>	<b>Comparison</b>	<b>p</b>	<b>effect size</b>
How would you rate your quality of life (63.64±24.80)	How satisfied are you with your health? (45.46 ±28.97)	< 0.001	0.231 (eta square)
<b>Female students IPSantarem</b>	<b>Comparison</b>	<b>p</b>	<b>effect size</b>
How would you rate your quality of life (58.20±21.48)	How satisfied are you with your health? (41.29 ±28.54)	< 0.001	0.227 (eta square)
<b>Male students IPLeiria</b>	<b>Female students IPLeiria</b>	<b>p</b>	<b>effect size</b>
How would you rate your quality of life (57.63±23.37)	How would you rate your quality of life (57.60±24.29)	0.990	-
How satisfied are you with your health? (42.90 ±29.55)	How satisfied are you with your health? (38.98 ±25.87)	0.295	-
<b>Male students IPSantarem</b>	<b>Female students IPSantarem</b>	<b>p</b>	<b>effect size</b>
How would you rate your quality of life (63.64±24.80)	How would you rate your quality of life (58.20±21.48)	0.029	0.012 (eta square)
How satisfied are you with your health? (45.46 ±28.97)	How satisfied are you with your health? (41.29 ±28.54)	0.074	-

*Quality of life perceived by students in the domains of Quality of Life*

Since the variables related to the four domains do not present a normal distribution, in the global sample considered and in the samples by Institute, the non-parametric technique of Friedman's test for related samples was used to verify if there would be

differences between some of the domains considered. Having verified the existence of these differences, the Wilcoxon test was used as a posthoc test to check between which domains there would be this. Thus, in the total sample, only between the social relations domain and the environment domain, there were no statistically significant differences. difference, as shown in Table 4.

**Table 4.** *Quality of life perceived by students in the different domains of the WHOQOL-Bref*



Total Sample (IPLeiria + IPSantarem)	Comparison	p	effect size
Physical (64.87±12.54)	Psychological (49.60 ±16.18)	0.246	0.51(eta square)
	Social relationships (52.71±19.10)	<0.001	0.25 (eta square)
	Environment (53.92 ±10.48)	0.704	0.41 (eta square)
Psychological (49.60 ±16.18)	Social relationships (52.71 ±19.10)	0.228	0.03 (eta square)
	Environment (53.92 ±10.48)	<0.01	0.08 (eta square)
Social relationships (52.71 ±19.10)	Environment (53.92 ±10.48)	0.246	-
Average QoL (55.49 ± 8.73)			
Students IPLeiria	Comparison	p	effect size
Physical (64.29 ±13,24)	Psychological (47.48 ±16.67)	< 0.001	0.50 (eta square)
	Social relationships (53.22 ±18.54)	< 0.001	0.22 (eta square)
	Environment (53.47±10.21)	< 0.001	0.40 (eta square)
Psychological (47.48±16,67)	Social relationships (53.22 ±18.54)	< 0.001	0.06 (eta square)
	Environment (53.47±10.21)	< 0.001	0.14 (eta square)
Social relationships (53.22 ±18.54)	Environment (53.47±10.21)	0.722	-
Average QoL (54.70 ±9.00)			
Students IPSantarem	Comparison	p	effect size
Physical (65.58±11.61)	Psychological (52.15 ±15.19)	< 0.001	0.45 (eta square)
	Social relationships (52.09 ±19.77)	< 0.001	0.29 (eta square)
	Environment (54.45±10.79)	< 0.001	0.43 (eta square)
Psychological (52.15 ±15.19)	Social relationships (52.09 ±19.77)	0.367	-
	Environment (54.45±10.79)	< 0.01	0.02 (eta square)
Social relationships (52.09 ±19.77)	Environment (54.45±10.79)	<0.259	-
Average QoL (56.44±8.32)			

Thus, in the total sample, only between the social relations domain and the environment domain, there were no statistically significant differences. The highest mean value occurred in the physical domain, and the lowest was found in the psychological domain. There were also several comparisons with high effect sizes.

Analysing separately by the Institute, the behaviour of each of them was very similar to the one in the global sample. However, it should be noted that, at IPSantarem there weren't, in addition, significant differences between the psychological and social relations domains.

#### *Differences between IPLeiria and IPSantarem in the domains of Quality of Life*

Since the variables related to the four domains do not have a normal distribution, only in the comparison (table 5) between Institutes regarding the average QoL (average of the 24 questions), were used parametric

statistics (T-test for independent samples); in the remaining cases, was used the Mann-Whitney test.

Thus, the differences between the two Institutes proved to be statistically significant in the psychological domain ( $p < 0.001$ ) and in the average QoL ( $p < 0.01$ ), with higher values, in both cases, in the average results of the students of IPSantarem. The effect sizes were considered low (eta square of 0.022) in the psychological domain and high (Cohen's  $d$  8.69) in the mean QoL.

Analysing separately by gender, we find that the superiority of students from IPSantarem over those from IPLeiria in the psychological domain is manifested equally in both genders ( $p < 0.05$  in males,  $p < 0.01$  in females), with effect sizes considered low (eta square 0.03 and 0.02, respectively). However, the significant differences in the mean QoL were only verified, now, in the female gender ( $p < 0.05$ , high effect size - Cohen's  $d$  8.48), with superiority, also, in the female students of the IPSantarem face those of IPLeiria.

**Table 5.** Comparison between IPLeiria and IPSantarem in the domains of Quality of Life

<b>IPLeiria</b>	<b>IPSantarem</b>	<b>p</b>	<b>effect size</b>
Physical (64.29±13.24)	Physical (65.58±11.61)	0.246	-
Psychological (47.48 ±16.67)	Psychological (52.15 ±15.19)	< 0.001	0.022
Social relationships (53.22±18.54)	Social relationships (52.09 ±19.77)	0.704	(eta square)
Environment (53.47±10.21)	Environment (54.45 ±10.79)	0.228	-
Average QoL (54.70±9.00)	Average QoL (56.44 ±8.32)	< 0.01	8.69 (Cohen's d)

  

<b>Male students IPLeiria</b>	<b>Male students IPSantarem</b>	<b>p</b>	<b>effect size</b>
Physical (68.34±12.30)	Physical (67.21±10.94)	0.430	-
Psychological (50.46 ±18.73)	Psychological (56.15 ±15.64)	< 0.05	0.03 (eta square)
Social relationships (54.91 ±20.10)	Social relationships (50.68 ±21.92)	0.173	-
Environment (54.76±11.09)	Environment (55.93 ±11.22)	0.478	-
Average QoL (57.10±9.84)	Average QoL (58.38 ±8.11)	0.315	-

  

<b>Female students IPLeiria</b>	<b>Female students IPSantarem</b>	<b>p</b>	<b>effect size</b>
Physical (63.14±13.29)	Physical (64.84±11.85)	0.155	-
Psychological (46.63 ±15.97)	Psychological (50.41 ±14.68)	< 0.01	0.02 (eta square)
Social relationships (52.74 ±18.06)	Social relationships (52.73 ±18.72)	0.708	-
Environment (53.11±9.93)	Environment (53.78 ±10.54)	0.541	-
Average QoL (54.01±8.64)	Average QoL (55.56 ±8.28)	< 0.05	8.48 (Cohen's d)

**Table 6.** Differences, in each institute, between genders, in the domains of Quality of Life

<b>Male students IPLeiria</b>	<b>Female students IPLeiria</b>	<b>p</b>	<b>effect size</b>
Physical (68.34±12.30)	Physical (63.14±13.29)	0.001	0.02 (eta square)
Psychological (50.46 ±18.73)	Psychological (46.63 ±15.97)	0.123	-
Social relationships (54.91 ±20.10)	Social relationships (52.74 ±18.06)	0.139	-
Environment (54.76±11.09)	Environment (53.11±9.93)	0.131	-
Average QoL (57.10±9.84)	Average QoL (54.01±8.64)	< 0.01	8.23 (Cohen's d)

  

<b>Male students IPSantarem</b>	<b>Female students IPSantarem</b>	<b>p</b>	<b>effect size</b>
Physical (67.21±10.94)	Physical (64.84±11.85)	0.133	-
Psychological (56.15 ±15.64)	Psychological (50.41 ±14.68)	< 0.01	0.03 (eta square)
Social relationships (50.68 ±21.92)	Social relationships (52.73 ±18.72)	0.582	-
Environment (55.93 ±11.22)	Environment (53.78 ±10.54)	< 0.05	0.01 (eta square)
Average QoL (58.38 ±8.11)	Average QoL (55.56 ±8.28)	< 0.01	8.23 (Cohen's d)

Thus, in IPLeiria, the differences between the male and female genders proved to be statistically significant in the physical domain and the average QoL ( $p < 0.01$ ), with higher values, in both cases, in the average results of the students of the male gender. The effect sizes were considered low in the physical domain (eta square of 0.02) and high (Cohen's d 8.92) in the mean QoL.

In turn, at IPSantarem the differences between male and female genders proved to be statistically

significant in the psychological ( $p < 0.01$ ), environment ( $< 0.05$ ) and mean QoL ( $p < 0.01$ ) domains, with higher values, in all cases, in the average results of male students. The effect sizes were considered low in the psychological domain (eta square of 0.03) and the environmental domain (eta square of 0.01) and high (Cohen's d 8.23) in the mean QoL).

Age

## Higher education students' quality of life during COVID-19 pandemic

When considering four age groups by gender (up to 20 years old, 21 to 30 years old, 31 to 40 years old and over 40 years old) there were significant differences between students of different age groups only in the female gender of IPLeia and only in the psychological domain ( $p < 0.01$ ). There, in a posthoc analysis (Dunn Test), it was found that significant differences occurred between the group of older students and all the others, with (eta square) medium (group 4 with 1 and 2, respectively 0.08 and 0.09) and high (group 4 with group 3, in the amount of 0.45) effect sizes.

*Aggregated Marital Status (single or divorced / married and in a consensual union) by gender*

Only in the group of married students / consensual union at IPSantarem there are statistically significant differences with superiority of married and in a consensual union when compared to single/divorced and only in the psychological domain (56.7% vs 49.7%), with a large effect size (d Cohen's ratio of 14.57).

*School where you study (within the respective Institute)*

Male participants who study at the Higher School of Sport in Rio Maior (IPSantarem) attribute a percentage value ( $49.31 \pm 7.84$ ) significantly lower than that assigned by male students from the Higher School of Management and Technology ( $53.13 \pm 7.84$ ), Higher School of Health ( $58.13 \pm 9.35$ ) and Higher School of Education ( $65.63 \pm 11.97$ ), in the domain of QoL environment ( $p \leq 0.01$  in the 3 comparisons). In female participants, there is no difference in any of the domains (nor in the global average of QoL) between the different schools of IPSantarem.

At IPLeia there are no significant differences between any schools (although there was no response from Health), both for men and women.

*To have or not special status, by gender*

Only in female students of IPLeia there are statistically significant differences ( $p < 0.05$ ), with superiority of those with special status ( $68.65 \pm 9.72$ ) compared to those without this status ( $62.65 \pm 13.47$ ) in the physical domain (small effect size - eta square

of 0.02) and in the global average of QoL ( $t = 2.327$   $p < 0.05$ ), with a large effect size (Cohen's d 8.58).

*Region where you live outside the school period (Leiria, Santarem, Lisbon, Others) without separation by gender*

Given the normal distribution of the variables in question, the One-Way-ANOVA test allowed to identify differences in the physical ( $Z = 3.055$ ;  $p < 0.05$ ) and psychological ( $Z = 2.636$ ;  $p < 0.05$ ) domains.

Using Tukey's posthoc test, we noticed that the differences were located, in the physical domain ( $p < 0.05$ ), between residents in the district of Leiria ( $63.43 \pm 13.02$ ) and Santarem ( $66.37 \pm 11.60$ ) and psychological ( $p < 0.05$ ) between residents in the district of Santarem ( $51.16 \pm 14.53$ ) and residents in other districts ( $46.03 \pm 16.46$ ), always with values higher in students residing in the district of Santarem.

## DISCUSSION

Since studies related to the QoL of students in the context of the pandemic COVID-19 were scarce, as we have already mentioned, we are analyzing the present results of this study with others, whose context is similar. Nevertheless, the period in which it occurs is different.

Based on the observed results, the present study indicated that there are differences between the students at the Institutes analyzed about average QoL and psychological domain. The students who self-evaluate themselves with the best average QoL are from IPSantarem. Regarding the psychological domain, it is noteworthy that in IPLeia, the average is less than 50%, in both genders. This finding is in line with other studies, with higher education students about QoL, which point to a decrease in values in this domain compared to others (Artigas et al., 2017; Catunda & Ruiz, 2008; Petrini et al., 2013). This decrease may reflect the dissatisfaction with conditions in personal and/or academic life, with possible implications in the motivation for the development of the course (Artigas et al., 2017; Catunda & Ruiz, 2008), which is manifested in our study by reference of the students of the two Institutes to the decrease in the ability to concentrate during the confinement period by the pandemic COVID-19. It

can also be mentioned that female students from IPSantarem who are married and in consensual union, have higher average values compared to single/divorced women in the same Institute.

The domain of social relations has low values in both Institutes, with a predominance of students from IPSantarem, with lower self-assessment of QoL in this domain compared to the others. These results differ from those of other investigations, that also evaluate the QoL of higher education students, where this domain was the one with the highest average (Amadeu & Justi, 2017; Manzatto & Rocha, 2011). This result makes us assume that personal, family and friendship relationships, whether in an academic or family context, were affected. The socialization developed in a healthy academic context, in the intensification of the development of friendships and social life, was reduced during the period of confinement. However, in Ferrinho (2021) study, 19 respondents, maintained "always good interaction with family members, close friends and social network" (p.52).

Self-assessment related to the physical and environmental domains are, among the domains, the highest for the students at both Polytechnic Institutes. The results obtained regarding the physical domain are in line with the results of other studies (Amadeu & Justi, 2017; Carleto et al., 2019; Santos & Bittencourt, 2017), which may be related to the good health perception of students, that in the majority are young and can carry out daily activities with little or no difficulty, pain, or discomfort. The results referring to the environment domain stand out from other studies, where self-assessment presents values normally lower than the other domains, which are related to difficulties in adapting to the academic environment, as well as the separation of family members (Carleto et al., 2019; Catunda & Ruiz, 2008; Manzatto & Rocha, 2011), which in the context of our study was differentiated by the imposition of confinement by the pandemic COVID-19.

We do not know if these results are even influenced by the confinement, because in Ferrinho (2021) study on the impact of the COVID-19 pandemic on the lives of students (undergraduate, master and doctoral) at the Institute of Hygiene and Tropical Medicine (IHMT) in Lisbon, it is highlighted that "negative feelings of frustration, anxiety, anger and boredom, coexisted with positive feelings of joy, hope, pride and relief" (p. 52), although it was found that in the total of 23 students, 63% presented anxiety. But several studies

have shown that COVID-19 is anxiety-producing (Chen et al., 2020; Lai et al., 2020; Frontini et al., 2021). The study of Fouilloux et al. (2021) on physical activity and mental health in Mexican medical students allowed observing an association between physical activity practiced by students and benefits in their mental health. Students who practiced physical activity at a low level showed lower resilience and life satisfaction.

The study of Cadena-Duarte (2021) with university students aged 18-48 years, from a private institution in Bogotá, during the confinement, the dimension of self-esteem was the one that obtained greater differences in average between men and women, being lower in women, being related to psychological aspects, depression, anxiety, and social skills. These aspects affecting self-esteem increased in adults due to the confinement caused by the COVID-19 pandemic (Wang et al., 2020).

Also analyzing the data in each of the Polytechnic Institutes, we found that male students from IPSantarem show better self-assessment about the average QoL compared to female students. It is also the male students of IPSantarem who present a higher self-assessment in the psychological and environmental domains, as well as those of IPLeiria in the physical domain, about female students. These data corroborate the results of other studies referring to the QoL of students in higher education (Chazan & Campos, 2013; Fiedler, 2008), which point to a bigger vulnerability about QoL in females students.

## LIMITATIONS AND FUTURE WORKS

It would have been interesting to have a broader perspective of the effects of confinement in different countries, at the beginning of the pandemic, using the same survey instrument. On the other hand, to be able to infer the results to the population of the two institutes, it would have been important to have a representative sample.

It would have been interesting to have assessed more socio-demographic data, such as, for example, socio-economic status, whether the patient was accompanied or alone during the confinement; if accompanied, the number of cohabitants; whether they practiced any type of physical activity at home; how they spent their time at home.

## CONCLUSIONS

## Higher education students' quality of life during COVID-19 pandemic

Studying QoL in higher education students is essential to understand their living conditions, lifestyles, and needs, to develop preventive and health promotion actions in this area.

The development of this study allowed us to achieve the objective of evaluating the impact of the pandemic COVID-19 on the quality of life of students in higher education at IPSantarem and IPLeiria.

Students' self-assessment of QoL is globally superior to self-assessment with their satisfaction with health, with female students having lower average values than male students.

Regarding the domains of QoL, the physical and environmental domains are those in which students from both Institutes evaluate themselves better in terms of their QoL, highlighting female students from IPLeiria who enjoy special status in the higher education regime, which have higher average values, compared to students who do not enjoy status. The domain of social relations has low average values, with students from IPSantarem standing out, with lower self-assessment of QoL in this domain, compared to those from IPLeiria. In the psychological domain, the low average values in both institutes stand out, especially in IPLeiria, where the average is less than 50%, in both genders. The lower results in these two domains (psychological and social relations) may be related to the period of confinement imposed by the pandemic COVID-19, and further studies in this area are imperative.

### PRACTICAL APPLICATIONS

The findings suggest the importance of implementing intervention programs or strategies aimed at health promotion. In the sense of promoting QoL among higher education students, the results point to the need for intervention, especially in the psychological domain. Future interventions are proposed with a focus on psychosocial factors, with possible different approaches and taking into consideration the gender of the students. Thus, the pertinence of the development of an online program to promote students' QoL is verified, enabling the integration of health promotion in the institutional and academic culture, according to the Edmonton Charter (Pan American Health Organization and World Health Organization, 2005), where confinement generated changes in the psychological domain.

The use of new information and communication technologies for distance learning, such as e-learning and b-learning should be considered in Higher Education Institutions that also have responsibility for the health of students and those who work in them, creating environments conducive to health, in a salutogenic, ecological, systemic, and holistic approach to health promotion (Dooris & Doherty, 2010).

### Funding

This work was supported by national funds through FCT-Fundação para a Ciência e Tecnologia, I.P., within the framework of the project UIDB/04748/2020.

### Conflicts of interest

None

### Acknowledgements

The authors would like to thank Beatriz Amorim for the precious work of revising the English writing of this article.

### REFERENCES

1. Abreu, M., & Dias, I. (2016). Relação entre qualidade de vida e exercício físico em contexto de ensino superior. *Revista da UIIPS*, 4(2): Número Especial do Congresso, 216-229.  
<https://doi.org/10.25746/ruiips.v4.i2.9933>
2. Alves, J., Tenório, M., Anjos, A., & Figueroa, J. (2010). Qualidade de vida em estudantes de Medicina no início e final do curso: avaliação pelo WHOQOL-Bref. *Revista Brasileira de Educação Médica*, 34(1), 91-96.  
<https://doi.org/10.1590/S0100-55022010000100011>
3. Antunes, R., Frontini, R., Amaro, N., Salvador, R., Matos, R., Morouço, P., & Rebelo-Gonçalves, R., (2020). Exploring lifestyle habits, physical activity, anxiety, and basic psychological needs in a sample of Portuguese adults during covid-19. *International Journal of Environmental Research and Public Health* 17(12),4360.  
<https://doi.org/10.3390/ijerph17124360>

4. Antunes, R., Rebelo-Gonçalves, R., Amaro, N., Salvador, R., Matos, R., Morouço, P. & Frontini, R. (2021). Higher Physical Activity Levels May Help Buffer the Negative Psychological Consequences of Coronavirus Disease 2019 Pandemic. *Frontiers in Physiology*, 12, 672811, 1-8. <https://doi.org/10.3389/fpsyg.2021.672811>
5. Amadeu, J., & Justi, M. (2017). Qualidade de vida de estudantes de graduação e pós-graduação em Odontologia. *Archives of Health Investigation*, 6 (11), 540-544. <https://doi.org/10.21270/archi.v6i11.2275>
6. Artigas, J., Moreira, N., & Campos, W. (2017). Percepção da Qualidade de Vida em Universitários: Comparação entre períodos de graduação. *Arquivos de Ciências da Saúde da UNIPAR*, 21 (2), 85-91. <https://doi.org/10.25110/arqsaude.v21i2.2017.5525>
7. Ato, M., López, J., & Benavente, A. (2013). Un sistema de clasificación de los diseños de investigación en psicología. *Anales de Psicología*, 29 (3), 1038-1059. <https://doi.org/10.6018/analesps.29.3.178511>
8. Belzunegui-Eraso, A., & Erro-Garcés, A. (2020). Teleworking in the Context of the Covid-19 Crisis. *Sustainability*, 12, 3662. <https://doi.org/10.3390/su12093662>
9. Benavente, A., Peixoto, P., & Gomes, R. (Coords.) (2020). *Impacto da Covid-19 no sistema de ensino português. Resultados parciais a 28 de abril 2020 – parte 5*. Observatório de Políticas de Educação Formação e Ciência. <https://www.ceied.ulusoфона.pt/pt/op-edu-divulgados-novos-resultados-estudo-impacto-covid-19/>
10. Burns, T. (2020, março 18). *A helping hand: Education responding to the coronavirus pandemic*. OECD Directorate for Education and Skills. <https://oecdeditoday.com/education-responding-coronavirus-pandemic/>
11. Cadena-Duarte, L., & Cardozo, L. (2021). Percepción del autoconcepto físico en estudiantes universitarios en tiempos de confinamiento por COVID-19. *Cuadernos de Psicología del Deporte*, 21(3), 48-61. <https://doi.org/10.6018/cpd.443591>
12. Calado, S. (2020, março15). Universidades: Covid-19 deixa professores e estudantes separados por um ecrã. *Pessoas*. <https://eco.sapo.pt/especiais/covid-19-poe-alunos-e-professores-a-distancia-de-um-ecra/>
13. Carleto, C., Cornélio, M., Gaudenci, E., Haas, V., & Pedros, L. (2019). Saúde e qualidade de vida de universitários da área da saúde. *Revista Família, Ciclos de Vida e Saúde no Contexto Social*, 7 (1), 53-63. <https://doi.org/10.18554/refacs.v7i1.2966>
14. Catunda, M., & Ruiz, V. (2008). Qualidade de vida de Universitários. *Revista Pensamento Plural*, 2 (1), 22-31. <https://www.fae.br/2009/PensamentoPlural/Todas/artigo21-qualidadedevidadeuniversitarios.pdf>
15. Chazan, A., & Campos, M (2013). Qualidade de Vida de Estudantes de Medicina medida pelo WHOQOL-Bref - UERJ, 2010. *Revista Brasileira de Educação Médica*, 37 (3), 376-384. <https://doi.org/10.1590/S0100-55022013000300010>
16. Chen, P., Mao, L., Nassis, G., Harmer, P., Ainsworth, B., & Li, F. (2020). Coronavirus disease (COVID-19): the need to maintain regular physical activity while taking precautions. *Journal of Sport and Health Science*, 9 (2), 103–104. <https://doi.org/10.1016/j.jshs.2020.02.001>
17. Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2ª ed.). Lawrence Erlbaum.
18. Comissão Nacional da UNESCO (2020, junho 8). *Mensagem de Audrey Azoulay, Diretora-Geral da UNESCO, por ocasião do Dia Mundial dos Oceanos*. <https://unescoportugal.mne.gov.pt/pt/noticias/mensagem-de-audrey-azoulay-diretora-geral-da-unesco-por-ocasio-do-dia-mundial-dos-oceanos-2020>

## Higher education students' quality of life during COVID-19 pandemic

19. Decreto n.º 14-A/2020. (2020) do Presidente da República. Diário da República: I Série, 3º Supl, n.º 55/2020. <https://dre.pt/dre/detalhe/decreto-presidente-republica/14-a-2020-130399862>
20. Dooris, M., & Doherty, S. (2010). Healthy universities: Time for action – a qualitative research study exploring the potential for a national programme. *Health Promotion International*, 25 (1), 94 -106. <https://doi.org/10.1093/heapro/daq015>
21. Ferrinho, P. (2021). Impacto da pandemia de COVID-19 na vida dos estudantes da NOVA-IHMT. *Anais do Instituto de Higiene e Medicina Tropical*, 9, 50-54. <https://doi.org/10.25761/anaisihmt.355>
22. Fiedler, P. (2008). *Avaliação da qualidade de vida do estudante de medicina e da influência exercida pela formação académica* [doctoral dissertation Universidade de São Paulo]. <http://dx.doi.org/10.11606/T.5.2008.tde-10072008-161825>
23. Fouilloux, C., Fouilloux-Morales, M., Tafoya, S., Petra-Micu, I. (2021). Asociación entre actividad física y salud mental positiva en estudiantes de medicina en México: un estudio transversal. *Cuadernos de Psicología del Deporte*, 21(3), 1-15. <https://doi.org/10.6018/cpd.414381>
24. Frontini, R., Rebelo-Gonçalves, R., Amaro, N., Salvador, R., Matos, R., Mouroço, P., & Antunes, R. (2021). The relationship between anxiety levels, sleep, and physical activity during COVID-19 lockdown: An exploratory study. *Frontiers in Physiology*, 12:659599. <http://dx.doi.org/10.3389/fpsyg.2021.659599>
25. Grove, S. K., Burns, N., & Gray, J. R. (2013). *Practice of Nursing Research: Appraisal, Synthesis, and Generation of Evidence* (9th ed.). Elsevier.
26. Hill, M., & Hill, A. (2012). *Investigação por questionário* (2ª ed.). Edições Sílabo.
27. Lee, J. (2020). Mental health effects of school closures during Covid-19. *The Lancet Child & Adolescent Health*, 4 (6), 421. [https://doi.org/10.1016/S2352-4642\(20\)30109-7](https://doi.org/10.1016/S2352-4642(20)30109-7)
28. Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., Wu, J., Du, H., Chen, T., Li, R., Tan, H., Kang, L., Yao, L., Huang, M., Wang, H., Wang, G., Liu, Z., & Hu, S. (2020). Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Network Open*, 3, 1-16. <https://doi.org/10.1001/jamanetworkopen.2020.3976>
29. Magalhães, P., Gouveia, R., Costa-Lopes, R., Silva, P. (2020). *O Impacto Social da Pandemia. Estudo ICS/ISCTE Covid-19*. Repositório da Universidade de Lisboa. <http://hdl.handle.net/10451/42911>
30. Manzatto, L. & Rocha, T. (2011). Consumo de álcool e qualidade de vida em estudantes universitários. *Revista Conexões*, 9 (1), 37-53. <https://doi.org/10.20396/conex.v9i1.8637712>
31. Ministério da Ciência, Tecnologia e Ensino Superior (2020, março 13). Comunicado: *Suspensão de todas as atividades letivas e não letivas com presença de estudantes em todas as instituições de Ensino Superior*. <https://www.portugal.gov.pt/pt/gc22/comunicacao/comunicado?i=suspensao-de-todas-as-atividades-letivas-e-nao-letivas-com-presenca-de-estudantes-em-todas-as-instituicoes-de-ensino-superior>
32. Ordem dos médicos (2020, janeiro 22). Atualização – *Surto de pneumonia por novo Coronavírus (2019-nCoV) na China*. <https://ordemdosmedicos.pt/atualizacao-surto-de-pneumonia-por-novo-coronavirus-2019-ncov-na-china/>
33. Organização das Nações Unidas (2020, março 10). *Covid-19: Unesco divulga 10 recomendações sobre ensino a distância*

- devido ao novo coronavírus. <https://news.un.org/pt/story/%202020/03/1706691>
34. Organização das Nações Unidas para a Educação, Ciência e Cultura (2020a, março 04). *290 million students out of school due to Covid-19: UNESCO releases first global numbers and mobilizes response*. <https://en.unesco.org/news/290-million-students-out-school-due-covid-19-unesco-releases-first-global-numbers-and-mobilizes>
  35. Organização das Nações Unidas para a Educação, Ciência e Cultura (2020b, maio 25). *Adverse consequences of school closures*. <https://en.unesco.org/covid19/educationresponse/consequences>
  36. Organização das Nações Unidas para a Educação, Ciência e Cultura (2020c, abril 29). *1.3 billion learners are still affected by school/university closures*. <https://en.unesco.org/news/13-billion-learners-are-still-affected-school-university-closures-educational-institutions>
  37. Oviedo, C. & Campo-Arias, A. (2005). Aproximación al uso del coeficiente alfa de Cronbach. *Revista Colombiana de Psiquiatria*, 34 (4), 572-580. <https://www.redalyc.org/articulo.oa?id=80634409>
  38. Petrini, A., Margato, G., & Júnior, G. (2013). Avaliação da percepção da qualidade de vida de jovens universitários: comparativo entre graduandos do turno diurno e noturno. *Revista Brasileira de Qualidade de Vida* 5 (3), 1-08. <https://doi.org/10.3895/S2175-08582013000300001>
  39. Pan American Health Organization/ World Health Organization (2005). *The Edmonton Charter for Health Promoting Universities and Institutions of Higher Education*.
  40. Ramos-Dias, J.; Libardi, M., Zillo, C., Igarashi, M., & Senger, M. H. (2010). Qualidade de vida em cem estudantes do curso de Medicina de Sorocaba - PUC/SP. *Revista Brasileira de Educação Médica*, 34 (1), 116-123. <https://doi.org/10.1590/S0100-55022010000100014>
  41. Reigal, R., Pastrana-Brincones, J., González-Ruiz, S., Hernández-Mendo, A., Morillo-Baro, J., & Morales-Sánchez, V. (2020). Use of Data Mining to Determine Usage Patterns of an Online Evaluation Platform During the COVID-19 Pandemic. *Frontiers in Physiology*, 25 (11), 588843. <https://doi.org/10.3389/fpsyg.2020.588843>
  42. Reigal, R., Páez-Maldonado, J., Pastrana-Brincones, J., Morillo-Baro, J., Hernández-Mendo, A., & Morales-Sánchez, V. (2021). Physical Activity Is Related to Mood States, Anxiety State and Self-Rated Health in COVID-19 Lockdown. *Sustainability*, 13(10), 5444. <https://doi.org/10.3390/su13105444>
  43. Rodrigues, J., Borrego, C. Chicau., Ruivo, P., Sobreiro, P., Catela, D., Amendoeira, J., & Matos, R. (2020). Conceptual Framework for the Research on Quality of Life. *Sustainability*, 12 (4911), 1-16. <https://doi.org/10.3390/su1212491>
  44. Santos, B. & Bittencourt, F. (2017). Análise da qualidade de vida e fatores associados dos acadêmicos da área de saúde de uma faculdade particular. Id online. *Revista de psicologia*, 10 (33), 186-197. <https://doi.org/10.14295/online.v10i33.611>
  45. Serviço Nacional de Saúde (2021, junho 25). Temas da saúde - COVID-19. <https://www.sns24.gov.pt/tema/doencas-infecciosas/covid-19/>
  46. Silva, E., & Heleno, M.G. (2012). Qualidade de Vida e Bem-Estar Subjetivo de Estudantes Universitários. *Revista Psicologia e Saúde*, 4 (1), 69-76. <https://doi.org/10.20435/pssa.v4i1.126>
  47. The WHOQOL Group (1995). The World Health Organization Quality of Life Assessment (WHOQOL): Position paper from the World Health Organization. *Social*



## Higher education students' quality of life during COVID-19 pandemic

- Science & Medicine*, 41(10), 1403-1409. [https://doi.org/10.1016/0277-9536\(95\)00112-K](https://doi.org/10.1016/0277-9536(95)00112-K)
48. The WHOQOL Group (1998). Development of the World Health Organization WHOQOL-BREF Quality of Life Assessment. *Psychological Medicine*, 28, 551-558. [https://doi.org/10.1016/0277-9536\(95\)00112-K](https://doi.org/10.1016/0277-9536(95)00112-K)
49. Torales, J., Higgins, M. O., Castaldelli-Maia, J. M., & Ventriglio, A. (2020). The outbreak of Covid-19 coronavirus and its impact on global mental health. *International Journal of Social Psychiatry*, 66 (4), 317-320. <https://doi.org/10.1177/0020764020915212>
50. Vaz-Serra, A., Canavarro, M. C., Simões, M. R., Pereira, M., Gameiro, S., Quartilho, M. J., Rijo, D., Carona, C., Paredes, T. (2006). Estudos psicométricos do instrumento de avaliação da qualidade de vida da Organização Mundial de Saúde (WHOQOL-Bref) para Português de Portugal. *Psiquiatria Clínica*, 27(1), 41-49. <http://hdl.handle.net/10316/21539>
51. Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R.C. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health*, 17(5), 1729. <https://doi.org/10.3390/ijerph17051729>
52. World Health Organization (1998). *WHOQOL User Manual*. [https://www.who.int/mental\\_health/evidence/who\\_qol\\_user\\_manual\\_98.pdf](https://www.who.int/mental_health/evidence/who_qol_user_manual_98.pdf)
53. World Health Organization. (2013, January 8). *Programme on mental health: WHOQOL user manual, 2012 revision*. <https://www.who.int/publications/i/item/WHO-HIS-HSI-Rev.2012-3>
54. World Health Organization. (2020). *Doing What Matters in Times of Stress: An Illustrated Guide*. [https://www.who.int/publications/i/item/9789240003927?gclid=CjwKCAjw4c-ZBhAEEiwAZ105RUKxWP\\_x4Ju5xi6ghAFibMPRSye2\\_1m6FuTa\\_a06eeW1FSZu-45LSbRoCdRoQAvD\\_BwE](https://www.who.int/publications/i/item/9789240003927?gclid=CjwKCAjw4c-ZBhAEEiwAZ105RUKxWP_x4Ju5xi6ghAFibMPRSye2_1m6FuTa_a06eeW1FSZu-45LSbRoCdRoQAvD_BwE)
55. Xavier, B., Camarneiro, A. P., Loureiro, L., Menino, E., Cunha-Oliveira, A., & Monteiro, A. P. (2020). Impacto da COVID-19 nas dinâmicas sociofamiliares e académicas dos estudantes de enfermagem em Portugal. *Revista de Enfermagem Referência*, 5(4), e20104. <https://doi.org/10.12707/RV20104>
56. Zhang, Y., Qu, B., Lun, S., Wang, D., Guo, Y., & Liu, J. (2012). Quality of Life of Medical Students in China: A Study Using the WHOQOL-BREF. *PLoS ONE*, 7 (11), e49714. <https://doi.org/10.1371/journal.pone.0049714>