Artículo de investigación

# Analysis of the Bond of Users from Different Basic Health Units with Possible Diagnosis of Non-Communicable Chronic Diseases during the Covid-19 Pandemic in a city in southern Brazil

**Análisis del Vínculo de Usuarios de Distintas Unidades Básicas de Salud Con Posible Diagnóstico de Enfermedades Crónicas no Transmisibles Frente a la Pandemia del Covid-19 en el en una ciudad del sur de Brasil**

**Análise do Vínculo de Usuários de Diferentes Unidades Básicas de Saúde com Possível Diagnóstico de Doenças Crônicas não Transmissíveis Frente à Pandemia da Covid-19 em uma cidade no Sul do Brasil**

Nanuncio-Capucho, Virgínia B.[1]; de-Paula, Regiane[2]; de-Almeida, Letícia[3]; Westphal-Nardo, Greice[4]; Nardo-Júnior, Nelson[5]; Ferrari, Bruno[6] & Magnani-Branco, Braulio H.[7]

Nanuncio-Capucho, V. B., de-Paula, R., de-Almeida, L., Westphal-Nardo, G., Nardo-Júnior, N., Ferrari, B. & Magnani-Branco, B. H. (2024). Analysis of the Bond of Users from Different Basic Health Units with Possible Diagnosis of Non-Communicale Chronic Diseases during the Covid-19 Pandemic in a city in southern Brazil. *Revista Ciencias de la Actividad Física UCM, 25*(1), enero-junio, 1-14. https://doi.org/10.29035/rcaf.25.1.6

## ABSTRACT

Non-communicable chronic diseases (NCDs) are considered one of the leading causes of death worldwide. During the COVID-19 pandemic, these diseases have been neglected due to the Brazilian Unified National Health System (BHUS) overload. In this context, this study aimed to analyze the bond between patients with NCDs and primary care during the COVID-19 pandemic while also seeking to identify the population's level of knowledge about health parameters and their relationship with the healthcare system. A cross-sectional and observational study was conducted, in which an online questionnaire was administered to collect socioeconomic information from patients and their bond with BHUS in the metropolitan region of Maringa, Parana, Brazil, encompassing individuals over 18 years of age. The survey was promoted on social media, and interested participants responded to the questionnaire, which addressed topics such as identification, medication use, disease information, knowledge about NCDs, and general data related to COVID-19. The obtained and analyzed responses revealed a low bond level between this population and primary care and a lack of knowledge about NCDs and their health during the pandemic. There was a notable decrease in seeking healthcare services during this period, which may be explained by the fear of contracting the novel coronavirus. This study is essential to understand patients' responses to public health challenges during the pandemic. It can become a valuable ally in dealing with future pandemics and endemic crises, enabling improvements in care and raising awareness among the population about NCDs and the healthcare system.

**Key words:** Primary health care; Degenerative diseases; Coronavirus infections; Health centers.

[1] Cesumar University, Maringa, Brazil.
https://orcid.org/0009-0006-0165-6644, vbenedettinanuncio@gmail.com
[2] Cesumar University, Interdisciplinary Laboratory of Health Promotion Intervention, Maringa, Brazil.
https://orcid.org/0009-0003-7061-2504, regipaula74@gmail.com
[3] Cesumar University, Maringa, Brazil.
https://orcid.org/0009-0006-0165-6644, almeidadeleticia@gmail.com
[4] Cesumar University, Maringa, Brazil.
https://orcid.org/0000-0001-9107-0108, greice.westphal@unicesumar.edu.br
[5] Cesumar University, Maringa, Brazil.
https://orcid.org/0000-0002-6862-7868, nnjunior@uem.br
[6] Cesumar University, Interdisciplinary Laboratory of Health Promotion Intervention, Maringa, Brazil.
https://orcid.org/0000-0002-6503-5576, ferrarisilvab@gmail.com
[7] Cesumar University, Maringa, Brazil.
https://orcid.org/0000-0002-4625-9128, braulio.branco@unicesumar.edu.br

## RESUMEN

Las enfermedades crónicas no transmisibles (ENT) son consideradas una de las principales causas de muerte a nivel mundial. Durante la pandemia de COVID-19, estas enfermedades han sido desatendidas debido a la sobrecarga de las Unidades Básicas de Salud (UBS). En ese contexto, el objetivo de este estudio es analizar el vínculo entre los pacientes con enfermedades crónicas no transmisibles (ECNT) y la atención primaria durante la pandemia de COVID-19, buscando identificar el nivel de conocimiento de la población sobre los parámetros de salud y la relación con el sistema de salud. Se realizó un estudio transversal y observacional, en el que se aplicó un cuestionario en línea para recolectar información socioeconómica de los pacientes y su vínculo con las BHU en la región metropolitana de Maringá/PR, abarcando personas mayores de 18 años. La divulgación se realizó en las redes sociales y los interesados respondieron el cuestionario que abordó temas como identificación, uso de medicamentos, información sobre enfermedades, conocimientos sobre ECNT y datos generales relacionados con el COVID-19. Las respuestas obtenidas y analizadas revelaron un bajo nivel de vinculación de esta población con la atención primaria, así como un desconocimiento sobre las ECNT y su propia salud durante la pandemia. Hubo una notable reducción en la demanda de servicios de salud durante este período, lo que puede explicarse por el temor a la contaminación por el nuevo coronavirus. Este estudio se presenta como una herramienta importante para comprender la respuesta de los pacientes a los desafíos de salud pública durante la pandemia. Puede convertirse en un valioso aliado para enfrentar futuras pandemias y crisis endémicas, posibilitando mejoras en la atención y concientización de la población sobre las ECNT y el sistema de salud.

Palabras clave: Atención primaria de salud; Enfermedades degenerativas; Infecciones por coronavirus; Estaciones de salud.

## RESUMO

As doenças crônicas não transmissíveis (DCNTs) são consideradas uma das principais causas de morte em todo o mundo. Durante a pandemia da COVID-19, essas doenças têm sido negligenciadas devido à sobrecarga das Unidades Básicas de Saúde (BHU). Neste contexto, o objetivo deste estudo é analisar o vínculo dos pacientes com DCNTs com a atenção primária durante a pandemia da COVID-19, ao mesmo tempo em que busca identificar o nível de conhecimento da população sobre os parâmetros de saúde e o relacionamento com o sistema de saúde. Realizou-se um estudo transversal e observacional, no qual foi aplicado um questionário online para coletar informações socioeconômicas dos pacientes e seu vínculo com as BHUs na região metropolitana de Maringá/PR, abrangendo indivíduos maiores de 18 anos. A divulgação foi realizada em mídias sociais e os interessados responderam ao questionário que abordou tópicos como identificação, uso de medicações, informações sobre doenças, conhecimento acerca das DCNTs e dados gerais relacionados à COVID-19. As respostas obtidas e analisadas revelaram um baixo nível de vínculo dessa população com a atenção primária, assim como uma falta de conhecimento sobre as DCNTs e a própria saúde durante a pandemia. Observou-se uma notável redução na procura por serviços de saúde durante esse período, o que pode ser explicado pelo receio da contaminação pelo novo coronavírus. Este estudo se apresenta como uma ferramenta importante para compreender a resposta dos pacientes frente aos desafios da saúde pública durante a pandemia. Ele pode se tornar um aliado valioso para lidar com futuras pandemias e crises endêmicas, possibilitando melhorias nos cuidados e na conscientização da população sobre as DCNTs e o sistema de saúde.

Palavras chave: Atendimento primário de saúde; Doenças degenerativas; Infecções por coronavírus; Postos de saúde.

## INTRODUCTION

Non-communicable chronic diseases (NCDs) constitute a group of pathologies that demand continuous and daily treatment, significantly influencing the lives of affected patients (Marques et al., 2022). In Brazil, numerous individuals are affected by various NCDs, including cardiovascular diseases, metabolic disorders, autoimmune conditions, and other psychological disorders (Figueiredo et al., 2021). Due to their prolonged and critical nature, these conditions exhibit high mortality rates and are the primary cause of death worldwide, responsible for 70% of cases, equivalent to approximately 38 million people annually. In light of this scenario, conducting studies and implementing interventions becomes imperative to confront this challenge (Malta et al., 2018). Chronic diseases are characterized by the absence of a cure, making it essential to elucidate the risk factors associated with these pathologies, focusing on those that can be modified (Moura et al., 2011). Among the most relevant modifiable risk factors, lifestyle habits play a significant role, including physical inactivity, continuous alcohol consumption, smoking, irregular eating habits, and poor sleep quality (Lemos et al., 2022; Perli et al., 2023; Ryal et al., 2023). On the other hand, non-modifiable risk factors primarily include age, genetic factors, and sex (Morais et al., 2018). Understanding the classical patterns of manifestation and the risks and possible associated risk factors for each chronic disease is a crucial and necessary step for subsequent control, treatment, and prognosis of these conditions (Malta et al., 2017).

In chronic diseases, the bond between patients and the Brazilian Unified National Health System (BUNHS) becomes an essential and necessary tool for continuous disease monitoring, aiming at secondary, tertiary, and quaternary health interventions (Malta et al., 2017). This approach aims to prevent potential disease complications and facilitate the patient's reintegration into society (Malta, Silva et al., 2020). Such monitoring is even more crucial due to chronic diseases' prolonged nature and care demand, making regular consultations and examinations for affected patients even more indispensable than for healthy individuals (Malta et al., 2017). The Basic Health System (BHU) is the main gateway to the BUNHS and, consequently, is where users establish their primary connection with the system. At this level, patients are warmly welcomed and receive regular care from the same healthcare professional who follows up and manages their illness. Additionally, there are regular visits from Community Health Agents (CHA) to patients' homes and the support of the entire nursing team and other professionals, including dentists, nutritionists, psychologists, pharmacists, and social workers. This environment becomes a secure and comfortable space for patients undergoing treatment and for the general population in the region, as attending the BHU allows for disease screenings and regular visits by ACSCHA to residents' homes (Méllo et al., 2021).

The coronavirus disease (COVID-19) pandemic, which began in Brazil in 2020, significantly impacted the bond between patients with NCDs and primary healthcare (Malta et al., 2020). Since then, the entire healthcare landscape in the country has been altered. The pandemic brought an unprecedented situation to public health, requiring changes in how emergency care and BHU dealt with suspected or affected COVID-19 patients (Adorno, 2020). COVID-19 is a viral disease caused by the novel coronavirus and is primarily transmitted through contact with infected individuals, especially in the upper respiratory tract (Perli et al., 2023). From a pathophysiological standpoint, COVID-19 is highly contagious, and despite the availability of effective vaccines to control cases, it still lacks a fully effective treatment that sustains its lethal potential, particularly for at-risk groups, including older people,

pregnant women, individuals with comorbidities (including non-communicable chronic diseases), respiratory conditions, obesity, and sedentary lifestyles (Lana et al., 2021; Lemos et al., 2022; Sordi et al., 2023; Silva-Lalucci et al., 2024).

Due to the COVID-19 pandemic, patients with pre-existing NCDs have increased their social isolation and avoided staying in high-contamination areas, such as Basic Health Systems (BHUS) (Jiménez-Pavón et al., 2020). The overcrowding of healthcare systems has led to a high concentration of infected individuals in waiting rooms and corridors, making BHUs potential sites for contamination due to unavoidable crowding, discouraging patients with NCDs from seeking care. This situation has raised concerns about adequate access to healthcare for individuals with chronic diseases, necessitating careful measures to ensure their safety during the pandemic (Mesenburg et al., 2021). The objective of this study was to characterize the bond between patients and the BUNHS in the municipality of Maringa, Parana, Brazil, to understand the population's perception regarding the development of chronic diseases, and to investigate factors that may be associated with the occurrence of Non-Communicable Chronic Diseases (NCDs) during the pandemic.

## METHODS

The study is a cross-sectional and observational research conducted through an online survey with patients treated in the metropolitan region of Maringa, Parana, Brazil, from September 2021 to May 2022. Patients were invited through local information available at BHU, electronic media, and social networks. All participants who agreed to participate in the research provided informed consent through the Informed Consent Form (ICF) and received participation instructions. Patients were interviewed, responding to the survey in their primary areas of interest. This study was approved by the Ethics Committee of Unicesumar (Approval number: 4.546.726).

The following inclusion criteria were adopted to select the target population: Inclusion criteria:

- Individuals over 18 years of age;
- Users of the BUNHS;
- Men and women;
- Patients with or without NCDs;
- The population resides in the metropolitan region of Maringa, Parana, Brazil.

*Exclusion criteria:*

- Non-users of the BUNHS;
- Individuals with private health insurance plans;
- Individuals unable to individually respond to the survey;
- Population attended in other regions.

A custom questionnaire was used, consisting of sections: identification, self-reported anthropometric data, sociodemographic condition, daily medication use, lifestyle habits, chronic disease diagnosis, self-perception of health, family history of chronic diseases, changes in health patterns during the BUNHS, frequency of consultations before and during the pandemic, knowledge about COVID-19, and psychosocial impact of the pandemic.

*Identification and anthropometric data:*

Patients provided information such as name, date of birth, marital status, weight, and height. For anthropometric data, participants were instructed on how to self-measure the requested metrics due to social isolation.

*Sociodemographic condition:*

Patients provided information such as their current profession and weekly working hours. These collected data are of utmost importance to understanding the patient's dependency on the BUNHS and their knowledge about their health.

*Daily medication use:*

Patients reported continuous and sporadic medication use. These collected data provide valuable information about the treatments adopted for diagnosed diseases, undisclosed diagnoses, and potential misuse of medications that may become risk factors for developing diseases.

*Lifestyle habits:*

Reported information regarding smoking, social or chronic alcohol consumption, physical activity, dietary habits, illicit drug use, and screen time. These collected data are essential for identifying the presence or absence of risk factors for chronic diseases and understanding the need for screening, prevention, and treatment.

*Diagnosis of chronic diseases:*

Information about pre-existing diagnoses of chronic diseases (such as hypertension, diabetes, dyslipidemia, insulin resistance, psychiatric disorders, and obesity), the degree of involvement, possible treatments, and follow-up.

*Perception of own health:*

Knowledge about one's health is based on information about symptoms and signs of anxiety, increased systolic pressure, elevated blood glucose, and changes in sleep quality.

*Family history of chronic diseases:*

Reported information about family history of chronic diseases is necessary for identifying the genetic patterns involved in the health of the surveyed patients.

*Health changes during the pandemic:*

Diagnosed information on changes in systolic pressure, blood glucose, cholesterol, signs of anxiety and depression, and sleep quality during the COVID-19 pandemic. These collected data contribute to negative prognostic factors for the onset of NCDs during the COVID-19 pandemic.

*Knowledge about the Public Health System:*

Knowledge about the services offered in the Public Health System, such as operating hours and locations, appointment scheduling, specialties, exams, and extra services outside the Basic Health Unit (such as the Family Health Support Center, the popular pharmacy, and the free medications offered), and vaccination application and schedule.

*Relationship with the BUNHS:*

Information about the frequency of using the BUNHS before and during the COVID-19 pandemic, types of care, emergency services, and personal relationships with CHA, nurses, and other healthcare providers.

*Knowledge about COVID-19:*

Knowledge about the pattern of infection, signs and symptoms, testing, mode of transmission and prevention, treatments, positive testing, and follow-up, considering the need for hospitalization and the presentation of symptomatology as mild, moderate, and severe, as classified by the World Health Organization (WHO). Additional information on infection in close relatives.

*Psychosocial impact of the pandemic:*

Symptoms of behavioral changes attributed (traits of anxiety and depression) to isolation, infection, confirmed deaths, lack of treatment, and vaccination.

*Data Treatment and Analysis*

The data were tabulated based on absolute values and classified according to the specificity of each analyzed variable. Descriptive and inferential analyses were performed using IBM SPSS Statistics version 24 (IBM, USA) (Field, 2009). G*Power software (Dusseldorf, Germany) was used to calculate the sample size based on the statistical inference model applied to the study's experimental design. A sample size of 74 participants was estimated, considering a test power (*1-β* error probability) of 80%. The analyzed data were presented descriptively as mean and standard deviation or absolute frequency and relative percentage of the sample for scenario characterization. Besides that, the odds ratio (OR) was calculated to identify a measure of association between an exposure and an outcome. The statistical normality of the data was assessed using the Shapiro-Wilk test, followed by a Chi-square ($X^2$) test of independence to determine the distribution of frequencies and associations between variables, with a significance level of 5% adopted.

## RESULTS

In Table 1, based on a descriptive analysis of the study participants, the average BMI (Body Mass Index) was 25.3 kg/m², classified as overweight in this population. Additionally, a high percentage of participants reported alcohol consumption, with 137 individuals (63.4%) stating they consume alcoholic beverages weekly. On the other hand, smoking was not a significant factor in the research, as only 8 out of 221 participants (3.7%) reported being smokers. Regarding the division of educational attainment, approximately 87 individuals (39.4%) have completed high school, and 122 individuals (55.2%) have completed higher education. Regarding self-assessment of nutritional status, the majority (146 individuals) consider themselves healthy, while only 9 participants consider themselves poor. Only 46 individuals (21.2%) engage in physical exercise 5 times or more per week. On the other hand, 48 individuals (22.4%) reported not engaging in any physical activity during the week. When asked about hereditary chronic diseases, 136 participants (62.9%) stated that there are cases of chronic diseases in their family, regardless of the specific condition.

**Table 1**

*Descriptive data on nutritional status, education level, and lifestyle habits.*

| Variables | Mean ± SD | Absolute and relative frequency | | |
|---|---|---|---|---|
| Weight (kg) | 71.3 ± 16.7 | | | |
| Height (m) | 1.67 ± 0.08 | | | |
| Body mass index (kg/m²) | 25.3 ± 4.9 | | | |
| Declared alcohol consumption | **Yes** | **No** | | |
| | 137 (63.4%) | 79 (36.6%) | | |
| Reported tobacco consumption | 8 (3.7%) | 208 (96.3%) | | |
| Hereditary diseases reported at the family level | 136 (62.9%) | 80 (37.1%) | | |
| Nutritional status | **Normal weight** | **Overweight** | **Obesity** | |
| | 121 (56.0%) | 62 (28.7%) | 33 (15.3%) | |
| Education | **Basic education** | **High school** | **University education** | |
| | 7 (3.2%) | 87 (39.4%) | 122 (55.2%) | |
| Nutritional self-perception | **Healthy** | **Compromised health** | **Unhealthy** | |
| | 146 (67.6%) | 61 (28.2%) | 9 (4.2%) | |
| Frequency of physical activity | **≤ 2x weeks** | **3-4x weeks** | **5 ≤ x weeks** | **Sedentary** |
| | 56 (25.9%) | 66 (30.5%) | 46 (21.2%) | 48 (22.4%) |

Note: data were presented by mean, standard deviation (SD), and absolute and relative frequency (%).

A relevant fact described in Table 2 shows self-awareness regarding the most prevalent chronic diseases: hypertension, diabetes, and mental health diseases, such as anxiety symptoms, hypertension, and diabetes. The best performance was observed in the knowledge about diabetes; 165 individuals (76.4%) reported recognizing and understanding a diabetes condition. On the other hand, despite being one of the most mentioned diseases regarding family history, hypertension was the least understood and recognized by 146 participants (63.7%). Anxiety symptoms were reported in 71.3% of participants, a factor highly elevated in this study.

**Table 2**

*Data on participants' self-knowledge about anxiety symptoms, hypertension, and diabetes.*

| Self-reported symptoms | Yes | No | Maybe |
|---|---|---|---|
| Anxiety symptoms | 154 (71.3%) | 16 (7.4%) | 46 (21.3%) |
| Hypertension | 70 (32.4%) | 146 (67.6%) | 0 |
| Diabetes | 165 (76.4%) | 51 (23.6%) | 0 |

Note: data were presented by absolute and relative frequency (%).

In the face of the changes caused by COVID-19, participants were asked about changes in their clinical condition during the pandemic, as shown in Table 3. Most participants reported feeling more anxious than habitual (61.1%) and experienced weight changes (50.9%). However, alterations in blood pressure were not a predominant factor among the study participants, as only 36 (16.6%) experienced this variation. When asked about changes in blood glucose and cholesterol levels, alarmingly high percentages of participants lacked the knowledge to respond, with 47.7% and 36.7% of participants, respectively. On the other hand, the most significant variant of changes caused by the pandemic was sleep quality, which was reported to be worse in 142 individuals (65.7%).

**Table 3**

*Data on the clinical condition of the participants during the period of the COVID-19 pandemic.*

| Clinical condition | Yes | No | I do not know how to inform |
|---|---|---|---|
| Felt more anxious than habitual | 132 (61.1%) | 84 (38.9%) | 0 |
| Weight gain | 110 (50.9%) | 106 (49.1%) | 0 |
| Pressure Alterations | 36 (16.6%) | 116 (53.7%) | 64 (29.7%) |
| Glycemia Alterations | 24 (11.1%) | 89 (41.2%) | 103 (47.7%) |
| Cholesterol Alterations | 33 (15.2%) | 104 (48.1%) | 79 (36.7%) |
| Worse sleep quality | 142 (65.7%) | 74 (34.3%) | 0 |

Note: data were presented by absolute and relative frequency (%).

Table 4 shows the link between BHU knowledge about the services provided and seeking BHU assistance. It can be observed that more than 25% ($n$=55; $X^2$ = 9.7; $p$= 0.002) of individuals who experienced weight gain during the pandemic did not seek BHU assistance. Furthermore, data on misinformation regarding changes in blood glucose levels show that 67 individuals (31%) could not provide information about the services offered by the BHU ($X^2$ = 8.27; $p$= 0.016). Similarly, over 24% ($n$=53; $X^2$ = 8.74; $p$= 0.013) of the population unaware of changes in blood glucose levels during the pandemic do not seek assistance at the BHU. The same can be observed for individuals unaware of changes in cholesterol levels during the pandemic and lacking knowledge about the services offered by the BHU ($n$=52; $X^2$ = 6.42; p= 0.04).

Table 4

*Relationship between changes in the clinical picture during the pandemic and knowledge and demand for Basic Health Units.*

| | Know the services offered by BHU | | | | BHU search | | | |
|---|---|---|---|---|---|---|---|---|
| Questions | Yes | No | $X^2$ | *p*-value | Yes | No | $X^2$ | *p*-value |
| Weight gain | | | | | 55 (25.5%) | 55 (25.5%) | 9.70* | 0.002* |
| Do not know how to inform alteration glycemia | 36 (16.7%) | 67 (31%) | 8.27* | 0.016* | 50 (23.1%) | 53 (24.3%) | 8.74* | 0.013* |
| Do not know how to inform alteration of cholesterol | 27 (12.5%) | 52 (24.1%) | 6.42* | 0.04* | | | | |

Note: Data were presented by absolute and relative frequency (%); X2 = Chi-square test; BHU = Brazilian Unified National Health System; Level of significance = * = p<0.05.

Based on the results found, we can observe in Table 5 that individuals classified as overweight and obese based on BMI have a 66% (OR=1.66; *p*= 0.011) higher chance of developing NCDs when compared to individuals with normal weight. Regarding sleep quality, individuals with any NCD have nearly twice the chance of developing sleep disorders (OR=1.99; *p*= 0.019). On the other hand, altered blood pressure and glucose levels were more present in patients with established NCDs (32/20.5% and 21/18.4%. respectively). However, it can be observed that individuals without NCDs who also did not develop changes in blood pressure and glucose levels are more prevalent (OR=0.36; *p*= 0.037).

Table 5

*Chi-square analysis with an odds ratio for developing Non-Cronical Diseases.*

| Variables analyzed | N (%) have NCDs | N (%) no have NCDs | X2 | OR | *p*-value |
|---|---|---|---|---|---|
| BMI (> 25 kg/m²) | 74 (33.5%) | 24 (10.9%) | 6.39 | 1.66 | 0.011* |
| COVID-19 | 80 (36.2%) | 31 (14%) | 3.09 | 1.40 | 0.079 |
| Weight alterations | 70 (31.7%) | 36 (16.3%) | 0.02 | 0.973 | 0.885 |
| Anxiety traits | 52 (23.5%) | 34 (15.4%) | 2.31 | 0.749 | 0.128 |
| Sleep disorder | 103 (46.6%) | 40 (18.1%) | 5.52 | 1.99 | 0.019* |
| Alterations in blood pressure | 31 (20.5%) | 5 (3.2%) | 6.36 | 0.38 | 0.012* |
| Alterations in glicemia | 21 (18.4%) | 3 (2.6%) | 4.36 | 0.36 | 0.037* |

Note: Data were presented by absolute and relative frequency (%); X2 = Chi-square test; OR = Odds ratio; NCDs = Brazilian Unified National Health System; BMI = body mass index; * = p<0.05.

## DISCUSSION

The study's objective was to characterize the bond of patients with the BUNHS in the municipality of Maringa-Parana and to identify factors that may be associated with NCDs during the pandemic. As a part of this, the patients were divided according to classifications based on BMI, education level, physical activity, self-assessment of nutrition, reported lifestyle habits, and presence of hereditary chronic diseases for risk factor analysis for the development of NCDs during the pandemic. Regarding BMI, the participants were classified as overweight, with an average of 25.3 kg/m². Overweight and obesity are multifactorial conditions that increase morbidity and mortality in patients of all age groups,

aggravating factors in the onset and unfavorable prognosis of chronic diseases (Thomas-Eapen., 2021; Silva-Lalucci et al., 2024). Regarding lifestyle habits, it is known that smoking and alcohol consumption are two risk factors intrinsically related to the development of chronic diseases and numerous other pathologies. and they are on the rise among users in Brazil (Dantas et al., 2018). In the present research, participants reported high weekly alcohol consumption, with a total incidence of 63.4%. On the other hand, smoking was not a considerably concerning factor in the population surveyed, with an incidence of only 3.7%.

The data reported by the participants regarding their nutritional self-perception shows that most of them consider themselves to have a healthy diet (66%), consuming a variety of foods and having complete meals while avoiding processed foods with high fat and sugar content. As for physical activity, the data were varied, with some of the population stating that they engage in physical activity five times or more per week (21.2%), while the rest report a low frequency of physical activity or even never engaging in it (22.4%). Both parameters are significant prognostic risk factors for NCDs (Gualano & Tinucci, 2011; Sordi et al., 2023). Moreover, they explain the high incidence of overweight in this population, which most do not engage in sufficient physical activity. Interestingly, more than half of the participants have completed higher education (55.2%), suggesting a population with more knowledge about NCDs, their manifestations, and treatments (Ribeiro et al., 2018). However, when questioned about their knowledge of the most prevalent NCDs (hypertension and diabetes), the patients demonstrated a deficit regarding hypertension, with 63.7% stating that they do not know its clinical presentation. Additionally. over 29% of the population would not know how to recognize a case of anxiety if they came across one. Knowledge was advantageous only in the case of diabetes, with 76.4% of patients claiming to recognize the metabolic disorder's clinical presentation.

Indeed, the lack of knowledge about chronic diseases has become a significant public health problem, especially when discussing conditions with high prevalence and mortality in the country. Not being familiar with such pathologies hinders public health efforts and disease prevention. Without the proper knowledge, individuals are unaware of the mechanisms of disease onset and ways to avoid them, leading to a deficit in early screening and treatment, ultimately negatively impacting disease rates (Mesenburg et al., 2021). This information becomes even more concerning when 62.9% of the study participants report having a hereditary pattern of NCDs in their family, exponentially increasing their chances of developing diseases they are not familiar. Addressing this knowledge gap through health education and awareness campaigns becomes crucial for improving health outcomes and preventing the burden of chronic diseases in the population. The pandemic was a wholly unexpected and unknown event that became the cause of changes in the entire population's daily lives and altered countless health parameters (Almeida et al., 2020; Perli et al., 2023; Ryal et al., 2023). Most participants (61.1%) reported anxious and depressive symptoms, such as distress, sudden sadness, a lack of hope in the face of the situation. and an exacerbated desire to cry. Alongside these psychological symptoms, most participants (65.7%) also reported sleep disturbances that emerged during the pandemic. The research data showed that individuals with chronic diseases were twice as likely (Table 5) to develop sleep disorders compared to those without NCDs, indicating a significant risk factor.

Furthermore, 50.9% of the participants reported weight gain during the pandemic, which the overweight BMI may explain found in this population and the small percentage that engages in regular

physical activity as recommended. Among all these patients who reported weight gain during the pandemic, over 25% stated they had no connection, lacked knowledge of the services offered, and did not seek care at the BHU or when feeling unwell (Table 4). Despite experiencing changes in health patterns, they did not seek medical attention for appropriate care. Therefore, there is a clear relationship between the lack of knowledge about the services offered at the BHU and the absence of a connection and seeking care during the pandemic, negatively impacting the staging and screening of chronic diseases, exacerbating the prevalence of these pathologies (Westphal-Nardo et al., 2023). The lack of knowledge was also alarming in the questioning about changes in blood glucose and cholesterol levels during the pandemic, as 47.7% and 36.7% of the population could not inform whether they experienced variations in these parameters during the pandemic (D 4); this condition can lead to neglecting the control of chronic diseases during the period that encompasses the COVID-19 crisis (Malta et al., 2018).

As biases that could not be addressed in the study, one can mention the lack of a more detailed exploration of the various clinical changes that may have occurred during the pandemic, leaving gaps to be filled in a future study. Based on the findings, it is necessary to propose interventions starting from the educational foundation regarding NCDs by raising awareness and disseminating knowledge about these conditions, including their investigation, risk factors, treatment, and prognoses. Additionally, finding ways to establish users' connection with BHU is essential, such as through frequent visits by CHA, neighborhood groups, regular conversations, and phone calls to confirm appointments and visits. Finally, measures must be taken to control the consequences of the COVID-19 pandemic, intervening in the population with risk factors for NCD development to prevent future increases in NCD rates due to the effects of the quarantine.

## CONCLUSION

Based on all the data found and discussed in this study, it is evident that the population lacks knowledge about NCDs, recognizing the characteristic clinical signs of these diseases, and identifying if they are affected. Despite this lack of knowledge, the population showed anthropometric changes worsened sleep quality and aggravated psychological factors, such as anxiety symptoms during the pandemic. These changes represent risk factors for the development of all these chronic conditions. The results indicate the need to invest in education and awareness programs about NCDs to reduce these risks and improve public health amid challenges like the pandemic. Furthermore, the lack of knowledge also reflects the difficulty of identifying all the services offered by the BHU, resulting in a reduced bond with the BUNHS and a decrease in seeking healthcare during the pandemic. These factors contribute to deficits in screening and early diagnosis of pathologies responsible for being the leading cause of death worldwide, worsening national morbidity and mortality rates, and causing excessive public expenditures. Given this situation, the importance of intensifying health education efforts and access to information for the population becomes evident. Promoting awareness about the services available in the BHU and the importance of regular health monitoring, especially during pandemic periods, is crucial to prevent the worsening of chronic diseases and their impact on public health.

## REFERENCES

Adorno, S. (2020). Pandemia. *Estudos Avançados, 34*(99), 2–3. https://doi.org/10.1590/s0103-4014.2020.3499.001

Almeida, W. da S. de., Szwarcwald, C. L., Malta, D. C., Barros, M. B. de A., Souza Júnior, P. R. B. de, Azevedo, L. O., Romero, D., Lima, M. G., Damacena, G. N., Machado, Í. E., Gomes, C. S., Pina, M. de F. de, Gracie, R., Werneck, A. O., & Silva, D. R. P. da. (2020). Mudanças nas condições socioeconômicas e de saúde dos brasileiros durante a pandemia de COVID-19. *Revista Brasileira de Epidemiologia, 23*, e200105. https://doi.org/10.1590/1980-549720200105

Dantas, D. R. G., Rodrigues Filho, F. M., & Sarmento, H. P. (2018). Associação entre etilismo, outras drogas psicoativas e comorbidades em uma população de usuários de um programa de tratamento do tabagismo em Campina Grande-Pb. *Revista Saúde & Ciência Online, 7*(3), 59–76. https://rsc.revistas.ufcg.edu.br/index.php/rsc/article/view/142

Field, A. (2009). Discovering Statistics using SPSS Statistics. SAGE Publications.

Figueiredo, A. E. B., Ceccon, R. F., & Figueiredo, J. H. C. (2021). Doenças crônicas não transmissíveis e suas implicações na vida de idosos dependentes. *Ciência & Saúde Coletiva, 26*(1), 77–88. https://doi.org/10.1590/1413-81232020261.33882020

Gualano, B., & Tinucci, T. (2011). Sedentarismo, exercício físico e doenças crônicas. *Revista Brasileira de Educação Física e Esporte, 25*(spe), 37–43. https://doi.org/10.1590/s1807-55092011000500005

Jiménez-Pavón, D., Carbonell-Baeza, A., & Lavie, C. J. (2020). Physical exercise as therapy to fight against the mental and physical consequences of COVID-19 quarantine: Special focus in older people. *Progress in Cardiovascular Diseases, 63*(3), 386–388. https://doi.org/10.1016/j.pcad.2020.03.009

Lana, R. M., Freitas, L. P., Codeço, C. T., Pacheco, A. G., Carvalho, L. M. F. de, Villela, D. A. M., Coelho, F. C., Cruz, O. G., Niquini, R. P., Porto, V. B. G., Gava, C., Gomes, M. F. da C., & Bastos, L. S. (2021). Identificação de grupos prioritários para a vacinação contra COVID-19 no Brasil. *Cadernos de Saúde Pública, 37*(10), e00049821. https://doi.org/10.1590/0102-311x00049821

Lemos, M. M., Cavalini, G. R., Henrique, C. R. P., Perli, V. A. S., Marchiori, G. de M., Marchiori, L. L. de M., Sordi, A. F., Moraes, S. M. F., Ramos, S. de P., & Valdés-Badilla, P. (2022). Body composition and cardiorespiratory fitness in overweight or obese people post COVID-19: a comparative study. *Frontiers In Physiology, 13*, 949351. http://dx.doi.org/10.3389/fphys.2022.949351

Malta, D. C., Bernal, R. T. I., Lima, M. G., Araújo, S. S. C. de, Silva, M. M. A. da, Freitas, M. I. de F., & Barros, M. B. de A. (2017). Noncommunicable diseases and the use of health services: analysis of the National Health Survey in Brazil. *Revista de Saúde Pública, 51*, 4s. https://doi.org/10.1590/s1518-8787.2017051000090

Malta, D. C., Bernal, R. T. I., Vieira Neto, E., Curci, K. A., Pasinato, M. T. de M., Lisbôa, R. M., Cachapuz, R. F., & Coelho, K. S. C. (2018). Tendências de fatores de risco e proteção de doenças crônicas não transmissíveis na população com planos de saúde no Brasil de 2008 a 2015. *Revista Brasileira de Epidemiologia, 21,* e180020. https://doi.org/10.1590/1980-549720180020.supl.1

Malta, D. C., Silva, A. G. da, Cardoso, L. S. de M., Andrade, F. M. D. de, Sá, A. C. M. G. N. de, Prates, E. J. S., Alves, F. T. A., & Xavier Junior, G. F. (2020). Doenças Crônicas Não Transmissíveis na Revista Ciência & Saúde Coletiva: um estudo bibliométrico. *Ciência & Saúde Coletiva, 25*(12), 4757–4769. https://doi.org/10.1590/1413-812320202512.16882020

Malta, D. C., Szwarcwald, C. L., Barros, M. B. de A., Gomes, C. S., Machado, Í. E., Souza Júnior, P. R. B. de, Romero, D. E., Lima, M. G., Damacena, G. N., Pina, M. de F., Freitas, M. I. de F., Werneck, A. O., Silva, D. R. P. da, Azevedo, L. O., & Gracie, R. (2020). A pandemia da COVID-19 e as mudanças no estilo de vida dos brasileiros adultos: um estudo transversal, 2020. *Epidemiologia e Serviços de Saúde, 29*(4), e2020407. https://doi.org/10.1590/s1679-49742020000400026

Marques, F. R. D. M., Domingues, L. F., Carreira, L., & Salci, M. A. (2022). Reorganização do serviço ambulatorial de referência para condições crônicas durante a pandemia da COVID-19. *Escola Anna Nery, 26*, e20210354. https://doi.org/10.1590/2177-9465-ean-2021-0354

Méllo, L. M. B. de D. e, Albuquerque, P. C. de, Santos, R. C. dos, Felipe, D. A., & Queirós, A. A. L. de. (2021). Agentes comunitárias de saúde: práticas, legitimidade e formação profissional em tempos de pandemia de Covid-19 no Brasil. *Interface - Comunicação, Saúde, Educação, 25*(suppl 1), e210306. https://doi.org/10.1590/interface.210306

Mesenburg, M. A., Hallal, P. C., Menezes, A. M. B., Barros, A. J. D., Horta, B. L., Barros, F. C. de, Hartwig, F. P., Jacques, N., & Silveira, M. F. da. (2021). Doenças crônicas não transmissíveis e covid-19: resultados do estudo Epicovid-19 Brasil. *Revista de Saúde Pública, 55,* 38. https://doi.org/10.11606/s1518-8787.2021055003673

Morais, H. C. C., Cavalcante, S. do N., Nascimento, L. B., Mendes, I. C., Nascimento, K. P. do, & Fonseca, R. (2018). Modifiable risk factors for chronic non-communicable diseases among university students. *Revista Da Rede de Enfermagem Do Nordeste, 19,* e3487. https://doi.org/10.15253/2175-6783.2018193487

Moura, E. C., Silva, S. A. da, Malta, D. C., & Morais Neto, O. L. (2011). Fatores de risco e proteção para doenças crônicas: vigilância por meio de inquérito telefônico, VIGITEL, Brasil, 2007. *Cadernos de Saúde Pública, 27*(3), 486–496. https://doi.org/10.1590/s0102-311x2011000300009

Perli, V. A. S., Sordi, A. F., Lemos, M. M., Fernandes, J. S. A., Capucho, V. B. N., Silva, B. F., Ramos, S. de P., Valdés-Badilla, P., Mota, J., & Branco, B. H. M. (2023). Body composition and cardiorespiratory fitness of overweight COVID-19 survivors in different severity degrees: a cohort study. *Scientific Reports, 13*, 17615. http://dx.doi.org/10.1038/s41598-023-44738-8

Ribeiro, K. G., Andrade, L. O. M. de, Aguiar, J. B. de, Moreira, A. E. M. M., & Frota, A. C. (2018). Educação e saúde em uma região em situação de vulnerabilidade social: avanços e desafios para as políticas públicas. *Interface - Comunicação, Saúde, Educação, 22*(suppl 1), 1387–1398. https://doi.org/10.1590/1807-57622017.0419

Ryal, J. J., Perli, V. A. S., Marques, D. C. de S., Sordi, A. F., Marques, M. G. de S., Camilo, M. L., Milani, R. G., Mota, J., Valdés-Badilla, P., & Branco, B. H. M. (2023). Effects of a Multi-Professional Intervention on Mental Health of Middle-Aged Overweight Survivors of COVID-19: a clinical trial. *International Journal of Environmental Research and Public Health, 20*(5), 4132-4145. http://doi.org/10.3390/ijerph20054132

Silva-Lalucci, M. P. de P., Marques, D. C. de S., Valdés-Badilla, P., Andreato, L. V., & Branco, B. H. M. (2024). Obesity as a Risk Factor for Complications and Mortality in Individuals with SARS-CoV-2: a systematic review. *Nutrients*, *16*(4), 543-550. http://doi.org/10.3390/nu16040543

Sordi, A. F., Lemos, M. M., Marques, D. C. de S.; Ryal, J. J., Lalucci, M. P. de P. S., Marques, M. G., Camilo, M. L. A., Ramos, S. de P., Moraes, S. M. F., & Valdés-Badilla, P. (2023). Effects of a multi-professional intervention on body composition, physical fitness and biochemical markers in overweight COVID-19 survivors: a clinical trial. *Frontiers In Physiology, 14*, 1219252. http://doi.org/10.3389/fphys.2023.1219252

Thomas-Eapen, N. (2021). Childhood Obesity. *Primary Care: Clinics in Office Practice, 48*(3), 505–515. https://doi.org/10.1016/j.pop.2021.04.002

Westphal-Nardo, G., Chaput, J.-P., Faúndez-Casanova, C., Fernandes, C. A. M., de Andrade Gonçalves, E. C., Utrila, R. T., Oltramari, K., Grizzo, F. M. F., & Nardo-Junior, N. (2023). Exploring New Tools for Risk Classification among Adults with Several Degrees of Obesity. *International Journal of Environmental Research and Public Health, 20*(13), 6263. https://doi.org/10.3390/ijerph20136263

## Dirección para correspondencia

Greice Westphal-Nardo
Doutora em Educação Física
Graduate Program of Health Promotion,
Cesumar University, Maringa,
Parana, Brazil.

ORCID: https://orcid.org/0000-0001-9107-0108
Contacto: greice.westphal@unicesumar.edu.br

Recibido: 02-08-2023
Aceptado: 29-01-2024