Effects of the COVID-19 pandemic on the biopsychosocial aspects of university students from Paraíba: a cross-sectional study

Efeitos da pandemia da COVID-19 sobre os aspectos biopsicossociais de universitários paraíbanos: estudo transversal

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ABSTRACT

The aim of the study was to analyze the possible effects of the COVID-19 pandemic on the perception of learning, mental health and quality of life of university students in Paraíba, Brazil. This is a cross-sectional, quantitative and analytical study conducted using the STROBE recommendations. The participating students showed a high incidence of difficulty in the distance education (DE) model (71.5%), dissatisfaction with the course (68.8%), learning difficulties (82.6%) and reported not having a good learning experience (82.6%). It can also show that more than half of the students (58.3%) scored 11.22 on their anxiety levels, which results in a warning sign for anxiety symptoms. This research was able to show that the academic aspects of university students in Paraíba suffered significant negative impacts, these findings may be associated with the decline of biopsychosocial aspects associated with the COVID-19 pandemic.

Keywords: Mental Health. SARS-CoV-2. Epidemiology.

RESUMO

O objetivo do estudo foi analisar os possíveis efeitos da pandemia de COVID-19 na percepção de aprendizagem, saúde mental e qualidade de vida de universitários da Paraíba, Brasil. Trata-se de um estudo transversal, quantitativo e analítico conduzido por meio das recomendações do STROBE. Os participantes do estudo demonstraram alta incidência de dificuldade no modelo de educação a distância (EaD) (71,5%), insatisfação com o curso (68,8%), dificuldades de aprendizagem (82,6%) e relataram não ter uma boa experiência de aprendizagem (82,6%). Também pode mostrar que mais da metade dos alunos (58,3%) obteve uma pontuação de 11,22 em seus níveis de ansiedade, o que resulta em um sinal de alerta para sintomas de ansiedade. Essa pesquisa pôde evidenciar que os aspectos acadêmicos de universitários na Paraíba sofreram impactos negativos significativos, esses achados podem estar associados com o declínio dos aspectos biopsicossociais associado à pandemia da COVID-19.

Palavras-chave: Saúde Mental. SARS-CoV-2. Epidemiologia.

INTRODUCTION

The disease caused by the new coronavirus (COVID-19) is defined as an infectious pathology generated by the SARS-CoV-2 virus, whose symptoms can vary between mild, moderate and severe[1]. In the most severe cases, patients may manifest respiratory difficulty, hypoxemia and respiratory failure [2]. As a result, in early 2020, the World Health Organization (WHO) declared a state of emergency to contain coronavirus worldwide[1-2].

In April 2020, infections caused by SARS-CoV-2 were already alarming. The new coronavirus was already present in more than 210 countries and the number of confirmed cases had already reached the mark of 2.1 million, with approximately 144 thousand confirmed deaths[1-2]. Since then, the WHO has recommended the adoption of security measures, which mainly include social distancing, closing establishments, cancellation of festivities, so that a slowdown in the pandemic can occur, preventing the overload of health services[3].

In view of this, some countries have adopted preventive measures that include hand hygiene, mass testing, case isolation, adoption of the use of face masks, respiratory tags (preventive habits), closing universities, schools, restrictions on public transport, travel and raising the awareness of the population to stay at home, until the complete prohibition of movement on the streets, with the exception of buying medicines and buying food or seeking health care[1].

Based on this assumption, the security measures, although necessary, caused significant impacts on the population's mental health, thus providing the socio-emotional decline, intensification of negative emotions, hopelessness, loneliness and sadness[4]. In addition, given the population's need to stop with their routine and replan their daily activities, uncertainties about the academic future have become increasingly evident[1-2].

COVID-19 has had unimaginable impacts on all social spheres of humanity, experiencing a historic rupture in the way in which various collective practices are developed[3]. Social life has been compromised and this affects the entire world in its various spheres: social, biological, educational, political and economic. In the midst of such practices, education contrasts with the paradox between the innovations of strategies and the teaching tradition[3]. With this, educational environments such as schools, colleges and universities continued the teaching-learning process, adhering to alternative forms education. The use of Digital Information and Communication Technologies (DICTs) has become the predominant way to boost in the emergency context[5].

Thus, this research was necessary to analyze and detail such changes in the current scenario that the COVID-19 pandemic has brought, especially in the mental health of university students and the effectiveness of new educational technologies in the perception of academic learning. This study is relevant since few

studies were found that related levels of stress, anxiety, depression, quality of life and their possible association with the learning of university students during this pandemic period.

Therefore, the following research question was raised: what are the impacts that the COVID-19 pandemic had on mental health, perception of learning and quality of life of university students? Aiming to analyze the possible effects of the COVID-19 pandemic on the perception of learning, mental health and quality of life of university students.

MATERIALS AND METHODS

This is a cross-sectional, quantitative and analytical study conducted through the recommendations of STROBE[6]. Participated in this research 253 Brazilian university students from the state of Paraíba, from public or private education, regularly enrolled in Higher Education Institutions (HEI). The research was carried out between October and December 2020, after the implementation of sanitary measures of social isolation and the use of remote teaching methodologies by the HEIs.

The sample size was calculated using the GPower software version 3.1.9.2 (Kiel, Germany) for Windows. Information from the 2016 INEP Census was considered, which identified a total number of higher education students in Paraíba of 136,216, adopting an alpha error of 0.05, a test power of 80% and a confidence level of 95%, the calculation being carried out through the website: https://pt.surveymonkey.com/mp/sample-size-calculator/ totaling a sample of 246 individuals. Inclusion criteria were: being a higher education student, with active enrollment in an accredited HEI and having already started at least one period of the course. Duplicate responses and questionnaires not completed in full were excluded.

Data collection was carried out through a questionnaire made available on the Google FORMS® platform shared in groups and social media of higher education students. The students answered a standard questionnaire prepared by the responsible researchers, which included information related to age, gender, marital status, employment status, family income, place of stay during social isolation, children, religion, physical activity, practice of activities leisure activities during the pandemic and type of higher education institution (HEI) link (public or private). Students were also asked about their perception of satisfaction with the course, difficulty with Distance Education (EaD), satisfaction with distance education, good learning, focus and participation in classes.

To assess the levels of anxiety and depression, the Anxiety and Depression Scale (HAD) instrument was used, in Portuguese, the Hospital Anxiety and Depression Scale. This instrument was formulated by Zigmond and Snaith[7], which was later translated and validated by Botega *et al.*[8] for Portuguese. This instrument was first created to be used in patients of non-psychiatric services of a general hospital[7].

Its main components track depressive signs, low self-esteem, nervous disturbance, hypervigilance, vegetative symptoms, detection of affective disorders, among others. The questionnaire is short and can be filled out quickly; the patient is asked to respond based on how he felt during the past week. The instrument consists of 14 multiple-choice questions, where the levels of depression and anxiety are measured using a LIKERT scale, scored from 0 to 3. This tool is divided into two domains: anxiety level (7 items) and depression level (7 items). The global score in each subscale varies between 0-21, and the scores are evaluated using the following criteria: 0 – 7 points: unlikely; 8 – 11 points: possible – (questionable or doubtful) and 12 – 21 points: probable[8].

The Perceived Stress Scale (PSS) was developed by Cohen, Karmack and Mermelsteinm [9]. It was translated and validated by Luft *et al*.[10] for Portuguese. The PSS assesses the individual's perception of how unpredictable and uncontrollable the life events experienced in the last month seem. of stresses, the brevity of the instrument stands out, which favors its application in conjunction with other measures. The PSS was initially developed with 14 items (PSS-14)[9], being seven positive and seven negatives. Subsequently, reduced versions of the instrument were produced, containing 10 (PSS-10, six positive and four negative). Items 4, 5, 7 and 8 are positive and for this reason the score must be reversed Ex: 0 = 4, 1 = 3, 2 = 2, 3 = 1 and 4 = 0. After the reversal, all items must be summed up. The score, obtained with the sum of all items, is used as a measure of perceived stress.

To assess quality of life, the SF-36 instrument (The Medical Outcomes Study 36-item short-form healthy survey) was used, translated and validated for the Brazilian reality by Ciconelli *et al*.[10]. The SF-36 is a multidimensional questionnaire composed of 36 items, with two to six possibilities of objective answers, distributed in eight domains, which can be grouped into two major components: the physical (functional capacity, physical aspects, pain and general state of health) and mental (mental health, vitality, social aspects and emotional aspects). For the final score of this questionnaire, the Raw Scale Calculation is applied. Who's the researcher will transform the value of the previous questions into scores for 8 domains ranging from 0 (zero) to 100 (one hundred), where 0 = worst and 100 = best for each domain. It is called raw scale because the final value has no unit of measurement. The domains are: Functional capacity; limitation by physical aspects; pain; general health status; vitality; social aspects and emotional aspects[11].

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) software, version 23.0 (SPSS, Chicago, IL, USA). Data normality was analyzed using the Kolmogorov-Smirnov test. Quantitative variables were described using means and standard deviations, median and interquartile ranges, depending on the presentation of data normality. Categorical variables were described by absolute and relative frequencies.

A multiple linear regression analysis (Stepwise method) was used to assess which variables are able to determine the variation in scores related to the self-perception of good learning reported by the study participants. Variables with $p < 0.05$ that were considered and retained in the final model. A significance level or p-value <0.05 and a 95% confidence interval was used for all tests.

The study followed all the ethical precepts proposed by resolution 466/12, and was submitted and approved by the research ethics committee, with the opinion number: 4,377,795. Participants were informed of the non-compulsory participation in the study, absence of financial expenses and anonymity in relation to the data collected. Volunteers were also instructed on the availability of the Free and Informed Consent Form (ICF) to be downloaded.

RESULT

A total of 253 university students of different age groups participated in the study. The sociodemographic characteristics of the participants can be seen in Table 1.

The participating students demonstrated a high incidence of difficulty in the distance education (DE) model (71.5%), dissatisfaction with the course (68.8%), learning difficulties (82.6%) and reported not having a good learning experience (82, 6%). These aspects can also be seen in detail in Table 2.

Table 1. Sample characterization

Variables	Values/%
N	253
Age n (%)	
18-24	171 (71.5)
25-34	53 (20.9)
+35	19 (7.5)
Sex n (%)	
Masculine	106 (41.9)
Feminine	143 (56.5)
Undefined	4 (1.6)
Marital status of (%)	
Single	216 (85.4)
Married	20 (7.9)
Divorced	6 (2.4)
Consensual Relationship	11 (4.3)
Family Income n (%)	
Less than 1,100	49 (19.4)
1200-3000	117 (46.2)
3001-4000	37 (14.6)
4001-5000	42 (16.6)
More than 5000	8 (3.2)
Place of Stay n (%)	
Urban Area	195 (77.1)
Countryside	38 (15.0)
Both	20 (7.9)
Children n (%)	
Yes	29 (11.5)
No	224 (88.5)
Religiosity n (%)	
Yes	155 (61.3)
No	98 (38.7)
Regular Physical Activity n (%)	
Yes	102 (40.3)
No	70 (27.7)
Sometimes	57 (22.5)
Rarely	24 (9.5)
Leisure n (%)	
Yes	143 (56.5)
No	110 (43.5)
Diagnosis of Depression n (%)	
Yes	47 (18.6)
No	206 (81.4)
University Network n (%)	
Public	74 (29.2)
Private	179 (70.8)

Source: Survey data

Table 2. Variables on academic aspects

Variables	Values/%
N	253
Satisfaction with the course n (%)	
Yes	192 (75.9)
No	61 (24.1)
Desire to change courses n (%)	
Yes	41(16.2)
No	212 (83.8)
Difficulty in distance learning n (%)	
Yes	181 (71.5)
No	72 (28.5)
Satisfaction with distance learning n (%)	
Yes	79 (31.2)
No	174 (68.8)
Good learning n (%)	
Yes	44 (17.4)
No	209(82.6)
Loss of Focus n (%)	
Yes	207 (81.8)
No	46 (18.2)
Class participation n (%)	
Yes	146 (57.7)
No	107 (42.3)

Source: Survey data

Table 3 below describes the scores obtained for anxiety, depression and perceived stress.

Table 3. Quality of life and mental health variables

Variables	Values
N	253
Anxiety Level	11.22 (Questionable or Doubtful)
Depression	9.18 (Questionable or Doubtful)
Perceived Stress	10.24 (Perceived Stress)
QOL - Mental Health n (%)	26 (10.3)
Very Good	83 (32.8)
Good	109 (43.1)
Intermediary	27 (10.7)
Bad	8 (3.2)
Too bad	
QOL - General Health n (%)	15 (5.9)
Excellent	70 (27.7)
Very Good	96 (37.9)
Good	66 (26.1)
Reasonable	6 (2.4)
Weak	
QOL - Functional Capacity n (%)	198 (78.3)
Nothing Limited	44 (17.4)
Little Limited	11 (4.3)
Very Limited	
QOL - Limitations due to functional aspects n (%)	54 (21.3)
Never	61 (24.1)
Shortly	73 (28.9)
Sometimes	38 (15.0)
Most of the time	27 (10.7)
Ever	
QOL - Limitations due to emotional aspects n (%)	52 (20.6)
Never	32 (12.6)
Shortly	64 (25.3)
Sometimes	64 (25.3)
Most of the time	41 (16.2)
Ever	
QL - Social aspects n (%)	60 (23.7)
Nothing Harmed	17 (6.7)
Slightly Impaired	98 (38.7)
Moderately Impaired	54 (21.3)
Much Impaired	24 (9.5)
Extremely Harmed	
QOL - Pain n (%)	141 (55.7)
Light	75 (29.6)
Moderate	22 (8.7)
Strong	8 (3.2)
Very strong	7 (2.8)
None	
QOL - Vitality n (%)	77 (30.4)
Preserved	148 (58.5)
Slightly Decreased	28 (11.1)

Anxiety and depression score: 0 – 7 points: unlikely; 8 – 11 points: possible – (questionable or doubtful); 12 – 21 points: probable. Average Perceived Stress Score: up to 21.3 (18-29 years); up to 17.8 between 30-44 years; up to 17.2 between 45-54 years; up to 14.5 between 55-64 years and up to 15.7 between 65 years and above.

Source: Survey data

The multiple linear regression model showed that class participation, marital status and loss of focus were associated with a 37% variation in the self-perception of good learning scores reported by the participating students, as shown in Table 4.

Table 4. Multiple linear regression of variables associated with the participating students self-perception of good learning

F (13.05) = 0,01; p=0.025; R²= 0,36			
Variable	**ß**	**p-value**	**IC**
Intercept	0,12	0,03	0,01 - 0,24
Participation in classes	0,22	≤0,01	0,13 - 0,31
Marital status	0,07	≤0,01	0,02- 0,12
Loss of Focus	-0,13	0,02	-0,01 - 0,98

Source: Survey data

Regarding variables related to students' mental health, the multivariate analysis model revealed that only depression scores were negatively associated with a 13% variation in scores related to self-perception of learning, as seen in Table 5.

Table 5. Multiple linear regression of mental health variables associated with the participating students self-perception of good learning

F (4,68) = 0,03; p=0.03; R²= 0,13			
Variable	**ß**	**p-value**	**IC**
Intercept	0,30	0,01	0,17 - 0,42
Depression Level	-0,01	0,03	-0,02 - -0,01

Source: Survey data

DISCUSSION

This study aimed to analyze the impacts of the COVID-19 pandemic on academic, psychological and quality of life aspects of university students. Among the most prevalent variables, the following stand out: students between 18 and 24 years old (71.5%), female (56.5%), single (85.4%), with family income between R$ 1,200.00 to R$ 3,000.00 reais (46.2%), place of urban permanence (77.1%), without children (88.5%), religious (61.3%), practitioners of regular physical activity (40.3%), who perform leisure activities (56.5%), without a diagnosis of depression (81.4%) and students from a Private Education Institution (70.8%).

These sociodemographic findings are in line with similar national articles[12-13].

The findings show that 148 students (58.3%) obtained a score of 11.22 in their anxiety levels, which results in a questionable or doubtful warning sign for anxiety symptoms. Associated with this, levels of depression were evidenced in more than half of the sample (50.4%) of the study. Similar results were found in the international study by Wang *et al.*[14] indicating that the damage to the mental health of university students caused by the COVID-19 pandemic had a global character.

However, the perception of stress stood out as the variable with the highest prevalence of mental health in students. The

final average of the sample obtained a score of 24.10. This result was above the normality table for all age groups and regardless of sex[15]. Significant losses related to quality of life were also observed, with higher percentages of impairment reported in the mental health domains, limitations due to functional, emotional aspects, social and vitality. Corroborating this way, with the polls of[14-16-17].

According to the study by Ladies 5, the coronavirus pandemic has brought about several changes in the educational context. As a result, many countries began to develop and implement strategies to mitigate the effects of social isolation in the face of the closure of universities and other educational centers. One of the strategies adopted to continue with the teaching-learning process was the use of Digital Information and Communication Technologies (DICTs), which were mostly disseminated in the context of the health crisis, thus changing the way of communicating, working, relating up and learn.

The studies by Zajac[18] and by Costa, Freitas and Oliveira[19] state that remote teaching is a positive way to keep students focused on their studies, in addition to promoting the maintenance of cognitive processes, critical thinking and learning. However, the scientific findings of the aforementioned research go in the opposite direction to that of this study, since 81.8% of the studied sample claimed to lose focus, and demonstrated that they did not have a good learning curve (82.6%). However, as it is a variable that is perceived by students, it is observed that sociocultural factors may be involved in this divergence between scientific literary findings.

Still in the educational aspects, the study can show that 71.5% of the students claimed to experience difficulty in the distance education model, and 68.8% said they were not satisfied with this teaching modality. These findings can be justified by the challenges imposed on students and teachers, essentially by the radical adoption of the full use of digital tools, so that the teaching-learning process could continue[20].

That is, many teachers had to face their insecurities about digital technologies and adapt to this format, so that they could assume the role of learning mediators, on the other hand, students needed to adopt more autonomous and independent postures within this scenario[20].

A recent study by Oliveira *et al.*[21] show that one of the main impediments to learning, with regard to digital education during the COVID-19 pandemic, was the lack of technological knowledge and skill of teachers in distance education. Linked to this, many teachers did not have adequate training to deal with digital teaching methodologies and setting in digital remote teaching platforms. Providing in this way, insecurity in the manipulation of new methodological tools.

Regarding the quality of life of university students, the main areas affected by the pandemic were: Mental Health (57%); Emotional Aspects (66.8%); Social Aspects (69.5%); and Vitality (69.6%).

These results are in agreement with the study by Sales *et al.*[16], showing that socio-emotional issues tend to be affected when individuals are exposed to situations of great stress and uncertainty, such as the pandemic. With this, mental illness is manifested in a more expressive way.

As a result, the social isolation resulting from the strategies adopted by the health authorities intensified negative feelings such as anguish, sadness, loneliness. and fear, essentially, due to the disruption of the routine activities of billions of people[16]. That said, there is a decrease in the practice of physical exercises, which may be related, specifically, to the high impact on the vitality domain of the individuals in this study[17].

The study by Corrêa *et al.*[22] corroborates the aforementioned evidence, further suggesting that practitioners of routine physical activities report lower impacts with regard to psychological and vitality factors. In this way, encouraging the continuation of daily physical exercise practices can contribute to the maintenance of physical and mental health during this moment of pandemic.

In terms of mental health aspects, the results confirm a significant increase in psychological distress (anxiety, 11.22> questionable or doubtful; depression, 9.18> questionable or doubtful, 24.10> perceived stress) among university students. These scientific findings are in line with other similar international and national studies,

which evaluated the impacts of the pandemic on psychological factors[14-15].

The information obtained through the most varied means of communication and technological information, combined with social discussions on strategies to stagnate the spread of the new coronavirus, essentially the quarantine, may have had a significant impact on the increase in damage to the mental health of the academic community. In addition, the alarming numbers of confirmed COVID-19 cases and deaths from the virus appear to have had a direct impact on levels of stress, anxiety and depression among university students[23].

Although the current scientific literature shows that psychological factors such as anxiety, depression and stress have a direct impact on the perception of learning of university students, the results of this research could show that in relation to variables related to the mental health of students[20-22], only depression scores were negatively associated with a 13% variation in scores related to self-perception of learning.

This evidence is in agreement with the study by Pereira *et al.*[24] and de Bordignon *et al.*[25], who claim that students with depressive symptoms are affected in their learning. In addition to external factors, there are also genetic and/or hereditary variables. Thus, the literature demonstrates that individuals with depression manifest deficits in learning, performance and content memorization.

The multiple linear regression model showed that class participation,

marital status and loss of focus are associated with a 37% variation in the self-perception of good learning scores reported by study participants. These findings indicate that single students tend to have better focus, and greater participation in classes, consequently, demonstrate a better perception of learning. However, Alves *et al.*[26] and Cavichioli *et al.*[27] state that, regardless of the university's marital status, the marital status variable does not significantly affect academic performance.

Regarding aspects of health promotion and prevention, it is observed that the study provides important information about the possible impacts of the COVID-19 pandemic on mental health and academic aspects of university students, emphasizing the importance of promotion and health prevention through health systems and government authorities in the face of a pandemic situation.

In this context, the findings provided in this study can be used as a subsidy in dealing with the impacts caused by the pandemic, essentially with regard to the management of the psycho-emotional state of university students.

The present research demonstrates limitations that need to be emphasized. As it is a cross-sectional, observational study, it is not possible to identify the direction of the relationship between the causal factors of the psychological, educational and quality of life aspects associated with the pandemic. Essentially due to the lack of knowledge of the same symptoms and perceptions before the pandemic period.

With this, it is necessary to carry out longitudinal studies that demonstrate the best visualization of the impacts of the pandemic on the entire biopsychosocial and educational arrangement of university students and other publics.

CONCLUSION

The results of this research indicate that the COVID-19 pandemic had an impact on the mental health of university students, given that psychological factors such as anxiety and depression manifested themselves in a moderate way, while the perception of stress stood out as the variable impact on students' mental health. Within the remote teaching strategies, it was evidenced that the participating students showed a high incidence of difficulty in the strategies adopted, in addition to dissatisfaction with distance learning, learning difficulties, and reported still not having a good learning experience.

Therefore, it is important to continue scientific investigations on the subject, so the mechanisms and their impacts on the psychological and educational aspects underlying this pandemic period are highlighted. In conclusion, the observational data from this study indicate that the domains most affected in the students' quality of life were mental health, emotional aspects, social aspects and vitality.

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