REVISTA CORPOCONSCIÊNCIA

INFLUENCE OF THE COVID-19 PANDEMIC ON HEALTH CARE OF PARTICIPANTS IN A CARDIORRESPIRATORY PREVENTION AND REHABILITATION PROGRAM

A INFLUÊNCIA DA PANDEMIA COVID-19 NOS CUIDADOS À SAÚDE DE PARTICIPANTES EM UM PROGRAMA DE PREVENÇÃO E REABILITAÇÃO CARDIORRESPIRATÓRIA

LA INFLUENCIA DE LA PANDEMIA DEL COVID-19 EM EL CUIDADO DE LA SALUD DE LOS PARTICIPANTES EN UM PROGRAMA DE PREVENCIÓN Y REHABILITACIÓN CARDIORRESPIRATORIA

Guilherme Tadeu de Barcelos
https://orcid.org/0000-0003-1356-1213
http://lattes.cnpq.br/8584327179525923
Universidade Federal de Santa Catarina (Florianópolis, SC – Brasil)
guilherme_barcellos@hotmail.com

Isabel Heberle
https://orcid.org/0000-0001-6407-7777
http://lattes.cnpq.br/6575625158014764
Universidade Federal de Santa Catarina (Florianópolis, SC – Brasil)
isabelheberle@hotmail.com

Juliana Cavestré Coneglian
https://orcid.org/0000-0003-1421-5005
http://lattes.cnpq.br/5055035178637029
Universidade Federal de Santa Catarina (Florianópolis, SC – Brasil)
julianacavestre@gmail.com

Antonio Cleilson Nobre Bandeira
https://orcid.org/0000-0002-0314-1146
http://lattes.cnpq.br/4393801781430230
Universidade Federal de Santa Catarina (Florianópolis, SC – Brasil)
cleilson.nobre@gmail.com

Rodrigo Sudatti Delevatti
https://orcid.org/0000-0003-1827-7799
http://lattes.cnpq.br/0330707893525396
Universidade Federal de Santa Catarina (Florianópolis, SC – Brasil)
rsdrodrigo@hotmail.com

Aline Mendes Gerage
https://orcid.org/0000-0002-0555-5422
http://lattes.cnpq.br/3522462017589271
Universidade Federal de Santa Catarina (Florianópolis, SC – Brasil)
alinegerage@yahoo.com.br

Abstract
The aim of the study was to evaluate by means of an online questionnaire the influence of the COVID-19 pandemic on exercise practice in the control of hypertension and type 2 diabetes. This is a cross-sectional study, which used a sample of patients with cardiovascular risk factors from a cardiorespiratory prevention and rehabilitation program. The questionnaire contains 29 questions about sociodemographic data and general health aspects. Regarding hypertension and diabetes, most participants reported the correct use of medications (76.0%). Regarding physical exercise, few remained active (56.0%). As for body mass, they reported an increase during the pandemic (52.0%). The COVID-19 pandemic negatively influenced the continuity of physical exercise, hypertension and diabetes control, and general health-related aspects of patients with cardiovascular risk factors in a cardiovascular prevention and rehabilitation program.
Keywords: Coronavirus; Physical Exercise; Social Isolation; Hypertension; Diabetes.

Resumo
O objetivo do estudo foi avaliar, por meio de um questionário online, a influência da pandemia de COVID-19 na prática de exercício físico no controle da hipertensão e do diabetes tipo 2. Este é um estudo transversal, conduzido com pacientes com fatores de risco cardiovascular, participantes de programa de prevenção e reabilitação cardiorrespiratória. O questionário continha 29 perguntas sobre dados sociodemográficos e aspectos gerais de saúde. Em relação à hipertensão e a diabetes, a maioria dos participantes relatou a utilização correta dos medicamentos (76.0%). Quanto à prática de exercício físico, poucos permaneceram ativos (56.0%) durante a pandemia. Quanto à massa corporal, relatou-se aumento durante a pandemia (52.0%). Conclui-se que a pandemia de COVID-19 influenciou negativamente a continuidade da prática de exercícios físicos, o controle da hipertensão e diabetes e os aspectos gerais relacionados à saúde dos participantes de um programa de prevenção e reabilitação cardiovascular.
Palavras-chave: Coronavírus; Exercício Físico; Isolamento Social; Hipertensão; Diabetes.

Resumen
El objetivo del estudio fue evaluar mediante un cuestionario online la influencia de la pandemia COVID-19 en la práctica de ejercicio físico en el control de la hipertensión y la diabetes tipo 2. Se trata de un estudio transversal, que utilizó una muestra de pacientes con factores de riesgo cardiovascular de un programa de prevención y rehabilitación cardiorrespiratoria. El cuestionario contiene 29 preguntas sobre datos sociodemográficos y aspectos generales de salud. En cuanto a la hipertensión y la diabetes, la mayoría de los participantes informaron del uso correcto de los medicamentos (76,0%). En cuanto a la práctica de ejercicio físico, pocos se mantuvieron activos (56,0%). En cuanto a la masa corporal, informaron de un aumento durante la pandemia (52,0%). La pandemia de COVID-19 influyó negativamente en la continuidad del ejercicio físico, el control de la hipertensión y la diabetes, y los aspectos generales relacionados con la salud de los pacientes con factores de riesgo cardiovascular en un programa de prevención y rehabilitación cardiovascular.
Palabras clave: Coronavirus; Ejercicio Físico; Aislamiento Social; Hipertensión; Diabetes.

INTRODUCTION

The pandemic caused by the disease of the new coronavirus (COVID-19) has strongly affected the lifestyle of the global population and has become an emergency case of public healt (SOHRABI et al., 2020). Coronavirus is a pathogen that primarily affects the human respiratory system, causing acute lung injury, which can worsen and lead to pulmonary insufficiency, which can lead to death (SHEREEN et al., 2020). The COVID-19 is a highly contagious disease that has already had 638.336,791 million cases confirmed and caused the death of 6.621,787 million people around the world (WHO, 2020). In Brazil, the disease has reached 34.999,495 million and led to the death of 688,907 thousand people (BRASIL, 2022). Several studies have observed that some characteristics of the population appear to be risk

factors for complications and mortality due to the COVID-19, with emphasis on hypertension and type 2 diabetes mellitus (DM2) (BARRERA et al., 2020; IOANNIDIS; AXFORS; CONTOPOULOS-IOANNIDIS, 2020; RICHARDSON et al., 2020; RODRIGUEZ-MORALES et al., 2020; YANAI, 2020; ZHOU et al., 2020). Meta-analysis studies show that the prevalence of hypertension and DM2 in patients affected by the COVID-19 varies between 17% to 20% and 9.7% to 12%, respectively (BARRERA et al., 2020; IOANNIDIS; AXFORS; CONTOPOULOS-IOANNIDIS, 2020; RODRIGUEZ-MORALES et al., 2020). Hypertension and DM2 are multifactorial chronic non-communicable diseases (NCDs) that have a high worldwide prevalence (BEANEY et al., 2018; SAEEDI et al., 2019) and are risk factors directly associated with mortality (ROTH et al., 2017). Such diseases are associated with greater risks of developing infections and lung diseases, which can lead to more severe complications in the cases of the COVID-19(ZAKI; ALASHWAL; IBRAHIM, 2020).

Among the main non-medication strategies for the treatment of hypertension and DM2, regular physical exercise is recommended, involving both aerobic and strength modes (AMERICAN DIABETES ASSOCIATION, 2020; BARROSO et al., 2021; WHELTON et al., 2018). Since the COVID-19 is a disease with a high capacity for dissemination, social distancing and social isolation are among the main preventive measures adopted to prevent or slow down contagion by the virus (CHU et al., 2020). In this context, access to regular physical exercise, especially those carried out in groups and supervised, was hindered, which can negatively affect people's health, mainly in patients who have some type of NCDs.

In addition to the complications inherent to the presence of hypertension and DM2 and the difficulty in accessing structured physical exercise, during the pandemic period, levels of physical activity tend to decrease, and time spent on sedentary behaviors to increase (AMMAR et al., 2020), increasing the stress oxidative, the inflammatory processes and the risk of cardiovascular events (PEÇANHA et al., 2020). Thus, patients with hypertension and DM2 are even more susceptible to the damage to health caused by the COVID-19 pandemic if they discontinue the regular practice of physical activities or remain physically inactive.

Furthermore, since the risk of mortality is greater in hypertensive patients without treatment with antihypertensive drugs (GAO et al., 2020), as well as in patients with uncontrolled DM2 (WILLIAMSON et al., 2020), it is necessary to investigate and understand the need and importance of continuing drug treatment and regular monitoring of blood pressure

(BP) and blood glucose levels in these patients during the current pandemic scenario (NADAR et al., 2020).

Therefore, the aim of the present study was to evaluate the influence of the COVID-19 pandemic on physical exercise practice, hypertension and DM2 control, and aspects related to the health of patients with cardiovascular risk factors participating in a program prevention and cardiorespiratory rehabilitation (PROCOR).

METHODS

Study Design

This is a cross-sectional descriptive study that was carried out in October 2020 through an online questionnaire to investigate the effects of the COVID-19 pandemic on habits related to health care and physical exercise practice of patients with cardiovascular risk factors.

Participants

The sample consisted of patients with cardiovascular risk factors, who participated in the Cardiorespiratory Prevention and Rehabilitation Extension Program (PROCOR) at the Federal University of Santa Catarina (UFSC). Subjects with cardiovascular risk factors were those with comorbidities such as diabetes, hypertension, dyslipidemia, or other cardiovascular diseases, and these comorbidities may be combined or isolated.

In the referred extension project (PROCOR), exercise sessions with combined training (aerobic and strength) were held three times a week, on non-consecutive days. Aerobic exercise was performed on the athletics track, cycloergometers or treadmills, lasting approximately 24 minutes. After aerobic exercise, approximately 20 minutes of strength exercises were performed with a focus on large muscle groups, using free weights, elastic bands, or body weight. Before and after each session, warm-up and stretching were performed, respectively. The total duration of the sessions was 60 minutes.

In addition to the physical exercises, several assessments were also carried out, such as anthropometric, body composition, hemodynamic, biochemical, functional capacities, internal and external training load monitoring, affective response to exercise, and acute and chronic blood pressure and capillary blood glucose responses.

Due to the COVID-19 pandemic, PROCOR's activities were suspended and participants were kept away from activities for approximately 10 months. Thus, the present study was conducted while the project participants were away from the face-to-face activities offered at UFSC.

Experimental Procedures

All participants of PROCOR were previously contacted by phone to explain the study and to invite them to participate. After confirmation of interest in participation, the questionnaire was sent as a link by e-mail and/or by message to all participants.

The questionnaire was elaborated with 29 questions, including information regarding age, body mass, height, blood pressure control in hypertensive patients, blood glucose control in patients with DM2, use of medications, perceived changes in health during the pandemic, occurrence of muscle or joint pain, physical exercise practice during the pandemic and the increase in body mass. The questionnaire was applied seven months after the start of local social isolation.

This study was approved by the local Ethics Committee (No. 4,354,912). Consent was given in the questionnaire itself, in which the Informed Consent Form was presented and participants could select the option to agree to the terms and participate in the study or disagree and not participate.

Data analysis

The data are presented descriptively in tables, with continuous numerical variables described as mean and standard deviation and categorical variables presented in absolute (n) and relative (%) frequency.

RESULTS

The study included 25 men and women between 40 and 80 years old, with a mean age of 66.6 ± 7.2 years. The sample had a higher proportion of men (52%), with a mean age of 68.8 ± 5.4 years and a mean body mass index (BMI) of 28.1 ± 3.5 kg/m^2. Table 1 shows the health characteristics of the participants.

Table 1 – Sociodemographic and anthropometric characteristics of the participants during the COVID-19 pandemic (n = 25). Florianópolis (SC), Brazil, 2020

Variables	n	%
Gender		
Male	13	52.0
Female	12	48.0
Age group (years)		
40 to 59	3	24.0
≥60	22	76.0
BMI *		
Eutrophic	13	52.0
Overweight	8	32.0
Obesity	4	16.0

BMI - body mass index. * Based on cut-off points for the elderly (≥65 years) from the World Health Organization.
Source: authors's owns.

Regarding the participants' health profile, 76% have hypertension and 24% have DM2, besides other diseases such as dyslipidemia (52%), and heart valve problems (16%). The least prevalent morbidities among the participants were peripheral arterial disease (4%) and pulmonary disease (4%). Table 2 shows in detail the presence and percentage of chronic diseases, conditions of control, and cardiovascular events in the participants.

Table 2 – Presence of diseases and blood pressure and blood glucose control measures during the COVID-19 pandemic (n = 25). Florianópolis (SC), Brazil, 2020

Variables	n	%
Type 2 diabetes		
Yes	6	24.0
No	19	76.0
Control Characteristics		
Use of medication		
Yes	5	83.3
No	1	16.7
Medical follow-up		
Yes	3	50.0
No	3	50.0
Blood glucose assessment		
Monthly	1	16.7
Rarely	4	66.6
Never	1	16.7
Hypertension		
Yes	19	76.0
No	6	24.0

Control Characteristics		
Use of medication		
Yes	19	100.0
No	-	-
Medical follow-up		
Yes	11	57.9
No	8	42.1
BP assessment		
Daily	1	5.3
Weekly	8	42.1
Monthly	1	5.3
Rarely	8	42.1
Never	1	5.3
Other diseases		
High cholesterol and/or triglycerides	13	52.0
Coronary artery disease	3	12.0
Peripheral arterial disease	1	4.0
Lung disease	1	4.0
Arrhythmias, dysrhythmias, heart failure	2	8.0
Heart valve problems	4	16.0
Others	3	12.0
None	8	32.0
Cardiovascular events		
Aneurysm	1	4.0
Heart attack	2	8.0
Stroke	1	4.0
Others	2	8.0
None	19	76.0

Source: authors's owns.

More than half of the participants remained active (56.0%) during the COVID-19 pandemic. In relation to the types of physical exercise, walking/running had the highest prevalence (57.1%) among the participants, with some of them reporting the practice of one or more modalities. Regarding the weekly frequency, the most reported was three to four times a week (50.0%) with a session duration between 30 to 60 minutes. The preferred places to physical exercise practice were at home and outdoors, with a prevalence of 50.0% in both (Table 3).

Table 3 – Information on physical exercise during the COVID-19 pandemic (n = 25). Florianópolis (SC), Brazil, 2020

Variables	n	%
Physical Exercise Practice		
Yes	14	56.0
No	11	44.0
Exercise modality*		
Walking / running	8	57.1
Strength training	3	21.4
Bodyweight exercises	5	35.7
Others	2	14.3
Weekly frequency		
1 to 2 times	3	21.4
3 to 4 times	7	50.0
5 to 6 times	3	21.4
Every day	1	7.1
Session length		
Up to 30 minutes	5	35.7
30 to 60 minutes	7	50.0
More than 60 minutes	2	14.3
Setting		
At home	7	50.0
Studio / box	1	7.1
Outdoors	7	50.0
Others	1	7.1
Prescription by PE professional		
Yes	6	42.9
No	8	57.1
Similar exercises to PROCOR		
Yes	12	85.7
No	2	14.3
Supervision of the PE professional		
Yes	4	28.6
No	10	71.4
Type of supervision of the PE professional		
In person in all classes / training	1	25.0
By video call in all classes/training	2	50.0
In person in some classes / training	1	25.0

* Participants reported one or more options regarding exercise. PE - physical education.
Source: authors's owns.

Regarding changes in health, a greater proportion of the sample (62.5%) presented pain in the shoulder and/or arms and reported body mass gain (52.0%). Table 4 details the perceived changes.

Table 4 – Changes in health perception, muscle or joint pain, and body mass during the COVID-19 pandemic (n = 25). Florianópolis (SC), Brazil, 2020

Variables	n	%
Perception of changes in health		
Yes, it got worse	9	36.0
No change	9	36.0
I do not know	4	16.0
Muscle or joint pain		
Yes	8	32.0
No	17	68.0
Body regions with pain		
Shoulder and / or arms	5	62.5
Thighs and / or knee and / or legs	4	50.0
Hip	2	25.0
Neck	2	25.0
Back	2	25.0
Changes in body mass		
I put on weight	13	52.0
I lost weight	2	8.0
No change	8	32.0
I do not know	2	8.0

Source: authors's owns.

DISCUSSION

The present study aimed to assess the influence of the COVID-19 pandemic on physical exercise practice, hypertension and DM2 control, and aspects related to the health of patients with cardiovascular risk factors participating in a program of cardiorespiratory prevention and rehabilitation. Our findings show that all hypertensive patients (76%) reported continuity of drug treatment, however, a medical follow-up seems to have been affected by the pandemic period, since 42% did not continue to follow up. Still, concerning the disease control measures, more than 50% of the participants reported a low frequency of monitoring the BP values. Among patients with DM2 (24%), one participant reported the inappropriate use of disease control medications, three did not maintain a medical follow-up and all reported a low frequency of blood glucose monitoring. It is noteworthy that these patients routinely performed BP and glycemic control measures in the program in which they were enrolled. Other diseases reported by the participants, such as high cholesterol levels, lung disease, and cardiovascular events are also related to the worsening of COVID-19 symptoms (ZAKI; ALASHWAL; IBRAHIM, 2020). The performance of routine medical consultations was influenced by the pandemic, as hospitals and clinics started to prioritize the care of people infected with

COVID-19 and use telemedicine to keep the social distancing, reducing the number of face-to-face consultations (NADAR et al., 2020). However, it is recommended that hypertension and DM2 control measures, such as the continuous use of medications and the regular blood pressure and blood glucose measurements, are maintained regardless of the circumstances (NADAR et al., 2020). It is important to highlight that the presence of hypertension and DM2 in patients infected with coronavirus is an aggravating factor for complications resulting from the disease (HU, S. et al., 2020; MIKAMI et al., 2021). Besides, hypertensive patients not adhering to drug treatment have a higher risk of mortality from the COVID-19 (GAO et al., 2020), as well as patients with uncontrolled DM2 (WILLIAMSON et al., 2020).

Isolation and social distancing are widely recommended measures during the COVID-19 pandemic period to reduce the transmission of the virus; however, these measures have a negative impact on physical activity practice. Studies comparing the levels of physical activity before and during the pandemic period observed significant reductions in light, moderate and vigorous physical activity, and in the number of daily steps (AMMAR et al., 2020; BROWNE et al., 2020; DUNTON et al., 2020). On the other hand, it was observed an increase in the time spent in sedentary behavior in healthy adults (AMMAR et al., 2020) and in hypertensive patients with risk factors (BROWNE et al., 2020).

These changes in the levels of physical activity and the increase in time spent in sedentary behavior are worrying, as they represent a risk factor for several diseases and mortality, and influence the continuity of the benefits of regular physical activity (WEDIG; DUELGE; ELMER, 2021), such as the control of blood pressure and glucose metabolism (MATTIOLI et al., 2020). In our study, despite not evaluating levels of physical activity and sedentary behavior, almost 50% of the participants reported an interruption in the practice of physical exercises, possibly related to the isolation measures, which, consequently, causes losses in the physical activity levels.

The increase in physical activity, as well as the practice of physical exercise during the current pandemic period, are actions that should be encouraged (HU et al., 2020; MATTIOLI et al., 2020; PEÇANHA et al., 2020) in an attempt to maintainthe pre-pandemic physical activity levels, and to reduce and control the deleterious effects of physical inactivity (PEÇANHA et al., 2020). Physical exercises performed in the home environment are alternative measures for the current moment, being safe and efficient (PEÇANHA et al., 2020; WEDIG; DUELGE; ELMER, 2021) however, exercises performed outdoors or even in closed environments such as the gym can

also be good options, if safety measures are adopted (GROSSMAN et al., 2020). In the present study, just over 50% of the participants reported practicing some type of physical exercise during the pandemic, either at home or outdoors. Also, half of the participants reported practicing these exercises three to four times a week, for periods of 30 to 60 minutes. It is worth noting that the participants in the present study who remained active in the pandemic are close to the recommendations for physical activity for this population (AMERICAN DIABETES ASSOCIATION, 2020; WHELTON et al., 2018).

Moreover, these participants continued to exercise at a frequency and weekly volume close to what they used to do in the cardiorespiratory prevention and rehabilitation program (combined training sessions, three times a week and duration of 60 minutes each), suggesting that, possibly, the program promoted a change in behavior and the acquisition of a lasting life habit in this portion of the sample. An important aspect of the present study was that we did not evaluate the intensity of the exercises performed during the pandemic, which were controlled in the PROCOR program, according to the specific recommendations for these populations (AMERICAN DIABETES ASSOCIATION, 2020; WHELTON et al., 2018).

In addition to the factors already mentioned, the COVID-19 pandemic period may favor other harmful health effects in general. The increase in stress levels, symptoms of depression and anxiety (MATTIOLI et al., 2020), and inadequate diet (AMMAR et al., 2020; MATTIOLI et al., 2020) are mentioned as some of these effects resulting from the isolation period. In our study, 36% of the participants reported a worsening of their perception of health because they were not engaged in PROCOR during the pandemic, the majority of whom were not practicing physical exercise during this period. Besides, 52% of participants reported an increase in body mass, possibly associated with reduced levels of physical activity and inadequate diet.

Although the present study did not directly assess aspects such as the participants' stress, anxiety, and eating habits, it is believed that such factors may have contributed to the results found of worsening health perception and increased body mass in part of the sample. Still, these harmful effects of the current moment on mental health could be minimized with the practice of physical exercises, contributing to the prevention or control of the symptoms of anxiety and depression (HU et al., 2020). In our study, 63.6% of the participants who interrupted the practice of physical exercises reported a worsening in the perception of health, corroborating the findings of Silva and collaborators (2020), who observed higher rates of

anxiety and depression in non-practitioners of physical exercises during the pandemic. Thus, it is important to encourage the practice of physical exercises, both indoors and outdoors, promoting improvements in mental health.

Although our study uses an online questionnaire to avoid social contact in the pandemic period, self-reporting has limitations, since this type of assessment can be influenced by the individual interpretation of the participants. Another limitation present in the study is the reduced sample size, which does not allow us to generalize the results. On the other hand, this study allows us to understand the effects of social distancing and isolation period due to the pandemic of COVID-19 concerning the control of diseases and health conditions of this population so that it is possible to carry out a safe intervention in order to maintain and improve the health of this public. Moreover, these results reinforce that, in the present and in the future, a higher prevalence of chronic diseases, such as obesity, hypertension and diabetes, or their worsening, can be expected, due to bad lifestyle habits adopted during the period of isolation. and social distancing experienced in the covid-19 pandemic. As a result, health and rehabilitation professionals will have the challenge of developing actions to minimize the negative impacts of the pandemic on this population.

CONCLUSION

The present study showed that the period of social distancing and isolation due to the COVID-19 pandemic had a negative influence on the practice of physical exercises, hypertension and DM2 control, and aspects related to the health of patients with cardiovascular

BIBLIOGRAPHIC REFERENCES

AMMAR, Achraf and collaborators. Effects of COVID-19 home confinement on eating behaviour and physical activity: results of the ECLB-COVID19 International Online Survey. **Nutrients**, v. 12, n. 6, 2020.

AMERICAN DIABETES ASSOCIATION. Standards of medical care in diabetes—2020 abridged for primary care providers. **Clinical diabetes**, v. 38, n. 1, p. 10–38, 2020.

BARRERA, Francisco J. and collaborators. Prevalence of diabetes and hypertension and their associated risks for poor outcomes in covid-19 patients. **Journal of the endocrine society**, v. 4, n. 9, 2020.

BARROSO, Weimar Kunz Sebba and collaborators. Diretrizes brasileiras de hipertensão arterial – 2020. **Arquivos Brasileiros de Cardiologia**, v. 116, n. 3, p. 516-658, 2021.

BEANEY, Thomas and collaborators. May measurement month 2017: an analysis of blood pressure screening results worldwide. ***The Lancet. Global health***, v. 6, n. 7, p. e736-e743, 2018.

BRASIL. Ministério da Saúde. **Painel de casos de doenças pelo coronavírus 2019 (COVID-19) no Brasil pelo Ministério da Saúde**. Disponível em: <https://covid.saude.gov.br/>. Acesso em: 20 de nov. 2022.

BROWNE, Rodrigo A. V. and collaborators. Initial impact of the COVID-19 pandemic on physical activity and sedentary behavior in hypertensive older adults: an accelerometer-based analysis. **Experimental gerontology**, v. 142, 2020.

CHU, Derek K. and collaborators. Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis. **Journal of vascular surgery**, v. 395, p. 1973-1987, 2020.

DUNTON, Genevieve F. and collaborators. Early effects of the COVID-19 pandemic on physical activity locations and behaviors in adults living in the United States. **Preventive medicine reports**, v. 20, 2020.

GAO, Chao and collaborators. Association of hypertension and antihypertensive treatment with COVID-19 mortality: a retrospective observational study. **European heart journal**, v. 41, n. 22, p. 2058-2066, 2020.

GROSSMAN, Gabriel Blacher and collaborators. Position Statement of the Brazilian Society of Cardiology Department of Exercise Testing, Sports Exercise, Nuclear Cardiology, and Cardiovascular Rehabilitation (DERC/SBC) on activities within its scope of practice during the COVID-19 pandemic. **Arquivos brasileiros de cardiologia**, v. 115, n. 2, p. 284-291, 2020.

HU, Shaojuan and collaborators. Beneficial effects of exercise on depression and anxiety during the Covid-19 pandemic: a narrative review. **Frontiers in psychiatry**, v. 11, p. 587557, 2020.

HU, Yong and collaborators. Prevalence and severity of corona virus disease 2019 (COVID-19): A systematic review and meta-analysis. **Journal of clinical virology**, v. 127, 2020.

IOANNIDIS, John P. A.; AXFORS, Cathrine; CONTOPOULOS-IOANNIDIS, Despina G. Population-level COVID-19 mortality risk for non-elderly individuals overall and for non-elderly individuals without underlying diseases in pandemic epicenters. **Environmental research**, v. 188, 2020.

MATTIOLI, Anna V. and collaborators. Quarantine during COVID-19 outbreak: changes in diet and physical activity increase the risk of cardiovascular disease. **Nutrition, metabolism, and cardiovascular diseases**, v. 30, n. 9, p. 1409-1417, 2020.

MIKAMI, Takahisa and collaborators. Risk factors for mortality in patients with COVID-19 in New York City. **Journal of general internal medicine**, v. 36, n. 1, p. 17–26, jan. 2021.

NADAR, Sunil K. and collaborators. Managing hypertension during the COVID-19 pandemic. **Journal of human hypertension**, v. 34, n. 6, p. 415-417, 2020.

PEÇANHA, Tiago and collaborators. Social isolation during the COVID-19 pandemic can increase physical inactivity and the global burden of cardiovascular disease. **American journal of physiology. Heart and circulatory physiology**, v. 318, n. 6, p. H1441–H1446, 2020.

RICHARDSON, Safiya and collaborators. Presenting characteristics, comorbidities, and outcomes among 5700 patients hospitalized with COVID-19 in the New York City Area. **JAMA**, v. 323, n. 20, p. 2052-2059, 2020.

RODRIGUEZ-MORALES, Alfonso J. and collaborators. Clinical, laboratory and imaging features of COVID-19: A systematic review and meta-analysis. **Travel medicine and infectious disease**, v. 34, 2020.

ROTH, Gregory A. and collaborators. Global, regional, and national burden of cardiovascular diseases for 10 causes, 1990 to 2015. **Journal of the american college of cardiology**, v. 70, n. 1, p. 1-25, 2017.

SAEEDI, Pouya and collaborators. Global and regional diabetes prevalence estimates for 2019 and projections for 2030 and 2045: results from the International Diabetes Federation Diabetes Atlas, 9(th) edition. **Diabetes research and clinical practice**, v. 157, 2019.

SHEREEN, Muhammad Adnan and collaborators. COVID-19 infection: origin, transmission, and characteristics of human coronaviruses. **Journal of advanced research**, v. 24, p. 91-98, 2020.

SOHRABI, Catrin and collaborators. World Health Organization declares global emergency: a review of the 2019 novel coronavirus (COVID-19). **International journal of surgery**, v. 76, p. 71-76, 2020.

WEDIG, Isaac J.; DUELGE, Tristan A.; ELMER, Steven J. Infographic. Stay physically active during COVID-19 with exercise as medicine. **British journal of sports medicine**, v. 55, n. 6, p. 346-347, 2021.

WHELTON, Paul K. and collaborators. ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults: Executive summary: A report of the American college of cardiology/American Heart Association task force on clinical practice guidelines. **Hypertension**, v. 71, n. 6, p. 1269-1324, 2018.

WHO. **Dashboard Coronavirus Disease**. Disponível em: <https://covid19.who.int/info>. Acesso em: 20 nov. de 2022.

WILLIAMSON, Elizabeth J. and collaborators. Factors associated with COVID-19-related death

using OpenSAFELY. **Nature**, v. 584, n. 7821, p. 430-436, 2020.

YANAI, Hidekatsu. A significance of high prevalence of diabetes and hypertension in severe COVID-19 patients. **Journal of clinical medicine research**, v. 12, n. 6, p. 389-392, 2020.

ZAKI, Nazar; ALASHWAL, Hany; IBRAHIM, Sahar. Association of hypertension, diabetes, stroke, cancer, kidney disease, and high-cholesterol with COVID-19 disease severity and fatality: a systematic review. **Diabetes & metabolic syndrome**, v. 14, n. 5, p. 1133-1142, 2020.

ZHOU, Fei and collaborators. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. **Lancet**, v. 395, n. 10229, p. 1054-1062, 2020.

Dados da primeira autora:
Email: guilherme_barcellos@hotmail.com
Endereço: Campus Universitário, Trindade, Florianópolis, SC, CEP: 88040-900, Brasil.

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