Original Article
doi: https://doi.org/10.1590/1983-1447.2022.20210066.en

# Modifiable risk factors for cardiovascular diseases and quality of life among first-year nursing students

*Fatores de risco modificáveis para doenças cardiovasculares e qualidade de vida de ingressantes da graduação de enfermagem*

*Factores de riesgo modificables para enfermedades cardiovasculares y calidad de vida de los graduados de enfermeira*

Marianna Sobral Lacerda[a]
Marina Bertelli Rossi[a]
Erika de Sá Vieira Abuchaim[a]
Alba Lúcia Bottura Leite De Barros[a]
Juliana de Lima Lopesa

**How to cite this article:**
Lacerda MS, Rossi MB, Abuchaim ESV, Barros ALL, Lopes JL. Modifiable risk factors for cardiovascular diseases and quality of life among first-year nursing students. Rev Gaúcha Enferm. 2022;43:e20210066. doi: https://doi.org/10.1590/1983-1447.2022.20210066.en

## ABSTRACT

**Objective:** To describe the risk factors for cardiovascular diseases and the quality of life of first-year college students.

**Methods:** A cross-sectional study conducted with first-year undergraduate nursing students attending a public university located in São Paulo, Brazil. The students completed nine questionnaires and the students'cervical and abdominal circumferences were measured along with their weight and height, blood pressure, lipid profile, and capillary blood glucose.

**Results:** 67 undergraduate students were included. Half of the students were physically inactive (73.1%), 7.5% reported smoking, 40.3% alcohol consumption, 25.4% overweight, and 16,4% increased total cholesterol. Depressive symptoms, anxiety, and stress were also reported, as well as excessive daytime sleepiness, risk of sleep apnea, and risky and harmful consumption of alcohol. As for the quality of life, the domains with the lowest scores were vitality and emotional aspects.

**Conclusion:** The most prevalent risk factors found in undergraduates were sedentary lifestyle, excessive daytime sleepiness and stress.

**Keywords:** Students, nursing. Cardiovascular diseases. Risk factors. Quality of life.

## RESUMO

**Objetivo:** Descrever os fatores de risco para doenças cardiovasculares e a qualidade de vida de alunos ingressantes no curso de enfermagem.

**Métodos:** Estudo transversal realizado com ingressantes no curso de enfermagem de uma Universidade Pública de São Paulo, Brasil. Os alunos responderam a nove questionários e as circunferências cervical e abdominal foram medidas, juntamente com peso e altura, pressão arterial, perfil lipídico e glicemia capilar.

**Resultados:** 67 alunos foram incluídos. Alguns estudantes apresentaram inatividade física (73,1%), 7,5% reportaram tabagismo,40,3% consumiam álcool,25,4% estavam acima do peso e 16,4% tinham aumento do colesterol total. Sintomas de depressão, ansiedade e estresse também foram reportados, assim como sonolência diurna excessiva, risco de apneia do sono e uso de risco ou nocivo de álcool. Quanto a qualidade de vida, os domínios com menor pontuação foram vitalidade e aspecto emocional.

**Conclusão:** Os fatores de risco mais prevalentes encontrados nos alunos foram sedentarismo, sonolência diurna excessiva e estresse.

**Palavras-chave:** Estudantes de enfermagem. Doenças cardiovasculares. Fatores de risco. Qualidade de vida.

## RESUMEN

**Objetivo:** describir los factores de riesgo de enfermidades cardiovasculares y la calidad de vida de los estudiantes universitários de primer año.

**Métodos:** estúdio transversal realizado con estudiantes de primer año de enfermeira de uma universidad pública ubicada em São Paulo, Brasil. Los estudiantes completaron nueve cuestionarios y se midieron las circunferencias cervical y abdominal de los estudiantes junto con su peso y altura, presión arterial, perfil de lípidos y glucosa en sangue capilar.

**Resultados:** se incluyeron 67 estudiantes. La mitad de los estudiantes eran fisicamente inactivos (73,1%), el 7,5% informó que fumaba, el 40,3% consumía alcohol, el 25,4% tenía sobrepeso y el 16,4% aumentaba el colesterol total. También se informaron síntomas depresivos, ansiedad y estrés, así como somnolencia diurna excesiva, riesgo de apnea del sueño y consumo peligroso y nocivo de alcohol. Em cuanto a la calidad de vida, los dominios com puntuaciones más bajas fueron vitalidad y aspectos emocionales.

**Conclusión:** Los factores de riesgo más prevalentes encontrados em los universitários fueron el estilo de vida sedentário, la somnolencia diurna excessiva y el estrés.

**Palabras clave:** Estudiantes de enfermeira. Enfermedades cardiovasculares. Factores de riesgo. Calidad de vida.

[a] Universidade Federal de São Paulo (UNIFESP), Escola Paulista de Enfermagem. São Paulo, São Paulo, Brasil

## INTRODUCTION

Cardiovascular diseases are the main cause of death worldwide, affecting almost 18 million individuals every year. Approximately 85% of these deaths are due to heart attack and stroke, and mainly take place in underdeveloped and developing countries[1]. Given the increased report of non-communicable diseases, among which cardiovascular diseases, the World Health Organization (WHO) proposed nine targets to be achieved by 2025, namely: a 25% relative reduction in the overall mortality from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases; at least 10% relative reduction in the harmful use of alcohol; a 10% reduction in the prevalence of insufficient physical activity; a 30% reduction in population intake of salt/sodium; a 30% reduction in the prevalence of current tobacco use in persons aged 15 years old or older; a 25% reduction in or contain the prevalence of increased blood pressure; halt the rise in diabetes and obesity; at least 50% of eligible people to receive drug therapy and counseling to prevent heart attacks and strokes; and availability of 80% of the affordable basic technologies and essential medicines[2].

The risk factors for cardiovascular diseases are divided into modifiable and non-modifiable. Modifiable factors include obesity, physical inactivity, diabetes mellitus, dyslipidemia, hypertension, smoking, alcohol consumption, stress, anxiety, depression, and sleep disorders, while age and sex figure among the non-modifiable factors[3]. Nursing undergraduate students present many of the factors increasing the risks for the development of cardiovascular diseases[4–6]. Stress, anxiety and moderate to severe levels of depression were identified in 20%, 39,9% and 24,3% of nursing students, respectively. In the same study, 14% of students reported using alcohol and less than 1% were smokers[4], while in Mexico, a study identified that 52,1% of students used alcohol and 24,5% used tobacco[5]. Regarding quality of life, a study identified mean scores above 50 in all domains, with the lowest score in the vitality domain and the highest in the functional capacity domain[7].

Currently, these are 20.7 million nurses and midwives, representing 47.6% of health professionals[7], with thousands of nurses graduating each year. This is a large number of future workers, whose main role will be to provide care to others. Therefore, they should first give priority to their health. In this context, identifying the risk factors for cardiovascular diseases of individuals at the time they enter the university enables identifying vulnerabilities early on to devise strategies intended to minimize and/or avoid potential complications.

Due to the impact of cardiovascular disease, the growing number of nursing students and the scarcity of studies that address this issue in this population, this study's objective was to describe the risk factors for cardiovascular diseases and the quality of life of first-year college students.

## METHODS

This cross-sectional study was conducted with students enrolled in the Undergraduate Nursing Program in 2018 at a public university located in São Paulo. All students enrolled in 2018 in the first year of the nursing course at the University were approached, and the objectives of the study were explained to them for a subsequent decision to participate or not in this study. All the students consented to participate in the study and signed free and informed consent forms after receiving clarifications about the study.

Data were collected from April to June 2018 on University premises. Were applied a form addressing sociodemographic and clinical information, such as age, sex, race, marital status, children, religion, housing conditions (whether there is basic sanitation, and the number of residents), transportation used to commute to the university, family income (number of times the minimum wage, and head of the family), paid job/employment contract, comorbidities, use of medications, addiction to nicotine, addiction to alcohol, and physical activity (150 minutes per week of moderate activity or 75 minutes per week of intense activity being considered adequate)[3] .

Coupled with this questionnaire, the authors collected the following measures: cervical and abdominal circumferences; weight and height to determine the body mass index (BMI); blood pressure; capillary lipid profile; and capillary blood sugar levels. These measurements were performed without the need for fasting, with portable material, by three of the authors on the university premises, and in accordance with the respective recommendations of the guidelines. The three authors who participated in the collection were all nurses and were previously trained and carried out a pilot test with three students to validate the collection procedure.

Questionnaires that were translated and validated for use in Brazil were also completed, namely the Fagerström Test for Nicotine Dependence; Alcohol Use Disorders Identification Test (AUDIT), Berlin Questionnaire (to screen for sleep apnea); Epworth Sleepiness Scale; Beck Anxiety Inventory, Beck Depression Inventory, Perceive Stress Scale-10; and Short-Form Health Survey (SF-36), which addresses quality of life. All questionnaires were self-administered, with an estimated average filling time of 30 minutes.

The Fagerström Test for Nicotine Dependence is composed of six closed-ended questions and estimates one's level of nicotine dependence. Each question is rated according to a different score and the sum yields a total score from 0 to

10. Nicotine dependence is classified as very low (0-2 points), low (3-4 points), moderate (5 points), high (6-7 points), and very high (8-10 points)[8].

The Alcohol Use Disorders Identification Test (AUDIT) is composed of 10 items distributed into three different domains (frequency of alcohol consumption, dependence on alcohol consumption, and negative consequences of alcohol consumption). The final score is obtained by the sum of the item scores (minimum of 0 and maximum of 40). Individuals are classified as low risk (0 to 7 points), risky use (8 to 15 points), harmful use (16 to 19 points), or probable dependence (20 to 40 points)[9].

The Berlin Questionnaire screens for sleep apnea and is divided into three different categories (sleep, fatigue, and presence of hypertension or obesity). The presence of two or three categories indicates a high risk of sleep apnea[10].

The Epworth Sleepiness Scale (ESS-BR) assesses the level of individuals' daytime sleepiness in eight different situations. Each question has four alternative answers ranging from 0 (would never doze off) to 3 (high chance of dozing off). The total score ranges from 0 to 24; scores above 10 may indicate excessive daytime sleepiness[11].

The Beck Anxiety Inventory (BAI) is composed of 21 items that assess anxiety symptoms (affective, somatic, and cognitive manifestations). Each item presents four alternative answers ranging from 0 (absent) to 3 (severe), with total scores ranging from 0 to 63 points. Anxiety levels are classified as minimal degree of anxiety (0 to 10 points), mild anxiety (11 to 19 points), moderate anxiety (20 to 30 points), and severe anxiety (equal to or higher than 31 points)[12].

The Beck Depression Inventory (BDI) is composed of 21 items and each item presents four alternative answers, ranging from 0 (absence of depressive symptoms) to 3 (presence of intense symptoms). The total score ranges from 0 to 63 and is classified as no depressive symptoms (0 to 14 points), dysphoria (15 to 19 points), or depressive symptoms (equal to or higher than 20 points) among individuals who have not been previously diagnosed with depression. For those with a prior diagnosis of depression, the score is classified as no sign of depression (0 to 9 points), mild depression (10 to 18 points), moderate depression (19 to 29 points), and severe depression (equal to or higher than 30 points)[13].

The Perceived Stress Scale-10 (PSS-10) is composed of 10 items addressing feelings and thoughts in the last 30 days. Items are rated on a four-item Likert scale, ranging from 0 (never) to 4 (very often), while items 4,5,7, and 8 present an inverted score, that is, 0=4, 1=3, 2=2, 3=1 and 4=0. The total score ranges from 0 to 40; the higher the score, the higher one's perceived stress[14].

Health-Related Quality of Life was assessed using the Short-Form Health Survey (SF-36). It is composed of 36 items distributed into eight domains (functional capacity, physical aspects, pain, general health condition, vitality, social aspects, emotional aspects, mental health). The total score ranges from 0 to 100; the higher the score, the better one's quality of life[15].

All data were stored in an Excel database for further analysis. Descriptive analysis was used. Categorical variables are presented using absolute and relative frequencies and numerical variables were analyzed using means and standard deviations. A statistical analysis was performed using the SPSS Program.

This study was submitted to and approved by the Institutional Review Board at the Federal University of São Paulo, CAAE 71264617.7.0000.5505, under No. 2.520.168 and complies with the Best Clinical Practices and Resolution 466 from December 12th, 2012 Brazilian Council of Health/ Ministry of Health.

## RESULTS

The sample was composed of 67 nursing undergraduates aged 25.15±3.83 years old on average;79,1% were women; 65.7% were Caucasians; 35.8% were catholic; 95.5% were single, and 98.5% had no children. In terms of housing arrangements, 89.6% lived with their families, 59.7% were homeowners, and all of the participants had basic sanitation. Almost half of the students (47.8%) presented a family income below three times the minimum wage, while 20.9% presented a family income of more than seven times the minimum wage. The minimum wage at the time of data collection was R$954.00. Only five (7.5%) students had a paid job; one of them (13.3%) was a nursing technician.

Transportation used to commute to the university was: seven (10.4%) students reported walking on foot and 49.3% of those who used car, subway, train or bus, needed to take two means of transportation.

Regarding comorbidities, 21 (31.3%) reported prior health conditions: six (28.6%) reported depression; four (19%) reported asthma; two (9.5%) hypothyroidism; one (4.8%) diabetes mellitus; and eight (38.1%) reported other diseases. A total of 31.3% of the participants reported the use of medication. Of those who reported having a prior diagnosis of depression (28.6%), three (50%) reported having the diagnosis between 5 and 7 years, two (33.3%) reported that the diagnosis was obtained one year ago, and one student (16.7%) reported having the diagnosis for seven months. Only two (33.3%) students reported pharmacological treatment for depression.

The students presented a sedentary lifestyle, smoked, consumed alcohol, were overweight/obese or presented increased cervical or abdominal circumferences in addition to elevated blood pressure (Table 1), and high levels of capillary blood glucose and/or lipid profile, classified according to with age, according to the Update of the Brazilian Dyslipidemia Guidelines. In five subjects, the calculation of LDL was not automatically performed by the portable device (Table 2). Fewer than half of the students reported exercises with an average duration of 204.8±189.8 minutes/week; minimum of 35 minutes and maximum of 840 minutes/week.

**Table 1** – Modifiable risk factors for cardiovascular diseases among undergraduate nursing students. São Paulo, São Paulo, Brazil, 2018

| Risk factors | N | % |
|---|---|---|
| *Lifestyle* | | |
| Sedentary lifestyle | 49 | 73.1 |
| Smoking | 5 | 7.5 |
| Alcohol consumption | 27 | 40.3 |
| *Body mass index* | | |
| Overweight | 11 | 16.4 |
| Obesity grade I | 3 | 4.5 |
| Obesity grade II | 2 | 3 |
| Obesity grade III | 1 | 1.5 |
| *Abdominal Circumference* | | |
| > 102cm for men | - | - |
| > 88 cm for women | 7 | 13.2 |
| *Cervical Circumference* | | |
| > 43 cm for men | - | - |
| > 38 cm for women | 1 | 1.9 |
| *Blood Pressure* | | |
| SBP from 121 to 139 mmHg | 12 | 17.9 |
| SBP ≥ 140 mmHg | 2 | 3 |
| DBP from 81 to 89 mmHg | 18 | 26.9 |
| DBP ≥ 90 mmHg | 6 | 9 |

**Table 1** – Cont.

| Risk factors | N | % |
|---|---|---|
| *Risk for Sleep apnea* | 11 | 16.4 |
| *Daytime excessive sleepiness* | 40 | 59.7 |
| *Risk for alcohol dependence* | | |
| Low | 57 | 85.1 |
| Risk use | 7 | 10.4 |
| Harmful use | 3 | 4.5 |

Source: Research data, 2018.
SBP: systolic blood press, DBP: diastolic blood press

**Table 2** - Lipid profile and capillary blood glucose level among undergraduate nursing students. São Paulo, São Paulo, Brazil, 2018

| Variable | n | Mean±SD | Minimum | Maximum |
|---|---|---|---|---|
| *Lipid profile* | | | | |
| Total cholesterol | | | | |
| < 20 anos | 38 | 154,1±26,8 | 100 | 212 |
| ≥ 20 anos | 29 | 156,4±32,9 | 100 | 236 |
| HDL | | | | |
| < 20 anos | 38 | 56,4±16,1 | 34 | 100 |
| ≥ 20 anos | 29 | 56,9±18,3 | 21 | 100 |
| LDL | | | | |
| < 20 anos | 35 | 81,4±23,4 | 48 | 144 |
| ≥ 20 anos | 27 | 78,3±23,3 | 33 | 145 |
| Triglycerides | | | | |
| < 20 anos | 38 | 107,2±90,1 | 57 | 558 |
| ≥ 20 anos | 29 | 102,8±44,8 | 48 | 239 |
| *Capillary blood glucose* | 67 | 89.1±15.8 | 55 | 131 |

Source: Research data, 2018.
SD: standard deviation, HDL: high-density lipoproteins, LDL: low-density lipoproteins

The questionnaire addressing nicotine dependence was applied only among those reporting tobacco use (5 students). Of these, 40% reported very low dependence, 40% low dependence, and 20% moderate dependence. None of the students presented high or very high nicotine dependence. A total of 25 students (40.3%) presented alcohol consumption.

Depression, anxiety, and stress were also identified in some nursing students, being the subjects classified according to the presence or absence of a previous diagnosis of depression. The means and standard deviations refer to the total scores of the completed questionnaires. (Table 3)

Regarding the quality of life, students presented a mean equal to 83.3±16.8 in the functional capacity domain; 62.7±34.6 in the physical aspects domain; 65.9±19.4 in the pain domain; 58.4±21.3 in the general health condition domain; 42.2±19.0 in the vitality domain; 68.5±25.1 in the social aspects domain; 54.2±40.1 in the emotional aspects domain; and 59.3±22.6 in the mental health domain.

**Table 3** - Depression, anxiety, and stress among nursing undergraduates. São Paulo, São Paulo, Brazil, 2018

| | N | % | Mean±SD |
|---|---|---|---|
| *Depression* | | | |
| *Individuals w/o prior diagnosis* | 61 | 91 | 11.2±8.4 |
| Dysphoria | 12 | 19.7 | |
| Depressive symptoms | 8 | 13.1 | |
| *Individuals w/ prior diagnosis* | 6 | 9% | 30.2±12.2 |
| Mild depression | 1 | 16.7 | |
| Moderate depression | 2 | 33.3 | |
| Severe depression | 3 | 50 | |
| *Anxiety* | | | 16.6±11.4 |
| Minimal | 24 | 35.8 | |
| Mild | 22 | 32.8 | |
| Moderate | 10 | 14.9 | |
| Severe | 11 | 16.4 | |
| *Stress* | | | 22.8±8.1 |
| Score ≤ 20 | 27 | 40.3 | |
| Score > 20 | 40 | 59.7 | |

Source: Research data, 2018
SD: standard deviation

## DISCUSSION

This study presented a predominance of women among the nursing students, which is in line with literature[4–6,16], as well as a predominance of young, single students[4–6,16], without children[6,16]. The prevalence of women may be related to the profession considering that nursing deals with the delivery of care, a role historically linked to the female sex.

As for employment, few students had a paid job (7.5%), less that found in the literature, which was 25.8% [16]. The low number of students with a paid job in this study may be related to the fact that this is a full-time program, making it unfeasible for most to reconcile undergraduate studies with a job. Regarding tobacco consumption, few students were smokers. A Brazilian study identified the consumption of tobacco among 6% of students[6], while a Mexican study reports a prevalence of 24.5% of tobacco consumption among students[5]. Almost half of the students reported social drinking. One study conducted in the same university verified that 90% of the 281 participants had already consumed alcohol, while 20.6% were classified as presenting risky or harmful consumption of alcohol. The same study shows that those who consumed alcohol also obtained the lowest mental health scores[17].

A quarter of the students included in this study were overweight, a percentage slightly below those reported in the literature, which ranged between 28.6% [6] and 32.7% [18] among nursing undergraduates. These findings may be related to a lack of exercise. Note that more than half of the students in this study reported no exercise at all, while the previously mentioned studies report physical inactivity corresponding to 17.8%[6] and 66.1%[18]. These studies did not mention the period of the undergraduate programs, whether they were full- or part-time programs, so that a relationship was not established between the students' availability of time and level of physical activity. Attending a full-time program may be one of the factors hindering exercises and weight control. The same occurs in the period prior to entering college, a time demanding intense dedication to studies, when students often abdicate healthy practices for the sake of preparation for the college entrance exams. The increase in cervical circumference was found in only one individual (1.5%), the same individual who presented increased abdominal circumference. Increased abdominal circumference was found in 13.2% of the individuals, below that found in the literature, that is, 36.9%[6]. Although the present study considered higher values of normality for abdominal circumference. Being overweight and lack of exercises are likely related. It is a full-time course, with excessive academic demands, which could be related to the lack of time to perform physical activity.

The analysis of the lipid profile enabled identifying increased levels of total cholesterol, triglycerides, and LDL in a few students. Similar studies were identified in a study addressing students from different fields, that is, increased cholesterol was found in 9.7%; triglycerides in 23%; LDL in 5.9%; and decreased HDL in 12% of the students[19]. The mean capillary blood glucose was within normal parameters, similar to what is reported in another study in which students presented a mean equal to 79.4±19 mg/dl [6]. As expected, blood glucose levels were within appropriate parameters, considering that most of the students in the sample presented appropriate body weight (74.6%).

Among those reported as not having a medical diagnosis of depression, a few presented dysphoria and depression, while half of the students who had a prior diagnosis of the disease presented severe depression. This result is of concern, considering that mainly female students attend nursing programs. Prevalence rates of anxiety, stress and moderate to extremely severe levels of depression were of 39.9%, 20% and 24.3%, respectively, among nursing undergraduates from Hong Kong[4]. These conditions are related to lifestyle, sociodemographic factors, mental health perception, and financial problems[4].

A total of 85.7% of the nursing undergraduate students from a state university reported daytime sleepiness, 26.2% of whom presented severe sleepiness[20]. In this study, daily sleepiness was found in more than half of the students, which may be explained by the need to adapt to a new life that includes intense workload and attend related courses and activities that go beyond the program's regular hours. Sleep deprivation is also a risk factor for depression, anxiety, and stress and may have contributed to the number of students presenting psychological disorders.

As for the quality of life, a higher score was obtained in the functional capacity domain, while vitality obtained the lowest score. The same findings are reported in Brazilian study, reporting that the functional capacity and vitality domains presented the highest and lowest scores, respectively[17]. The students addressed in this study did not present physical limitations, which might explain the high score obtained in this domain, while the score obtained in terms of vitality, which is a domain related to the level of energy, may be related to the daytime sleepiness more than half of the students reported.

This study enabled outlining the profile of the first-year students attending the nursing program at a public university, identify potential vulnerabilities, and needs that

require interventions to avoid and/or minimize complications accruing from modifiable risk factors for cardiovascular diseases. The results of this study will impact and contribute to achieving the goal proposed by the World Health Organization, which is to reduce by 2025, 25% of cardiovascular diseases. In addition, the results they will be socialized with the coordinators of the Undergraduate Course so that interventions can be discussed and implemented.

## CONCLUSION

The first-year college students addressed here present different risk factors for cardiovascular diseases, the most prevalent being sedentary lifestyle, daytime excessive sleepiness and stress. These risk factors should be identified early on to minimize impacts in the individuals' lives, since these are future professionals, whose main function will be caring for the other and, therefore, should care for themselves. Vitality was the domain of quality of life with the lowest mean score. Note that other studies addressing different profiles of undergraduate nursing students are needed to outline a more detailed profile of these individuals. This study's limitations include the low number of students in the sample and the fact that a single university was addressed.

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**Funding/Acknowlegment:**
The project received financial support from the Brazilian Council for Scientific and Technological Development (CNPq) No. 407708/2018-9 and No. 307562/2018-2 and the doctoral student received financial support from the Coordination for the Improvement of Higher Education Personnel (CAPES).

**Authorship contribution:**
Conceptualization: Marianna Sobral Lacerda, Alba Lúcia Bottura Leite de Barros, Juliana de Lima Lopes.
Data curation: Marianna Sobral Lacerda, Marina Bertelli Rossi, Juliana de Lima Lopes
Formal analysis: Marianna Sobral Lacerda, Marina Bertelli Rossi, Erika de Sá Vieira Abuchaim, Alba Lúcia Bottura Leite de Barros, Juliana de Lima Lopes.
Funding acquisition : Juliana de Lima Lopes.
Investigation: Marianna Sobral Lacerda, Marina Bertelli Rossi, Erika de Sá Vieira Abuchaim, Alba Lúcia Bottura Leite de Barros, Juliana de Lima Lopes.
Methodology: Marianna Sobral Lacerda, Marina Bertelli Rossi, Erika de Sá Vieira Abuchaim, Alba Lúcia Bottura Leite de Barros, Juliana de Lima Lopes.
Project administration: Alba Lúcia Bottura Leite de Barros, Juliana de Lima Lopes.
Resources: Marianna Sobral Lacerda, Marina Bertelli Rossi, Erika de Sá Vieira Abuchaim, Alba Lúcia Bottura Leite de Barros, Juliana de Lima Lopes.
Supervision: Erika de Sá Vieira Abuchaim, Alba Lúcia Bottura Leite de Barros, Juliana de Lima Lopes.
Validation: Marianna Sobral Lacerda, Marina Bertelli Rossi, Erika de Sá Vieira Abuchaim, Alba Lúcia Bottura Leite de Barros, Juliana de Lima Lopes.
Visualization: Marianna Sobral Lacerda, Marina Bertelli Rossi, Erika de Sá Vieira Abuchaim, Alba Lúcia Bottura Leite de Barros, Juliana de Lima Lopes.
Writing: Marianna Sobral Lacerda, Marina Bertelli Rossi, Erika de Sá Vieira Abuchaim, Alba Lúcia Bottura Leite de Barros, Juliana de Lima Lopes.
Writing – review & editing: Marianna Sobral Lacerda, Marina Bertelli Rossi, Erika de Sá Vieira Abuchaim, Alba Lúcia Bottura Leite de Barros, Juliana de Lima Lopes.
The authors declare that there is no conflict of interest.

**Corresponding author:**
Marianna Sobral Lacerda
Email: sobralmarianna@gmail.com

Received: 12.03.2021r
Approved: 28.10.2021

**Associate editor:**
Graziella Badin Aliti

**Editor-in-chief:**
Maria da Graça Oliveira Crossetti