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Original article

Effect of confinement on physical inactivity in child and juvenile populations

Efecto del confinamiento sobre la inactividad física en poblaciones infanto-juveniles

Efeito do confinamento sobre a inatividade física em populações infantis e juvenis

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ABSTRACT

Introduction: An outbreak of disease due to a variety of coronavirus that affects humans began in December 2019 in Wuhan, China, where as of January 2022 it has caused more than five and a half million deaths. As the COVID-19 pandemic continues to unfold on a global scale, authorities in different territories and countries have introduced various protective measures, including the closure of schools, universities, travel bans, cultural, sporting and meeting, as well as social events. These compulsory social isolation and confinement processes were a reality imposed by the Argentine government as a preventive measure against the SARS-CoV-2 pandemic. Currently, there are few statistical records showing the damage caused to the physical state of child and adolescent populations, which have been confined due to the preventive measures taken against the Covid-19 pandemic.

Objective: For this reason, this study aimed to describe some of the effects of confinement on physical inactivity in child and juvenile populations in Comodoro Rivadavia and Rada Tilly.

Materials and methods: Scientific research methods and techniques were used, such as analytical-synthetic, inductive-deductive, document analysis and an anonymous questionnaire, answered by 466 subjects (female= 237 - male= 229), whose ages were 12 ± 6 years.

Results: With the data obtained, it was concluded ($P < 0.05$) that this population suffered an increase in the time spent in front of the screens, decreasing the time used to perform physical activity, causing changes associated with an increase in the amount of sleep, due to confinement.

Conclusions: This situation will bring consequences in the future; therefore, it is necessary to generate strategies that allow an active environment through physical exercise.

Keywords: Confinement; Pandemic; Physical inactivity.

RESUMEN

Introducción: Un brote de enfermedad por una variedad de coronavirus que afecta a los humanos comenzó en diciembre de 2019 en Wuhan, China, donde hasta enero del 2022 ha provocado más de cinco millones y medio de muertes. A medida que la pandemia de COVID-19 continúa desarrollándose a escala mundial, las autoridades de los diferentes territorios y países han introducido varias medidas de protección, incluido el cierre de escuelas, universidades, la prohibición de viajes, eventos culturales, deportivos y de reuniones sociales. Estos procesos de reclusión y aislamiento social obligatorios fueron una realidad impuesta por el gobierno argentino como medio preventivo frente a la pandemia del SARS-CoV-2. Actualmente, existen pocos registros estadísticos donde se muestren las afectaciones ocasionadas en el estado físico de poblaciones infanto-juveniles, que hayan sido confinadas debido a las medidas preventivas tomadas frente a la pandemia del Covid-19.

Objetivo: Por tal motivo, en este estudio se pretendió describir algunos de los efectos del confinamiento sobre la inactividad física en poblaciones infanto-juveniles de



Comodoro Rivadavia y Rada Tilly.

Materiales y métodos: Se emplearon métodos y técnicas científicas de investigación como el analítico-sintético, inductivo-deductivo, análisis de documentos y un cuestionario anónimo, contestado por 466 sujetos (femenino= 237 - masculino= 229), cuyas edades eran de 12 ± 6 años.

Resultados: Con los datos obtenidos, se concluyó ($P < 0,05$) que esta población sufrió un incremento en el tiempo frente a las pantallas, disminuyendo el tiempo empleado para realizar actividad física, provocando modificaciones asociadas a un incremento en la cantidad de sueño, debido al confinamiento.

Conclusiones: Esta situación traerá consecuencias a futuro; por ello que es necesario generar estrategias que permitan un entorno activo a través del ejercicio físico.

Palabras clave: Confinamiento; Pandemia; Inactividad Física.

RESUMO

Introdução: Um surto de doença de uma cepa de coronavírus afetando seres humanos começou em dezembro de 2019 em Wuhan, China, onde em janeiro de 2022 resultou em mais de cinco milhões e meio de mortes. Como a pandemia da COVID-19 continua a se desenvolver em escala global, as autoridades em diferentes territórios e países introduziram várias medidas de proteção, incluindo o fechamento de escolas, universidades, proibições de viagens, eventos culturais, encontros esportivos e sociais. Estes processos de isolamento obrigatório e isolamento social foram uma realidade imposta pelo governo argentino como medida preventiva contra a pandemia de SARS-CoV-2. Atualmente, há poucos registros estatísticos mostrando os efeitos na condição física de crianças e jovens que foram confinados devido às medidas preventivas tomadas em resposta à pandemia de Covid-19.

Objetivo: Por esta razão, o objetivo deste estudo foi descrever alguns dos efeitos do confinamento sobre a inatividade física em populações infantis e jovens em Comodoro Rivadavia e Rada Tilly.

Materiais e métodos: Utilizamos métodos e técnicas de pesquisa científica como analítico-sintético, indutivo-dedutivo, análise de documentos e um questionário anônimo, respondido por 466 sujeitos (feminino= 237 - masculino= 229), cuja idade era de 12 ± 6 anos.

Resultados: Com os dados obtidos, concluiu-se ($P < 0,05$) que esta população sofreu um aumento no tempo diante das telas, diminuindo o tempo gasto em atividade física, causando modificações associadas a um aumento na quantidade de sono, devido ao confinamento.

Conclusões: Esta situação terá consequências no futuro; portanto, é necessário gerar estratégias que permitam um ambiente ativo através do exercício físico.

Palavras-chave: Confinamento; Pandemia; Inatividade física.

INTRODUCTION

This study attempts to provide information on physical inactivity related to confinement due to the covid-19 pandemic in child and juvenile populations. In our region, physical inactivity and confinement due to the Covid-19 pandemic is one of the main health problems today (Da Luz Pereira *et al.*, 2020). It further explores the risks associated with a sedentary lifestyle, such as cardiovascular problems, obesity, depression, or even



various types of cancer. Physical activity to maintain and improve health should be seen as a public policy not only for children and adolescents, but also for the general population, and should be covered from a comprehensive perspective (educational, health, employment, transportation), both during confinement and after returning to relatively normal possibilities for physical activity, exercise, and sports (Kalazich *et al.*, 2020).

Confinement and physical inactivity

Regarding the importance of physical activity for children and adolescents, it is necessary to emphasize that there is an international consensus that children should be involved in at least 60 minutes of physical activity daily, and that it is also necessary to include muscle and bone strengthening exercises in this population (World Health Organization, 2010). Otherwise, it is considered physically inactive as proposed by health agencies.

In Argentina, according to the Social Debt Observatory (2014), 45.4 % of the urban population between 5 and 17 years old has high levels of physical inactivity, due to the fact that they do not achieve a daily practice of 60 minutes. 48.1 % of these children had less than 2 weekly Physical Education classes throughout the school year. In addition, 61.8 % of these young people have a sedentary behavior, since they spend more than two hours a day in front of various types of screens (TV, computer, tablets) cited in Casas (2016).

The currently accumulated scientific evidence reflects a negative trend regarding the level of physical activity observed in children and adolescents from different countries of the world. Authors such as Andersen *et al.* (2006), report a drastic reduction in the levels of daily physical activity in children. On the other hand, other researchers have reported a global and alarming increase in overweight and obesity in children and adolescents (World Health Organization, 2014); and a significant reduction in their muscle strength levels (Malina *et al.*, 2006).

Physical inactivity and sedentary behaviors during the current COVID-19 pandemic can lead to devastating effects on people's health in both healthy and pathological subjects, and even alter the mortality rate in the population in a negative way (Booth *et al.*, 2017) (Figure 1).

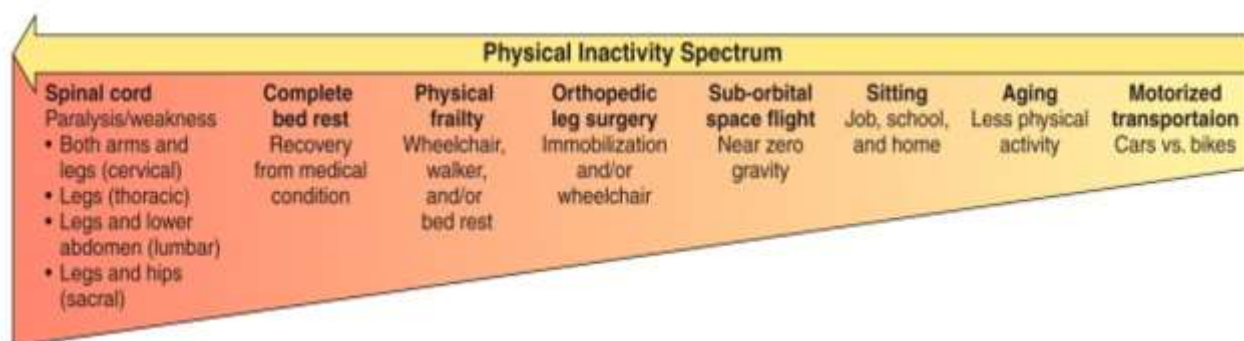


Fig. 1. - Spectrum of types of physical inactivity. Following the arrow from right (low intensity of physical inactivity) to left (high intensity of physical inactivity) shows an estimate of the intensity of physical inactivity per unit of time



Faced with the situation described above, its danger stands out, because the increase in sedentary lifestyle is strongly associated with the decrease in physical fitness and with the increase in fat mass in young people (Marta, *et al.*, 2012), and that, in addition, there is an inverse relationship between the body mass index and the motor performance of children (Zhu *et al.*, 2011) (Figure 2).

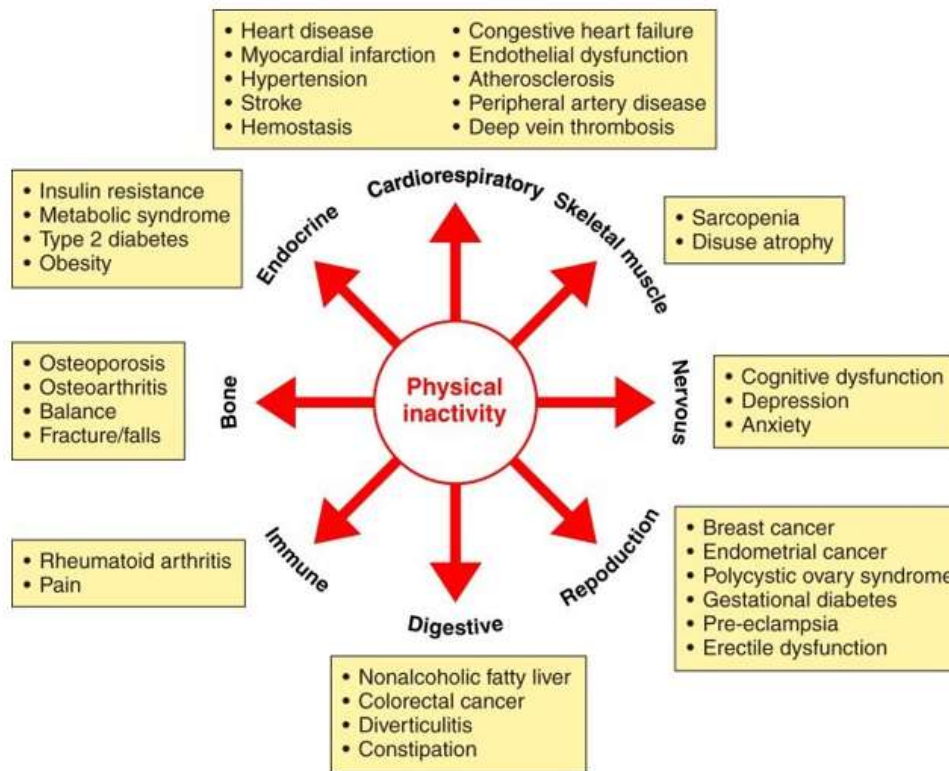


Fig. 2. Physical inactivity increases 35 chronic diseases

Source: Adapted from Booth *et al.*, 2017.

It should also be considered that increased adiposity is related to low levels of muscle strength in children and young people of school age (Janz *et al.*, 2002), and that this population may be more insecure and have less motor skills, which can promote an increase in their sedentary behaviors, thus favoring the development of cardiovascular and metabolic risk factors (Faigenbaum *et al.*, 2013).

Finally, we must underline that the low potential of the strength levels of young people directly impacts basic motor skills, resulting in movement deficit disorder and increased adipose tissue (Faigenbaum & Myer, 2012).

Confinement and amount of sleep

Regarding the effects of confinement on the amount of time sleeping, we can say that exposure to an unprecedented stressful situation, such as the confinement due to the current pandemic, can make most individuals more likely to experience anxiety, depression and interruptions in the sleep pattern. At a biological level, it is important to note that, on the one hand, the appearance of fatigue during the day (Gené -Badia, *et al.*, 2016) and the exacerbation of problems such as stress, anxiety and depression



(Altena, *et al.*, 2020), can affect the amount of circulating lymphocytes of NK cells (Natural Killer) and antibodies, which exposes an impaired defense function when an immune challenge such as COVID-19 is presented (Sepúlveda *et al.*, 2000).

As part of the accumulation of evidence that associates physical inactivity with a weakened state of health, some studies show evidence that when healthy subjects spend between 7 to 10 days of bed rest, their sensitivity to insulin decreases between 10 to 34 %. throughout his body (Sonne *et al.*, 2010).

Confinement and screen time

In the wake of COVID-19, the American Pediatric Association has released a new set of guidelines. Tellingly, it specifically steers away from time-based limits. During the Pandemic, what matters is the child, the content and the context, also known as the rule of the three "C" for its acronym in English (*Child, Content, Context*) (Argentine Society of Pediatrics, 2020).

Certainly, the current screen time recommendations that exist do not take into account the reality of how we use media in the pandemic. Kids use screens to watch cartoons, but they also need them to connect with teachers, classmates, friends, and family. Indeed, television, streaming platforms, and app downloads have seen a notable increase in usage since the pandemic began (UNICEF, 2020).

Sedentary activities such as office work, watching television, and sitting are associated not only with the previously mentioned increased mortality, but also with increased morbidity (metabolic syndrome and cardiovascular disease) (Shephard *et al.*, 2010).

In the vast majority of cases studied on the use of communication technologies by children and adolescents, sleep disorders and excessive use of cell phones, tablets, video games and computers are reported. Specifically, exposure to these technological items should be monitored because these light-emitting sources can increase stress. Sleep disorders are part of the first manifestations with a prevalence close to 30 % and play an important role in the development and maintenance of mental illnesses. These manifestations are related to alterations in eating patterns and body overweight, also favored by low physical activity (Ramírez *et al.*, 2020).

On the other hand, Orgiles *et. to the.* (2020), point out that in their study, 73 % of parents reported an abusive use of ICTs by their children, and on the other hand, they report that 55 % of children spend more than two hours per day in front of to these elements, despite numerous studies indicating that television and other technological devices play a close causal role in reducing parent/child play time, distract the child, disturb the quality and quantity of hours of rest and sleep, and in a certain way exposes children to news not controlled by adults (Argentine Society of Pediatrics, 2020).

These modifications in habits and behavior will bring negative consequences later and, for this, it is necessary that health professionals have the ability to generate a change based on knowing the effects of confinement on physical inactivity in child and adolescent populations. thus achieving, develop strategies and recommendations to reverse this problematic situation.



MATERIALS AND METHODS

This research work is descriptive, correlational ($P < 0.05$), scientific research methods and techniques such as analytical-synthetic, inductive-deductive, document analysis and a questionnaire were used.

The document analysis method was used to review all the sources of consultation, materials, texts and articles that supported the research study, giving it theoretical and methodological support.

All participants were informed of the purpose of the study, as a requirement to fill out the form, anonymously, during 3 weeks of the confinement measures imposed by the government of Chubut on the citizens of Comodoro Rivadavia, with the purpose of reaching the diagnosis of the problematic situation. The participants had to be between 5 and 18 years old inclusive, being accompanied by a person in charge (Parents or Guardian), signing the informed consent that authorizes the use of their information for scientific purposes.

- Independent variable: social, preventive and compulsory confinement.
- Dependent variable: physical inactivity.

Population and sample tested

The present research work was carried out through the simple random sampling method, 467 resident respondents of the city of Comodoro Rivadavia and Rada Tilly were analyzed, between June 28 and July 19, 2020. The distribution of sex was 49.1 % men and 50.9 % women, being an exclusion factor being younger than 5 years and older than 18 years.

The analyzed ages showed a higher percentage of respondents, in the population of children from 5 to 10 years old, with 61 % ($n = 285$), followed by an age group from 11 to 14 years old with 22.1 % ($n = 103$), continuing with 16.9 % ($n = 79$) in the age group of 15 to 18 years.

Instruments

A survey designed by the research team was used, with the use of the *Google forms application*. This online questionnaire was focused on closed questions composed of a total of 18 questions structured in sections (physical inactivity, sedentary lifestyle, amount of sleep and time spent in front of screens), they were disseminated online, email, social networks and media. of radio and television communication.

Statistical analysis

Statistical data were collected through: a) *Google forms online questionnaire*, then the information was analyzed, determining frequency counts and percentage calculations; b) Subsequently, the data was exported to the statistical program IBM SPSS, version 25.0, with the that the relationship between the variables was determined through the non-parametric Chi-square test.



RESULTS

Based on the data obtained in the survey, the following results can be seen, which are detailed in several sections:

Physical inactivity

After 123 days of preventive and compulsory social isolation, the results reported an increase of 45 %, tripling the percentages of daily time of physical inactivity prior to confinement, according to the recommendations of health organizations (*World Health Organization, 2010*) (Table 1).

Table 1. Daily time of physical activity before and during confinement.

PERCENTAGE BEFORE LOCKDOWN	DAILY TIME OF PHYSICAL ACTIVITY	PERCENTAGE DURING LOCKDOWN
10%	Less than 30 min.	30.3%
42.9%	60 minutes	27.9%
36.9%	More than 60 min.	7.5%
10.2%	Does not do physical activity	34.3%

Regarding the weekly frequency, this reality is accentuated, reflecting that 9 out of 10 children do not perform physical activity, being very far from reaching the proposed recommendations (*World Health Organization, 2010*). This could have a detrimental impact on the osteomyoarticular and metabolic health of the child and adolescent population (Table 2).

Table 2. - Weekly frequency of physical activity before and during confinement

PERCENTAGE BEFORE LOCKDOWN	WEEKLY FREQUENCY OF PHYSICAL ACTIVITY	PERCENTAGE DURING LOCKDOWN
	ACTIVITY	
7.57%	once a week	22.1%
31.33%	2 times a week	20.9%
37.85%	3 times per week	12.5%
12.27%	Every day	10.3%
10.96%	Does not do physical activity	34.2%

Time spent in front of screens

Regarding the time spent in front of the screens of the population studied, the percentages prior to confinement of 41.9 % were doubled and during isolation it was 84.4 %, far exceeding the recommended limits according to the American Association of Pediatrics, increasing the time they spend sitting and lying down to more than 4 hours.

Regarding the most consumed content would be YouTube (77 %), Netflix (64.3 %), video games (50 %) and Zoom (42 %) (Table 3).



Table 3. Time spent in front of screens before and during confinement

PERCENTAGE BEFORE LOCKDOWN	ALLOCATED TIME IN FRONT OF SCREENS	PERCENTAGE DURING LOCKDOWN
10.4%	Less than 30 minutes	1.9%
46.7%	Between 30 minutes to 2 hours	13.5%
28%	Between 2 to 4 hours	29.6%
13.9%	More than 4 hours	54.8%
1 %	I don't use the screens	0.2%

Amount of sleep

Together, the amount of sleep during confinement was analyzed, teenagers aged 15 to 18 reflected a longer time lying down and it was possible to conclude that 60 % of the child-juvenile population presented an increase in hours of sleep., about 40 % who did not refer such alteration (Figure 3) and (Table 4).

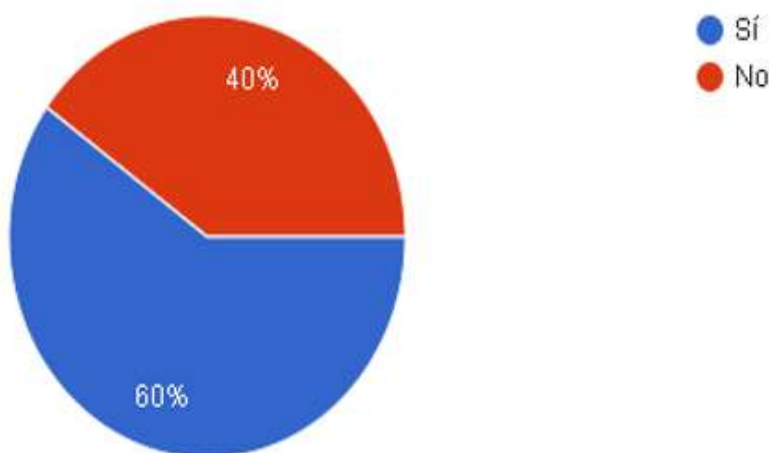


Fig. 3. - Sleep more hours during confinement



Table 4. - Correlations obtained, from Pearson's Chi-square, between the different indicators

	Asymptotic significance (bilateral)
Daily time dedicated to physical activity and daily hours dedicated to screens, during confinement.	018
*p<0.05 significant correlation between the indicators	
Daily hours dedicated to screens, sleep more hours than before confinement, during confinement	036

*p<0.05 significant correlation between the indicators

- a) It can be affirmed with a $p<0.05$, that there is a relationship between the daily time dedicated to physical activity and daily hours dedicated to screens, during confinement.
- b) It can be affirmed with a $p<0.05$, that there is a relationship between daily hours dedicated to the screens, they sleep more hours than before confinement, during confinement.

DISCUSSION

The evidence on adherence to physical exercise to preserve health and quality of life is overwhelming, as is the detrimental impact of the COVID-19 pandemic on sedentary lifestyle and physical inactivity (Fonseca *et al.*, 2018; Rundle *et al.*, 2020).

The World Health Organization recommends a design of physical activity with an ephemeral aspect, detailing the implication of physical and emotional health in different age ranges, through movements of various intensities and execution times. As a consequence of this, the evidence suggests according to World Health Organization, that children should be involved in at least 60 minutes of physical activity daily, and that it is also necessary to include muscle and bone strengthening exercises in this population.

Confinement has detrimental aspects in the increase in physical inactivity, increasing the percentages, provided by the Social Debt Observatory (2014), 45.4 % of the urban population between 5 and 17 years old has high levels of physical inactivity, due to who does not achieve a daily practice of 60 minutes. 48.1 % of these children had less than two weekly Physical Education classes throughout the school year.

In this context of social isolation, the child and youth populations spent more time in front of screens than usual, exceeding four hours, increasing the percentages reflected in the survey, 61.8 % of these young people have a sedentary behavior, since who spend more than two hours a day in front of various types of screens (TV, computer, tablets) cited in Casas (2016).



CONCLUSIONS

As an integrating conclusion, the negative impact suffered by the studied population is highlighted, increasing the previous ones during the confinement stage, in the spectrum of types of physical inactivity that can be cited according to the results of the work that will be mentioned below: a) Increased physical inactivity and sedentary lifestyle; b) Increase in daily hours in front of screens (increase in sitting time); c) Increase in sleep hours (increase in time lying down); d) Physical inactivity in relation to daily hours in front of screens ($P < 0.05$); e) Daily hours dedicated to screens, they sleep more hours than before confinement, during confinement ($P < 0.05$).

The stressful environment of quarantine has an unfavorable impact due to the increase in the levels of physical inactivity and sedentary lifestyle of a large part of the child and youth population.

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Conflict of interest statement:

The authors declare that there are no conflicts of interest.

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The authors have participated in the writing of the paper and analysis of the documents.



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