



Historiografia

Historiography

## 2020, a Global Health Problem: A Historiography on the CoViD-19 Pandemic and Physical Activity Related Issues

### *2020, um problema de saúde em escala global: uma historiografia sobre a pandemia de CoViD-19 e aspectos relacionados à prática de atividade física*

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#### Abstract

**Introduction:** In early January 2020, diffuse news emerged about a new disease, which soon turned into a pandemic.

**Objective:** To examine the historical development of this health problem and to identify the possible effects on the practice of physical activity.

**Methods:** A search was made under the terms "CoViD-19 or SARS-Cov2 or coronavirus" and "WHO" and "2020" on Google Web and Scholar and PubMed. In this research was included: scientific articles published, recommendations from the World Health Organization (WHO) and newspaper articles.

**Results and Discussion:** Results and Discussion: The first months of the year were characterized by a period of great apprehension, given the confrontation of the new, and potentially deadly, disease. With the development of clinical and experimental knowledge, the mechanisms of the disease were being unraveled and the ways to treat/prevent CoViD-19 were being established. WHO recommendations regarding the use of protective masks during physical activity were identified.

**Conclusion:** Conclusion: The consequences of the pandemic affected all sectors of human life, affecting productivity. It is likely that the prevalence of sedentary lifestyle has increased in all parts of the globe, however, the impacts on the practice of physical activity, whose health benefits are well established in the literature, have not yet been examined.

#### Key Points

- January 2020: a pandemic of an unknown virus, called "new coronavirus", hits the whole globe.
- The virus originated in China in the second half of 2019, so the disease was called CoviD-19.
- All sectors of human life were affected by the pandemic and the impacts on the practice of physical activity are still unknown.

**Keywords:** exercise, pandemic, CoViD-19, social determinants of health.

#### Resumo

**Introdução:** No início de janeiro de 2020, surgiram notícias difusas a respeito de uma nova doença, que logo se transformou em pandemia.

**Objetivo:** Examinar o desenrolar histórico desse agravamento à saúde e identificar possíveis efeitos sobre a prática de atividade física.

**Métodos:** Foi feita busca nos termos "CoViD-19 or SARS-Cov2 or coronavírus" "WHO" "2020" compuseram o estudo artigos científicos, recomendações da Organização Mundial da Saúde (OMS) e notícias de jornais.

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**Resultados e Discussão:** Os primeiros meses do ano configuraram-se em um período de grande apreensão, face ao enfrentamento da nova, e potencialmente mortal, doença. Com o desenvolvimento do conhecimento clínico e experimental, os mecanismos da doença foram sendo desvendados e as formas de tratar/prevenir a CoViD-19 foram sendo estabelecidas. Recomendações da OMS quanto ao uso de máscaras de proteção durante a prática de atividade física foram identificadas.

**Conclusão:** As consequências da pandemia atingiram todos os setores da vida humana, afetando a produtividade. É provável que a prevalência de sedentarismo tenha aumentado em todas as partes do globo, porém, os impactos sobre a prática de atividade física, cujos benefícios à saúde são bem estabelecidos na literatura, ainda não foram examinados.

#### **Pontos Chave**

- Janeiro de 2020: uma pandemia de um vírus desconhecido, chamado “novo coronavírus” atinge todo o globo.

- O vírus teve origem na China no segundo semestre de 2019, assim a doença foi chamada de CoviD-19.

- Todos os setores da vida humana foram afetados pela pandemia e os impactos sobre a prática de atividade física ainda são desconhecidos.

**Palavras-chave:** exercício, pandemia, CoViD-19, determinantes sociais da saúde.

## **2020, a Global Health Problem: A Historiography on the CoViD-19 Pandemic and Physical Activity Related Issues**

### **Introduction**

2020 was a milestone in mankind history. From the beginning of January, diffuse news was brought about a new disease, the first cases of which were reported in Wuhan, in the province of Hubei, China(1). Within a scenario of many doubts, while the number of deaths grew alarmingly around the world – as presented later in this study, doctors, scientists, government officials and populations were looking for information to protect themselves from the deadly plague that approached. The disease was initially declared to be due to a new coronavirus and named CoViD-19, which is the abbreviation for coronavirus disease of 2019.

The aim of the present study was to examine the historical development of this health problem that affected all lives on the planet and, consequently, productivity in several areas of human life and to seek to identify the

possible effects on the practice of physical activity. It is the first part of the work that contextualizes the theme, which will be followed by an edition focusing on what science displays regarding the reflexes of the pandemic<sup>(2)</sup> related to the practice of physical activity.

### **Methods**

The search terms were: “*CoViD-19 or SARS-Cov2 or coronavirus*” e and “*WHO*” and “*2020*” at PubMed and at Web and Scholar Google. In addition to scientific articles published in scientific journals, this work was included, recommendations from the World Health Organization (WHO) and newspaper articles.

### **Results and Discussion**

#### *Chronology*

**December 30, 2019** – The young Chinese doctor Li Weliang tried to alert his colleagues

<sup>1</sup>Pandemic: epidemic that affects several nations or continents(2).

about the new coronavirus, which would be dangerous, was warned and arrested by the Chinese police for spreading untruths(3).

**January, 2020** – While little was reported by China about the virus – how contagious and ways of spreading, all countries turned to the World Health Organization (WHO) seeking information and recommendations to protect and, who knows, cure their populations. However, at that moment, the issue was quite obscure.

**January 23, 2020** – WHO stated that human-to-human transmission was not clear(4).

**January 24, 2020** – An article published in Lancet, one of the most prestigious medical journals, stated that it was an outbreak of pneumonia of unknown cause and that it would be plausible that it was an airborne contagion(5,6). Literature presents reports, since 2002, about respiratory infections caused by coronavirus, which lead to severe acute respiratory syndrome (SARS), named SARS-CoV – there was a pandemic in 2002-2003 and an epidemic in 2012: the Middle East respiratory syndrome coronavirus: MERS-CoV(7).

By the end of January, the disease had already spread across the globe and the number of deaths that occurred in a noticeably short period of time was extremely alarming: between January 22 and 31 (ten days), the number of deaths jumped from 17 to 259(8). Despite this, on January 30, WHO did not recommend any travel restrictions and, in addition, stated that any measures taken by any country in relation to travel should be communicated to WHO, warning them against actions that promote stigmatization and / or discrimination, invoking the principles of article 3 of its 2005 International Health Regulations (IHR, 2005):

*“The Committee does not recommend any travel or trade restriction based on the current information available.*

*Countries must inform WHO about travel measures taken, as required by the IHR. Countries are cautioned against actions that promote stigma or discrimination, in line with the principles of Article 3 of the IHR.”*

At the beginning of the problem, barriers should be established by countries, which

could prevent the increase of contagion. However, it was not done.

Subsequently, the literature showed that the transmission of coronavirus 2 would be by air only within a short distance, due to its high molecular weight(9,10). Thus, contagion would occur at close contact, mainly within 2 meters, with very loud speech, coughing or sneezing. It is important to highlight that the ease of propagation increases considerably when such situations occur at indoor environment(5,9–15).

**February 4, 2020** – In Brazil, the Federal Government preliminarily decreed a state of emergency, preparing actions to manage the approaching health crisis in the country(16). Nevertheless, Carnival in Brazil went smoothly, especially at major cities of the country: São Paulo and Rio de Janeiro, which always have a large influx of foreigners for the holiday(17,18).

**February 20, 2020** – A study showed that the virus spread from human to human(19).

**February 26, 2020** – The first confirmed case of CoViD-19 was registered in Brazil(20).

**February 27, 2020** - WHO addressed the theme of tourism, emphasizing that extrapolative travel restrictions could cause unnecessary interference in international traffic, including negative repercussions in the tourism sector(21). On that day, the record of deaths by CoViD-19 worldwide was 2,858.

**March 2020** – In March, several important events took place, setting up a critical period in the search for actions for treatment and prevention of the new disease.

**March 1st, 2020** – A group of French scientists, under the guidance of the eminent medical researcher Dr. Didier Raoult, carried out an observational pilot study, with a sample size of 80 patients with mean age of 52 years, ranging between 18 and 88 years, who had moderate symptoms of CoViD-19. Results showed that the use of hydroxychloroquine, in combination with azithromycin, decreased the nasopharyngeal viral load by 83% on the seventh day and by 93% on the eighth day(22). Similar results *in vitro* were published by Liu et al.(23), on March 18.

**March 7, 2020** – WHO highlighted the record of 100,000 cases of CoViD-19 around the world and warns that the spread of the virus

can be significantly slowed or even reversed through the implementation of robust containment and control activities, citing China as an example to follow to deal with the disease and recommended efforts to contain the virus(24). However, observing the data distribution from China one can see that they

are quite different from other epidemiological curves from other countries, as can be seen in Figure 1(25).



**Figure 1** – Epidemiological mortality curves for CoViD-19 in United States, Brazil, France, Sweden, United Kingdom, and China.

**March 15, 2020** – A statistical projection was published by a group of researchers from the Imperial College of London whose figures for predicting deaths from CoViD-19 were staggering: 500,000 people would die in the UK and more than 2,200 million in the United States of America(26). They recommended that the main prolific strategy to combat the pandemic would be the so-called *lockdown*. In Brazil, the *Agência Brasil* (Brazil Agency – governmental news)(27) explained that in the Ministry of Health (MS) guidelines, *lockdown* is defined as one of the measures of social distance. The total *lockdown* consists of surrounding a certain perimeter (state, city, or region), interrupting all activity for a brief period. This model has the advantage of being effective in reducing the case curve and allowing time for reorganizing the health system in a situation of uncontrolled acceleration of cases and deaths. The disadvantage is the high cost to the economy.

In addition, there are two other types of lockdown: selective and expanded – which present forms less rigid. The selective *lockdown* should focus only on people of the highest risk groups: over 60 years old and/or with chronic diseases, in addition to those who show symptoms of the disease. That strategy is also known as “*vertical isolation*”, which allows the return-to-work activities, since it does not prevent the movement of people in an apparently healthy state or who have already suffered from the disease and are considered immunized.

The expanded *lockdown* type has been adopted in most states and cities, in Brazil. The *stay-at-home* strategy stops all sectors of society and economy, except of the essential activities, as long as hygiene is ensured, and crowding is avoided. The object proposed was to reduce the speed of virus spread, aiming to gain time to properly equip the health services with the minimum operating conditions: beds,

respirators, PPE (personal protective equipment), laboratory tests and human resources(27).

In a very obscure context, many countries adhered to the extended *lockdown* recommended by *Imperial College of London*(26) and WHO(4). The WHO recommendation for such restrictions was to be temporary for short period (15 days)(4).

As the governments failed to observe the short-term recommendation for social restrictions, the health problem gained political outlines, since the action of general population confinement has tragic consequences for the economy, leading to increase in extreme poverty and deaths from hunger(28). In addition, the decline in economy relates to several other physical(29) and mental(30–32) health problems.

Still in March, the International Chamber of Commerce (ICC) met with WHO to coordinate efforts to jointly combat the pandemic by ensuring recent and reliable information to guide the global trading community(33). According to WHO, the CoViD-19 pandemic is a global health emergency in society that requires immediate, effective action by governments, individuals, and businesses. All companies have a key role to play in minimizing the likelihood of transmission and impact on society. Early, bold and effective action will reduce short-term risks for employees and long-term costs for companies and the economy(33).

**March 17, 2020** – In Brazil, it was recorded the first death from CoViD-19.

**March 20, 2020** – The number of deaths from CoViD-19 in the world was 11,610 and in Brazil it jumped from 1 to 330 in only three days. The Brazilian Federal Government decreed a state of public calamity (34). At that point, in several states and cities began the extended *lockdown*.

**March 30, 2020** – WHO warned that precautions should be taken so that the economy in countries is not disabled(35) alerting that millions of people around the world depend on international trade for their food security and livelihood. As countries take steps to stop the CoViD-19 pandemic, caution must be taken to minimize potential impacts on food supplies or unwanted consequences on

global trade and food security. Such recommendations were and continued to be ignored by the great press and by various rulers.

**April 8, 2020** – The WHO's manifestations were related to the polio prevention program problem, which could be affected by the pandemic(36). Further, it was addressed the problem of the sharp increase in violence against children, during pandemic-related confinement(37). Still in April, the search for vaccines has started(38).

In Brazil, the central coordination of pandemic management was largely withdrawn from the Federal Government by the supreme court(39). To date, states and municipalities have managed and managed the pandemic crisis. The next day, the Minister of Health, who differed from the President on social isolation (*lockdown*) was dismissed(40).

At this point, the literature on early treatment using hydroxychloroquine / chloroquine – first study related to CoViD-19, published on March 1<sup>st</sup>(22) – exhibited several studies conducted in humans, indicating that, associated with azithromycin, it significantly lowered the viral load of patients with moderate symptoms (22,41,42). In addition, evidence is beginning to emerge of another drug considered to be a powerful viral load reducer for the new coronavirus: ivermectin(43). Furthermore, vitamins D and Zinc were pointed out as having to be at adequate levels to favor the recovery of the individual's health, playing an especially important role in the process(44).

In Brazil, new early treatment protocols were developed for the treatment of CoViD-19 – in the outpatient phase before the stage of needing hospitalization. Early treatment protocol was adopted in Piauí State(45), in the municipality of Porto Feliz-SP(46) and was stated the official protocol by the Ministry of Health in May, 2020(47). One of the first protocols to be applied was that developed by doctors (clinicians and researchers) and certified by the government of Piauí(45).

**May 20, 2020** – The Ministry of Health published new guidelines for the early coping of the disease (47).

It is noteworthy that a municipality, of Porto Feliz (population: 53,402 people(48), in the

interior of the state of São Paulo, which developed and applied the early treatment protocol, since April 5(46) and, on December 7, 2020, the epidemiological bulletin presented the following numbers: 2,521 cases, 2,478 cured, with 18 deaths (Figure 2), showing a mortality rate of 33.70 per 100,000 inhabitants and a lethality of 0.01. Today, the rates in Brazil are mortality<sup>2</sup> of 83.96 per 100,000 inhabitants and lethality<sup>3</sup> of 2.66E-02. Lethality of the new coronavirus in the world

is 0.02, according to data from Worldometers®(25).

**May 31, 2020** – On the day following the establishment of the protocol for the early treatment of CoViD-19 of the Ministry of Health, Piauí state formalized its protocol(45) which, according to clinical research and scientific studies, outlined the phases of disease, enabling the understanding of the specific processes and treatments for each of them.



**Figure 2** – Epidemiological Bulletin of Porto Feliz - SP, December 7, 2020. *Confirmed cases: 2,521 – Recovered: 2,478; Hospitalized: 08; ICU (UTI) intensive care unit: 02. Waiting for testing results: 279 – Isolation at home: 272; Hospitalized: 08; ICU (UTI) intensive care unit: 02. Total deaths by CoViD-19 confirmed: 18.*

<sup>2</sup>Mortality rate according to cause: it is the number of deaths from a given cause divided by the population multiplied by 100,000 (49).

<sup>3</sup>Lethality: is the number of deaths divided by the number of cases (49).

### *A year of many uncertainties*

And since the beginning of 2020, the human being started to live with an enormous new health problem, unknown, that could be deadly for certain people. In this context, despite advances in the knowledge of the disease(45), the recommendations of the WHO recommendations(35) for the resumption of activities and the declaration of the Federal Government that essential activities should return to work, since before May 2020(50), the resumption of activities in several states and cities, until today (mid-December 2020), are restricted and/or prohibited in various regions of the country.

Such restrictions have affected all areas of human life in societies around the world, as well as in Brazil. By affecting the economy, unemployment increases and populations vulnerable to poverty can suffer a large number of deaths from hunger. According to the united nations (UN) alert, published in mid-April(28,51).

In addition, there are an acute increase on mental health problems. The literature shows that there was an increase in the overall burden of stress, anxiety, depressive symptoms, insomnia, denial, anger and fear(52–54).

### *Effects of restricting the peoples' movement on human health*

#### Decreased vitamin D levels

The restriction of circulation in public places affects the individual's immunology in several aspects. First, the high amount of time at indoor environment increases the risk for respiratory diseases(11–15,55). Second, emerges the impossibility for individuals to be exposed to sun bathing – the main source of endogenous vitamin D production, which is synthesized into the skin, especially after exposure to UVB (ultraviolet B rays), while only a small part of this production derives from dietary sources(56,57) and it is essential to the readiness of the immune system (58).

Another factor that hindered the management of the disease was, notably, the misinformation present in the media. An example that can be cited is that, despite the literature being abundant and consistent

regarding the benefits of vitamin D to the immune system - a simple search in PubMed (one of the main medical scientific bases) with the terms "*D vitamin*" and "*immune*" exhibits 641 review studies, prior to the pandemic, dates between 1987 and 2019, the media broadcast that vitamin D did not prevent against CoviD-19(59–61). Such news published in 2020 was on contrary to what the scientific literature exhibited: that low levels of vitamin D are associated with influenza and with , acquired human immunodeficiency syndrome (AIDS)(62). The fundamental role of this vitamin was gradually being established as information to the general population. Especially when a retrospective case-control epidemiological study conducted in Spain, which investigated the association of vitamin D level with CoviD-19 identified a significant difference between hospitalized patients (n=216) and controls (n=197), and patients had lower vitamin D levels compared to controls(63), results that are in line with previous studies(56–58,62,64).

#### Mental health problems

Another problem related to *lockdown* is that stress, confinement and social isolation cause mental health problems(54,65). The effects of the pandemic were that there was an increase in the overall burden of stress, anxiety, depressive symptoms, insomnia, denial, anger and fear(52,54,65). Therefore, there is a concern that the next pandemic will be in mental health(66). These mental health problems leads to immunodepression(67,68) and are associated with low levels of physical activity(69–71).

Nevertheless, to this day, in several states and municipalities, some managers continue to impose *lockdown* on society.

#### *The use of masks*

In addition to peoples' movement restrictions, rules and obligations have been imposed regarding the use of protective devices. The most recent WHO guidelines(72) on the use of masks, published on December 1, 2020, are presented below.

### Indoors, the protective mask should be used:

- **When there is little ventilation** – limited opening or no opening of windows and doors for natural ventilation; the ventilation system is not functioning properly or is not maintained on time or cannot be evaluated;
- **In public indoor environments** with adequate ventilation if the physical distance of at least one meter cannot be maintained;
- **In indoor home environments** when there is a visitor who is not a family member and ventilation is known as bad, with limited opening of windows and doors for natural ventilation, or the ventilation system cannot be evaluated or is not working properly; and
- **In indoor home environments** that have adequate ventilation if the physical distance of at least one meter cannot be maintained.

### At external environment:

- **People with symptoms of any respiratory diseases** – the recommendation is that in public they should wear protective medical masks;
- **Healthy people should** wear masks in public when the physical distance of at least one meter is not possible to be maintained;
- **People at high risk for serious CoViD-19 complications** – Individuals  $\geq 60$  years old and those with underlying conditions such as: cardiovascular disease or diabetes mellitus, chronic lung disease, cancer, cerebrovascular disease or immunosuppression should wear medical masks in any place where physical distance cannot be maintained.

### The use of masks during physical activity

The literature on the use of protective masks during physical activity is scarce. Studies have demonstrated significant harmful effects of this use on cardiopulmonary physiological parameters in healthy people, and there was a significant reduction in pulmonary ventilation from 131 l/min to 114 l/min(73) and reduction of 37% in respiratory exchange with the use of protective masks(74). Furthermore, for healthy people, the use of masks modifies or significantly dyspnea<sup>4</sup> without influencing walking distance, and the results were considered clinically relevant(76). Another study also recorded problems for people with lung diseases(77). It should also be considered that from the medical point of view, during the use of a mask there is a theoretical possibility of obstruction of respiratory flow(78).

According to the WHO, the recommendations regarding the use of protective masks during the practice of physical activity are as follows:

- **Masks should not be used during physical activities of vigorous intensity**, maintaining the physical distance of at least one meter and guaranteeing good ventilation in the environment during exercises.
- If the activity occurs indoors, adequate ventilation should be ensured at all times through natural ventilation or a properly functioning or maintained ventilation system;
- Special attention should be paid to cleaning and disinfection of the environment, especially high contact surfaces. Moreover, when all previous measures cannot be guaranteed, one should consider the temporary closure of internal (condominium) or public (gyms, clubs) fitness facilities.

### *Possible effects of the CoviD-19 pandemic on the practice of physical activity*

Given the examined scenario, it is easy to see that there are several factors that can cause from decrease to cessation of physical activity<sup>5</sup>

<sup>4</sup>Dyspnea: shortness of breath(75).

<sup>5</sup>Physical activity: any body movement produced by muscle contraction skeletal system that increases



practice: psychosocial and physical factors. Among the psychosocial factors are those related to stress caused by the traumatic factor of the pandemic itself, whose mortality in a few months was quite high leading to a great concern of the individual with his own health and with the health of his/her beloved ones. In addition to these, the obstacles to physical activity practice are those physical factors of social restriction and the mandatory use of the uncomfortable masks, which can represent several extra obstacles to the motivation of the individual.

In addition to the described situation, there are limitations regarding the schedule availability at the gyms and circulation in appropriate public spaces, may have hindered and discouraged the practice of physical activity in all types of population. Environmental safety problems (lighting, public safety, floor quality, appropriate area), quality of transportation(79), psychological stress and mental health(69–71) are determinant factors of physical activity, being related to lower levels of practice.

It is important to highlight that the relationship between level of physical activity and mental health is bidirectional - this means that both higher levels of physical activity are associated with fewer symptoms in mental health(83) and more symptoms in mental health lead to lower levels of physical activity(69–71), which suggests that to break the inertia – that means to break the vicious cycle, it takes greater effort from the individual. The literature shows that once one overcome inertia and managed to engage in the practice of physical activity, the benefits to mental health are evident(84,85).

### *Benefits of physical activity to health*

The issue health benefits promoted by the practice of physical activity, there is a correlational picture of several linked aspects

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energy expenditure above the baseline level(80) and can be classified into three types: Occupational physical activity is due to occupational activities. For example, going up and down stairs, carrying weights, sweeping, among others. Leisure-time physical activity includes exercise and sports, occupational physical activity, leisure-time physical activity and physical activity in Locomotion(81).

of human life. For example, physical activity prevents and treats, as an adjunct, symptoms of anxiety and depression(85). Mental health, in turn, is related to the state of the immune system(86–88). According to the literature, the psychological mechanisms related to the practice of exercise favor mood states, which may be due to distraction and/or self-efficacy(84,86). Additionally, it reduces inflammation through several different physiological processes(86) promoting improvement in endothelial function(89) and protecting the cardiocirculatory system, as well as improving brain function and cognition(92). It has been recommended by scientists to improve the health of populations, as well as the immune system, in the face of the CoviD-19 pandemic(93,94).

## **Conclusion**

The aim of this study was to examine the historical development of the health problem CoViD-19, that affected all lives on the planet and, consequently, productivity in several areas of human life. Further, we sought to identify the possible effects on the practice of physical activity.

The literature is vast and consistent regarding the benefits of physical activity for health, which leads to the need to be always present in the considerations of health managers.

Future studies should examine the effects on healthy habits during and after the pandemic, assessing the impact of decreased levels of physical activity on the general population.

### *Declaration of conflict of interest*

There is no conflict of interest in relation to the present study.

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Exercise: It is a subcategory of physical activity that is planned, structured, repetitive and aims to improve or maintain one or more components of physical fitness(82) Sport can be defined as structured physical activity that is performed according to specific rules, which requires technical training and usually has between the objectives the competition(81).

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