

Impact of the SARS-CoV2 pandemic on the self-concept of undergraduate students in the Western Amazon

DOI <https://doi.org/10.5281/zenodo.17418112>

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Recibido: 02 de febrero 2025
Aceptado: 25 de junio 2025
Publicado 15 de julio 2025



Revista editada en el Decanato de Ciencia de la Salud de la Universidad Centroccidental Lisandro Alvarado. Barquisimeto, Venezuela

ISSN N°: 1856-9528 / ISSN: 2957-4463(online)

SAC 121



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ABSTRACT

To describe the changes resulting from the pandemic period and its impact on the self-concept of undergraduate students from five academic centers before and after the COVID-19 pandemic. Methods: This is an observational, descriptive, and cross-sectional study with two data collections, before and during the decline of the COVID-19 pandemic with 617 students. Participants responded to two instruments: one regarding sociodemographic profile and the AF5 for multidimensional self-concept assessment. Results: It was possible to observe that based on the P value, only the social self-concept showed a difference between times. To investigate potential associations between the behavior of the study variables, as they are quantitative data, the observations were treated with the Euclidean similarity index and Pearson's correlation coefficient, the first presented as a dendrogram and the following in correplot. A greater similarity between the general, social, academic and family self-concept, with a correlation between the behavior of the general self-concept with: social AC (0.7); academic AC (0.7); Family AC (0.5), all with P value < 0.05. Conclusions: The decline in academic self-concept among students may have been caused by the changes resulting from the pandemic, including infections, misinformation, deaths, social isolation, and adaptations in teaching practices.

Keywords: self-perception; cognitive; psychiatry; mental health

Impacto de la pandemia del SARS-CoV2 en el autoconcepto de los estudiantes universitarios de la Amazonía Occidental

RESUMEN

Describir los cambios derivados del periodo de pandemia y su impacto en el autoconcepto de estudiantes de pregrado de cinco centros académicos antes y después de la pandemia de COVID-19. Métodos: Se trata de un estudio observacional, descriptivo y transversal con dos recolecciones de datos, antes y durante el descenso de la pandemia de COVID-19 con 617 estudiantes. Los participantes respondieron dos instrumentos: uno sobre perfil sociodemográfico y el AF5 para evaluación multidimensional del autoconcepto. Resultados: Se pudo observar que con base en el valor P, solo el autoconcepto social mostró diferencia entre tiempos. Para indagar potenciales asociaciones entre el comportamiento de las variables de estudio, por ser datos cuantitativos, las observaciones fueron tratadas con el índice de similitud euclidiano y el coeficiente de correlación de Pearson, el primero presentado como dendrograma y el siguiente en correplot. Se encontró una mayor similitud entre el autoconcepto general, social, académico y familiar, con correlación entre el comportamiento del autoconcepto general con: CA social (0.7); CA académica (0.7); AC familiar (0,5), todos con valor P < 0,05. Conclusiones: El deterioro del autoconcepto académico entre los estudiantes puede haber sido causado por los cambios derivados de la pandemia, incluidos los contagios, la desinformación, las muertes, el aislamiento social y las adaptaciones en las prácticas docentes.

Palabras clave: autopercepción; cognitiva; psiquiatría; salud mental

Impacto da Pandemia de SARS-CoV-2 no Autoconceito de Estudantes Universitários da Amazônia Ocidental

RESUMO

Descrever as mudanças decorrentes do período pandêmico e seu impacto no autoconceito de estudantes de graduação de cinco centros acadêmicos antes e depois da pandemia de COVID-19. Métodos: Trata-se de um estudo observacional, descritivo, transversal, com duas coletas de dados, antes e durante o declínio da pandemia de COVID-19, envolvendo 617 estudantes. Os participantes responderam a dois instrumentos: um sobre perfil sociodemográfico e o AF5 para avaliação multidimensional do autoconceito. Resultados: Com base no valor de P, observou-se que apenas o autoconceito social apresentou diferenças entre os períodos. Para investigar potenciais associações entre o comportamento das variáveis do estudo, por se tratarem de dados quantitativos, as observações foram processadas com o índice de similaridade euclidiano e o coeficiente de correlação de Pearson, o primeiro apresentado como dendrograma e o segundo como correplot. Foi encontrada maior similaridade entre o autoconceito geral, social, acadêmico e familiar, com correlações entre o autoconceito geral e: CA social (0,7); CA acadêmica (0,7); e CA familiar (0,5), todas com valores de P < 0,05. Conclusões: A deterioração do autoconceito acadêmico entre os estudantes pode ter sido causada por mudanças decorrentes da pandemia, incluindo infecções, desinformação, óbitos, isolamento social e adaptações nas práticas de ensino.

Palavras-chave: autopercepção; cognitiva; psiquiatria; saúde mental

INTRODUCTION

Self-concept can be described as a theoretical construct formed by individuals about themselves based on their experiences with the social environment, as the individual's perception of themselves influences how others perceive and react to them.¹ These central characteristics presented by individuals are related to competencies that affect students' success in educational environments.²

Self-concept needs to be measured in students from the fifth grade of primary school up to university.³ Being an important protective factor, self-concept becomes a fundamental element in mental health prevention and promotion programs.⁴ However, some factors can affect student performance, such as emotional profile⁵ and family support,⁶ and these criteria present themselves as positive or negative points in relation to self-concept.⁷ This construct includes cognitive and behavioural aspects, also being multidimensional, while self-esteem seems to be limited to an affective, unidimensional component.⁸

Furthermore, affective-emotional factors influence academic performance from childhood, and understanding the limitations presented is closely interrelated with factors present in the family context.⁹ In relation to aspects concerning the family context, it is relevant to create strategies that seek to strengthen academic self-concept.³ This is because it presents positive predictors for students' adaptation in the first year of the course.¹⁰

In the context studied and mentioned previously, external factors positively or negatively influence self-determination and consequently the self-concept of individuals. In recent years, we have experienced a significant change that has impacted the well-being of higher education students, namely the COVID-19 pandemic.¹¹

Indeed, this pandemic has affected all areas of people's lives, with an impact on individual and population health across various domains.¹² Among them, higher education has continued to be affected by the health crisis throughout 2021.¹³ By October 2023, there were already more than 771,191,203 confirmed cases and 6,961,014 deaths from COVID-19 worldwide.¹⁴

Additionally, financial difficulties, concerns about family members' health, and worries about questionable news on social media were the main causes of COVID-19-related stress among higher education students.¹⁵ Moreover, online learning contributed to students feeling a lack of personal contact with their peers.¹⁶

Certainly, the feeling of efficacy, of being able to contribute to others, of understanding the process one is going through, is marked by personal satisfaction.¹⁷ It is important to highlight that there can be an improvement in mental health problems if there are interventions on self-concept or mindful attention to this population.¹⁸ Individuals who are satisfied with competence, autonomy, and relationships generate greater self-motivation and mental health, and when threatened, lead to decreased motivation and well-being.¹⁹

To expand knowledge on this topic, there is a need for more studies in this area, as it is a complex and multidimensional concept.^{4,10} The relationship of this variable with the pandemic period, which has caused lifestyle changes and disruptions in the routine of the general population, has been little studied.

This study aims to describe the changes resulting from the pandemic period and their impact on the self-concept of undergraduates from five academic centers at the Federal University of Acre (UFAC) before and after the COVID-19 pandemic.

METHODS

This is an observational, descriptive and cross-sectional study with two data collections, before and during the decline of the COVID-19 pandemic.

Participants

The sample was made up of 219 graduating students from the Center for Health and Sports Sciences (CCSD); Center for Biological and Natural Sciences (CCBN); Center for Education, Letters and Arts (CELA); Center for Philosophy and Human Sciences (CFCH) and the Center for Exact and Technological Sciences (CCET) of the public university in the Western Amazon region (UFAC), aged between 21 and 48 years (24.01; SD

= 5.60), the majority were female ($n = 119$; 54.6%) and single ($n = 179$; 81.7%).

Instruments

To carry out this study, two instruments were used, one that characterizes the sociodemographic profile and one that measures self-concept, which are described below:

Sociodemographic questionnaire: with the aim of collecting information such as name, age, sex, marital status, course, housing situation, current occupation, how many people you live with, leisure activities, physical activities, health perception, use of medication, smoker and drinking (quantity and frequency), whether they received any assistance (scholarship), whether they were involved in any institutional practice and some questions regarding the pandemic situation, whether they continued studying or had to cancel subjects, whether there were deaths from COVID-19 in the family.

AF5 questionnaire for self-concept: The AF5 scale is a self-report instrument composed of 30 items, which assesses five dimensions of self-concept: academic, social, emotional, family and physical dimensions, constituting a highly recommended instrument for analysing the various dimensions of self-concept.²⁰ The elements are presented in 'Likert' in positive and negative terms, allowing participants to respond with a score between 1 and 99, with the closer to 1 (one) the score being negative, the closer to 99 being positive. Based on the fact that a higher score in each of the mentioned factors corresponds to a higher self-concept in a given factor.

Procedure

As it was a cross-sectional survey, students initially answered the questionnaires in 2019 when they were entering the Higher Education Institution (HEI) before contamination by the SARS-CoV2 virus occurred. In 2023, contact was made with the course secretariats to find the classes and shifts that the students would be taking, discarding those who failed, retired and those who changed courses, with the updated list in hand, we went in search of the subjects a to one and when found clarified that they initially participated in this research in 2019 when they were entering the courses, with the Free and Informed Consent

Form (TCLE) initially signed by them. Only those students who agreed to continue with the research were given the instruments to obtain answers and returned the instrument to the researcher, with this participation being voluntary. The application of the instruments was sometimes carried out collectively in the HEI's own classroom and sometimes individually, as only that graduate was found in the classroom. The time required to apply the instruments was 30 to 50 minutes.

This study followed the standards of CNS Resolution No. 466/2012 and CNS Resolution No. 510/2016. Forwarded to the Ethics committee (UFAC) located at Rio Branco, AC, Brazil. The approval of the research is contained in opinion number 3.325.930 and by CAAE: 13486519.5.0000.0094.

Data analyses

SigmaPlot 14.5 software (Academic Perpetual License - Single User - ESD Systat® USA), Past 4.03 (Free version for Windows), and the R programming language integrated with R Studio were used for data analysis. The objective is to estimate models that, although simplifications of reality, present the best possible adherence between real values and predicted values. In this way, we estimated the model as described: 1 (Data wrangling); 2 (Shapiro-Wilk normality tests; 3 (Mann-Whitney/ T Test); 4 (Cohen effect size); 5 (Application of the Euclidean Similarity Index); 6 (Pearson correlation test).

RESULTS

In the initial data collection in 2019, 617 students took part in the study. Of these, the average age of the students was 20.8 years ($SD = 4.15$), with a minimum of 18 and a maximum of 45. Most of the students were male ($n = 331$; 53.6%), single ($n = 552$; 89.5%), did not work ($n = 518$, 84.1%), lived at the institution ($n = 298$; 48.3%), did not receive a scholarship ($n = 510$; 83.2%), practiced leisure activities ($n = 376$, 61%), had no health problems ($n = 487$; 78.9%), do not use medication ($n = 544$; 88.3%), are not smokers ($n = 593$; 96.1%), do not drink alcohol ($n = 452$; 73.4%), do not practice physical activity ($n = 348$; 56.5%), do not follow a specific diet ($n = 545$; 88.3%), and

belong to social class C1 (n = 149; 24.1%) (table 1).

Table 1. Absolute and relative frequencies of social and health variables of academics entering the Federal University of Acre in 2019.

Variable		Absolute Frequency (N)	Relative Frequency (%)	Accumulated Relative Frequency (%)
Sex	Masculine	331	53.6	53.6
	Feminine	287	46.4	100.0
	Total	617	100.0	-
Marital status	Single	552	89.5	89.5
	Married	59	9.6	99.0
	Divorced	5	0.8	99.8
	Widower	1	0.2	100.0
	Total	617	100.0	-
Work	No	518	84.1	84.1
	Yes	99	15.9	100.0
	Total	617	100.0	-
Type of Residence	Institution	298	48.3	48.3
	Funded	124	20.1	68.4
	From Family	4	0.6	69.0
	Own	188	30.5	99.5
	Leased	3	0.5	100.0
	Total	617	100.0	-
Handbag	No	510	83.2	83.2
	Yes	103	16.8	100.0
	Total	613	100.0	-
Leisure	No	240	39.0	39.0
	Yes	376	61.0	100.0
	Total	616	100.0	-
Problem of health	No	487	78.9	78.9
	Yes	130	21.1	100.0
	Total	617	100.0	-
Use of Medication	No	544	88.3	88.3
	Yes	72	11.7	99.8
	Total	616	100.0	-
Smoker	No	593	96.1	96.1
	Yes	24	3.9	100.0
	Total	617	100.0	-
Consumption of Drink	No	452	73.4	73.4
	Yes	164	26.6	100.0
	Total	616	100.0	-
Physical activity	No	348	56.5	56.5
	Yes	268	43.5	100.0
	Total	616	100.0	-

Diet	No	545	88.3	88.3
	Yes	72	11.7	100.0
	Total	617	100.0	-
Social Class ^a	A	29	4.7	4.7
	B1	64	10.4	15.1
	B2	130	21.1	36.1
	C1	149	24.1	60.3
	C2	144	23.3	83.6
	IN	101	16.4	100.0
	TOTAL	617	100.0	-

^a According to the Brazilian Economic Classification Criteria, monthly household income estimates for the socioeconomic strata are: **A-** 22 749.24; **B1-** 10 788.56; **B2-** 5 721.72; **C1-3** 194.33; **C2-** 1 894.95; **DE-** 862.41. **Source:** Prepared by the authors based on the results of the study.

When collecting data from graduating students after the COVID-19 pandemic, 219 students who took part answered the questionnaires. Among these, the average age of the students was 24.01 years (SD = 5.60), with a minimum of 21 and a maximum of 48 years. The majority of graduating students were female (n = 119; 54.6%), single (n = 179; 81.7%), did not work (n = 137, 62.2%), lived in their own

home (n = 96; 48.3%), did not receive a scholarship (n = 141; 64.4%), practiced leisure activities (n = 118, 54.1%), did not take medication (n = 171; 78.1%), are not smokers (n = 205; 94.0%), do not drink alcohol (n = 145; 66.2%), practice physical activity (n = 110; 50.5%), do not follow a specific diet (n = 187; 85.8%), and belong to social class C2 (n = 60; 27.4%) (Table 2).

Table 2. Absolute and relative frequencies of social and health variables of academics graduating in 2023 from the Federal University of Acre.

Variable		Absolute Frequency (N)	Relative Frequency (%)	Accumulated Relative Frequency (%)
Sex	Masculine	100	45.4	45.4
	Feminine	119	54.6	100.0
	Total	219	100.0	-
	Single	179	81.7	81.7
Marital status	Married	20	9.1	90.8
	Divorced	3	1.4	92.2
	Other	3	1.4	93.6
	Living together	14	6.4	100.0
	Total	219	100.0	-
Work	No	137	62.6	62.6
	Yes	82	37.4	100.0
	Total	219	100.0	-
Type of Residence	Institution	1	0.5	0.5
	Other	3	1.4	1.9
	From Family	73	33.3	35.2

	Own	96	43.8	79.0
	Leased	46	21.0	100.0
	Total	219	100.0	-
Handbag	No	141	64.4	64.4
	Yes	78	35.6	100.0
	Total	219	100.0	-
Leisure	No	100	45.9	45.9
	Yes	118	54.1	100.0
	Total	218	100.0	-
Use of Medication	No	171	78.1	78.1
	Yes	48	21.9	100.0
	Total	218	100.0	-
Smoker	No	205	94.0	94.0
	Yes	13	6.0	100.0
	Total	218	100.0	-
Consumption of Drink	No	145	66.2	66.2
	Yes	74	33.8	100.0
	Total	219	100.0	-
Physical activity	No	108	49.5	49.5
	Yes	110	50.5	100.0
	Total	218	100.0	-
Diet	No	187	85.8	85.8
	Yes	31	14.2	100.0
	Total	218	100.0	-
Class	A	14	6.4	6.4
	B1	26	11.9	18.3
	B2	46	21.0	39.3
	C1	52	23.7	63.0
	C2	60	27.4	90.4
	IN	21	9.6	100.0
	TOTAL	219	100.0	-

^a According to the Brazilian Economic Classification Criteria, monthly household income estimates for the socioeconomic strata are: **A-** 22 749.24; **B1-** 10 788.56; **B2-** 5 721.72; **C1-3** 194.33; **C2-** 1 894.95; **DE** - 862.41.
Source: Prepared by the authors based on the results of the study.

Due to the pandemic period, it became important to investigate some questions from this perspective. These included whether there was an impact on classes (suspension), whether any family members were infected with COVID-19, whether there was a death in the family due to the infection and whether the student tested positive for COVID-19. Among the responses, 206 students said that classes were impacted during the pandemic ($n = 206$; 94.1%). As for reports of COVID-19 infection in the family, 198 students (90.4%) said they had infected family members; 164 reported deaths in the family due to COVID-19 (74.9%) and 53% of students ($n = 116$) said they had tested positive for COVID-19.

The descriptive analysis, as well as the P value and the representation of the Cohen effect size were presented in table 3 for the main study variables.

Table 3. Descriptive analysis of the study variables.

	Average	Median	SD	SE	Kurtosis	Skewness	P value
General self-concept I	56.3	56.8	10.67	0.43	0.79	-0.39	P = 0.472
General self-concept C	56.7	57.8	11.05	0.75	3.22	-0.71	
AC social I	61.7	64.8	19.11	0.77	0.17	-0.64	P < 0.001 ^S
AC social C	67.0	69.6	18.66	1.26	0.84	-0.92	
AC Academic I	58.3	60.0	12.61	0.51	0.89	-0.42	P = 0.085
AC Academic C	56.5	57.5	12.99	0.88	1.80	-0.81	
AC emotional I	53.3	54.2	21.63	0.87	-0.76	-0.07	P = 0.615
AC emotional C	52.2	51.7	21.98	1.48	-0.52	-0.14	
Family AC I	62.6	66.0	16.19	0.65	-1.04	-1.06	P = 0.427
Family AC C	62.1	64.8	15.44	1.04	0.38	-0.85	
AC Physics I	48.4	49.5	22.46	0.90	-0.68	-0.04	P = 0.908
AC Physicist C	48.7	46.7	22.75	1.53	-0.72	-0.001	

SD: Standard Deviation; SE: Standard Error; I: Entrants; C: Graduates; AC: self-concept. P values are presented by the T test or Mann-Whitney test, according to the value obtained in the Shapiro-Wilk test (normality). ^SSmall Effect; ^Mmedium Effect; ^LLarge Effect (Cohen d).

As the normality test indicated non-normal behavior of the study variables, the boxplot below presents the median and interquartile regions for general and social self-concept. In this case, it was possible to observe that based on the P value, only the social self-concept showed a difference between times (Figure 1).

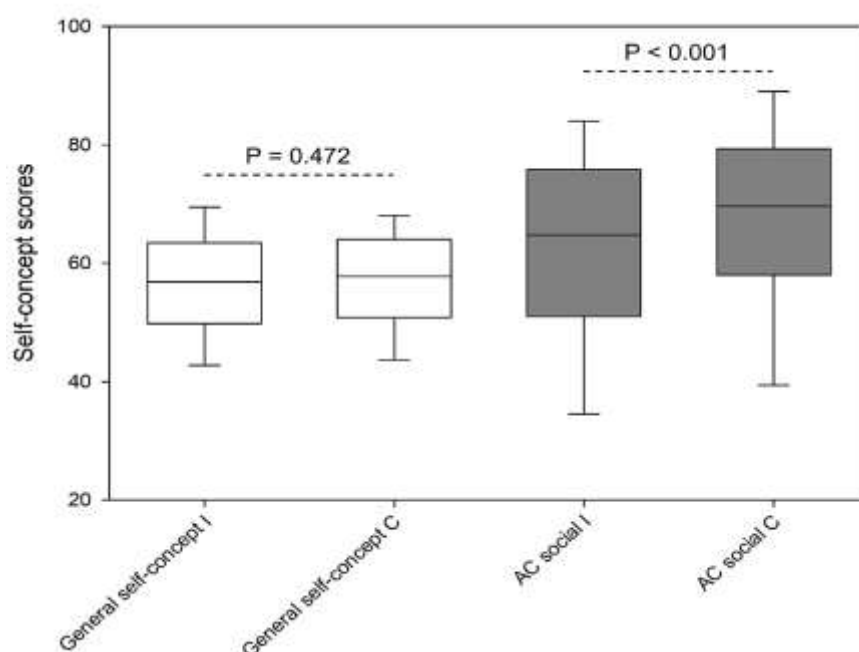
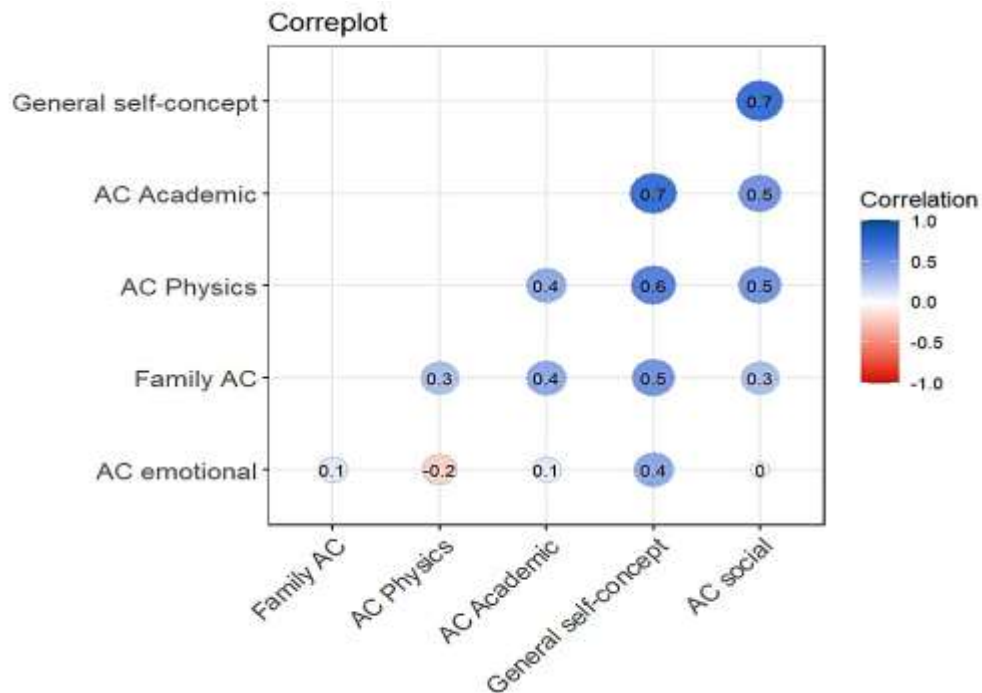


Figure 1. Comparison of the means of the academic self-concept variable before and after the pandemic.

With the aim of investigating possible associations between the behaviour of the study variables, as they are quantitative data, the observations were treated with the Euclidean

similarity index and Pearson's correlation coefficient, the first being presented in the form of a dendrogram and the following in correplot in the following figure.

A



B

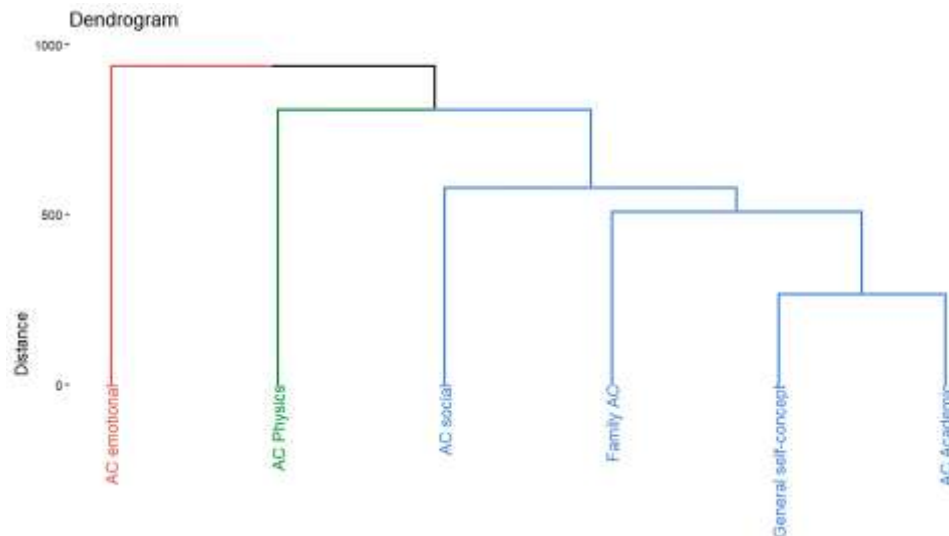


Figure 2. Association between variables. (A) Pearson correlation and (B) Euclidian Similarity Index.

Figure 2 revealed a greater similarity between the general, social, academic and family self-concept, with a correlation between the behaviour of the general self-concept with: social AC (0.7); academic AC (0.7); Family AC (0.5), all with P value < 0.05.

DISCUSSION

The present study investigated the changes resulting from the pandemic period and its impact on the self-concept of students at the Federal University of Acre before and after the COVID-19 pandemic. The sample of incoming students studied before the pandemic was composed predominantly of males, single, not employed, residing on campus, not receiving scholarships, engaging in leisure activities, not participating in physical activity, not following a diet, and belonging to social class C.

After a little over three years of course duration and as they were nearing completion, having gone through a period declared as pandemic, the sample was composed mainly of female students, with an average age of 24 years, who were single, not employed, living in their own homes, not receiving scholarships, engaging in leisure and physical activities, not following a diet, and belonging to social class C2.

The sociodemographic profile found aligns with the demographic census of higher education in Brazil in 2021, where the majority of students were female, aged between 19 and 24 years old.²¹ A recent analysis indicates that gender-related differences revealed that women reported higher academic self-concept but lower emotional self-concept than men.²²

Regarding reports of COVID-19 infections within families, nearly all respondents indicated that their family members had been infected, with over half experiencing cases of death and also reporting their own infections. Social isolation has posed challenges to accessing mental health treatments and care, as mental health and psychosocial support have been identified as priority areas by South American countries in response to COVID-19.²³

A recent finding suggests that students living in urban areas with their families, having a sedentary lifestyle and a history of contact with the virus, were at increased risk of developing stress. Conversely, those who reported confirmed cases in the family and did not engage in physical exercise had a higher likelihood of developing depression. Therefore, physical activity was identified as a protective factor against mood alterations.²⁴

The practice of physical activity or leisure have a direct correlation with academic performance, and it can contribute to enhancing self-concept and, consequently, academic factors.³ It is important to highlight that focusing solely on

the physical health of higher education students is not sufficient; attention must be holistic, encompassing physical, emotional, mental, and spiritual aspects. Satisfaction of basic needs impacts various components of health, including self-concept.^{11,24} Self-concept was recognized as a protective factor, contributing to the individual's well-being and personal satisfaction.⁴

The way people live differ in their ability to generate happiness and well-being.¹⁹ It is worth noting that the pandemic forced the closure of various activities worldwide, including educational activities, resulting in a massive shift from in-person to remote learning.²⁵ In this study, almost all students reported that classes were impacted during the pandemic period.

Given that the impact of the pandemic led to changes in the way teaching was conducted, instructors who traditionally taught in-person courses faced challenges such as organizing classes, adapting to online teaching in accordance with the syllabus, selecting appropriate online teaching platforms, and monitoring the effectiveness and quality of instruction.²⁶

A study conducted in China indicated that the availability of online teaching platforms influenced the dissatisfaction of users in higher education.²⁵ The social impact caused by COVID-19 will lead to emotional problems at different levels due to the influence of domestic isolation and other factors, affecting the effectiveness of online learning.²⁵

The psychological variables related to self-concept are related to the outcome of academic performance, hindering the learning process from occurring fully.²⁷ The analysis of this present study showed that the majority of students upon entering higher education demonstrated having a good social, academic, emotional, and physical self-concept in relation to the completion period. However, only at the completion stage did they exhibit a good family self-concept.

Given the above, families stayed united and overcame the problems that arose, relating to happy and affectionate moments, closeness and reconnection, overcoming and coming together in the face of difficulties arising from the SARS-CoV-2 pandemic.^{28,29}

In this context, it was evidenced that the academic self-concept post COVID-19 pandemic showed a statistically significant decline when compared to entry into HEIs before the pandemic, meaning that students exhibited better self-concept upon entering universities before the pandemic.

Academic self-concept has a significant positive effect on deep, surface, and strategic approaches, as well as academic performance.³⁰

These findings suggest that postsecondary educators can provide positive encouragement to increase students' learning motivation, efficiency, and self-concept and help develop recognition regarding self-learning and metacognitive skills.³⁰ Reinforcing that there were direct and/or indirect consequences for mental health due to the pandemic.²³

In view of the above, it is clear that the main points that may have caused a drop in academic self-concept were the changes caused by the pandemic, be it family: due to contamination and deaths,²² or social: due to social isolation^{1,15,31} and fake News,³² or in academics: due to the need to change teaching practices, moving from face-to-face to online teaching, which made life difficult for many who did not have access to quality internet, as well as the difficulty in understanding the classes taught^{24,26} and the neglect of care for your mental health where your profile has been raised by the pandemic.³³

Regarding the possible limitations of the present study, one could point out the sample size due to: dropout rates, course changes, and withdrawals, which diminish the capacity for result generalization. However, these limitations do not invalidate the results and their possible causes, and could be a suggestion for further studies on the contributing factors to the high dropout rates in Higher Education Institutions.

CONCLUSIONS

During the pandemic, it became clear that many students, especially men, gave up on continuing their undergraduate studies, with numerous reports of deaths among family members. This fact reduced academic self-concept after the pandemic.

Notably, the decline in academic self-concept among graduate students may have been caused by changes resulting from the pandemic, such as infections, deaths, social isolation, fake news, and the shift from in-person to online teaching.

However, in the present study, the fact that the sample was made up of only students from a single HEI and from just one city is a limitation, considering the different contexts of the country and the world. Future research could be carried out in other HEIs in different states and even countries to address different social and economic realities.

Acknowledgements

The authors would like to thank everyone involved directly and indirectly in the evolution of knowledge.

Conflict of interest

The author officially certifies that there are no conflicts of interest with any party with respect to this research.

Author's contribution

ESPR, JSVB, AND RPMS: essential contributions to the conception and design of the study protocol; acquisition, analysis and interpretation of data; and involvement in drafting of the manuscript. ESPR, JSVB, JGG, JAB, AMMN, LCA, LCOG, and RPMS: critical revisions for important intellectual content. The manuscript has been read and approved by all authors, the journal's stated authorship requirements have been met, and each author believes that the manuscript represents honest work.

Funding/sponsorship

No funding.

Data availability

All data generated or analysed during this study are included in this published article

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