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Article

Sociodemographic Factors Related to Perceived Physical Activity on Chilean Adults: Consequences of Post-Pandemic COVID-19 Movement Habits and Sedentary Lifestyle

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Abstract: The current study aimed to examine the relationship between sociodemographic variables (i.e., sex, age, marital status, educational level, socioeconomic status, and working mode) and physical activity levels declared by Chilean adults. The sample comprised 483 Chilean adults, 159 men (32.9%), and 324 women (67.1%) aged from 18 to 69 years old (36.5±12.0). The participants completed an ad-hoc sociodemographic online survey that included questions about characteristics of participants such as sex, age, educational level, household income, marital status, and working mode. Vigorous, moderate, and walking activities were measured using the International Physical Activity Questionnaire-Short Form (IPAQ-SF), a self-administered questionnaire. Results: Men declared significantly higher vigorous and moderated physical activity than women. People aged 18 to 25, single or unmarried, and with the lowest household income, showed significantly higher scores in vigorous physical activity than those aged 26 to 45, cohabiting with a partner or married, and middle household income, respectively. Regarding working mode, people working on their job site said walking more than people not working, working on hybrid, and online mode. Our findings suggest that promoting strategies that increase physical activity during the pandemic is necessary to avoid health problems.

Keywords: physical activity; sedentarism; COVID-19; sociodemographic

1. Introduction

Research into the influence of coronavirus disease 2019 (henceforth COVID-19) pandemic on physical activity has been subject to growing attention worldwide [1–3]. The conditions of high or low participation in physical exercise activities vary depending on the context, and the COVID-19 pandemic has significantly decreased physical activity levels [4]. Sociodemographic factors such as sex, age, socioeconomic status, educational level, and marital status have also been consistently associated with the level and type of physical activity [5–7]. However, the people's working mode is another aspect to consider in this field of study, given the effects that working in the workplace, working remotely, and non-working during the COVID-19 pandemic lockdown have had on higher or lower levels of physical activity [8].

Association between Chileans' COVID-19 pandemic context and physical activity

The first case of COVID-19 in Chile was in March 2020, marking the beginning of a unique and challenging period. Since then, several public health measures have been implemented, including lockdowns, quarantines, confinement, and reduction of maximum capacity in public places. In August 2020, Chile ranked first in Latin America in the number of PCR and antigen tests and was also the first country in the zone to start the mass vaccination process with the fourth dose against this disease [9].

The COVID-19 pandemic has impacted people's health habits despite the abovementioned sanitary actions. Scientific evidence suggests that COVID-19 confinement has influenced physical activity, in which people declared that they had experienced a decrease in physical activity and an increasingly sedentary lifestyle [10]. Promoting physical activity in Chile during the COVID-19 pandemic could protect against health problems, which are consequences of physical inactivity at the national level [11,12].

In this context, the quality of life of Chilean adults during the COVID-19 confinement has been influenced by different variables, including the level of a sedentary lifestyle and physical activity. Being physically inactive increases the probability of having a lower quality of life during the pandemic lockdown [13]. The relationship between better quality of life and physical activity could be because it is well known that persons performing regular physical activity perceived themselves as having more autonomy, personal growth, purpose in life, and self-acceptance [14]. Nevertheless, some sociodemographic factors could be determinants of physical activity among adults during the COVID-19 pandemic.

Influence of sociodemographic factors on physical activity

Among demographic variables related to physical activity levels, socioeconomic status (SES), sex, marital status, and educational level have received considerable attention. Usually, studies have measured physical activity with instruments such as accelerometers and questionnaires to evaluate their perception [15–17]. The scientific evidence has shown conflicting results associated with this issue.

Several studies focused on age and sex. Their relationship with exercise has indicated that older people performed lower physical activity than younger people, and men have demonstrated to be more active physically than women [18–20]. Nevertheless, the differences by sex differed from other results that showed that men and women reported similar physical activity levels. However, physical activity is reduced and declines with age for both genders [21].

Regarding the association between marital status and physical activity, some research findings have shown that married people spend less time on exercise than unmarried people [22] and participate in more physical activities than people with higher educational and socioeconomic status [23,24].

Sociodemographic factors may be less or more beneficial for physical activity. However, changes in the pandemic work mode due to restrictions during COVID-19 could be closely related to people's level of physical activity, which is an interesting variable to consider in this issue. Working changes related to COVID-19 have been associated with a higher sedentary lifestyle [25]. Research carried out during the pandemic lockdown has demonstrated that physical activity performed by people working at their job site was higher than those working remotely [8].

Based on the evidence reviewed above, the overall aim of the current study is to examine the relationship between sociodemographic variables (i.e., sex, age, marital status, educational level, socioeconomic status, and working mode) and physical activity levels (vigorous, moderate, and walking) declared by Chilean adults during COVID-19 pandemic. Following the references mentioned in the introduction, we hypothesized that men declare a higher physical activity in Chilean adults than women, people with higher education and socioeconomic status, single and younger individuals, and those working in their job site. Therefore, we focused on the following research question: How are levels of physical activity declared by Chilean adults related to sociodemographic factors such as age, sex, marital status, socioeconomic and educational level, and their working mode during a pandemic?

2. Materials and Methods

2.1. Participants

A non-probabilistic sample of Chilean adult respondents was recruited. The following criteria were used to include the study participants: a) reside in Chile at the moment of participation and b) people aged 18 or over.

The final sample in the current study comprised 483 Chilean adults, 159 men (32.9%), and 324 women (67.1%) aged from 18 to 69 years old (36.5 ± 12.0). 58% were not cohabiting with a partner or were unmarried, and 42% were married or cohabiting with a partner. 32% of the respondents completed high school, 47% had a university or technical degree, and 21% had completed post-graduate studies. Almost all the participants (56.5%) worked online, 18.6% in hybrid mode, 10.4% on their job site, and 14.5% were not working. The household income (USD) was \$72 to \$12000 (1883.2 ± 1686.7).

2.2. Measures

An ad-hoc sociodemographic online survey included questions about the characteristics of participants, such as sex, age, educational level, household income, marital status, working mode, and city and region where they were residing. This last variable was considered an exclusion criterion for people living in different countries. The online survey was promoted through emails and telephone calls to students and academics from universities where researchers worked. Participants accessed a link to give their online informed consent.

The International Physical Activity Questionnaire-Short Form (IPAQ-SF) [26] was applied to estimate the physical activity level of subjects. The instrument has a version translated into Spanish [27] used in this study. The IPAQ-SF is a self-administered questionnaire that estimates physical activity in the last seven days. Recorded activities corresponding to vigorous, moderate, walking, and sitting time are converted to daily minutes. Using a physical activity calculation method given on the IPAQ website [28], it was possible to obtain the levels into which the subjects can be classified. Only the first three activities were considered for this study since energy expenditure was estimated. Therefore, sitting time was not considered.

2.3. Data analysis

Sociodemographic factors were divided into categories. Specifically, sex was classified as men and women; the age in emerging adulthood (18-25 years old) according to Arnett criteria [29], young adulthood (26-45 years old), and older adulthood (46-69 years old), taking as a reference to Mesters et al. [30]. Marital status was categorized as single/unmarried and cohabiting with a partner/married. The educational level was divided into completed high school, university or technical degree, and post-graduate. Socioeconomic status was classified considering monthly household as low (840 USD or less), middle (841 to 2313 USD), and high (2314 USD or more), taking as reference the Chilean Association of Market Researchers 2019 criteria [31], and working mode as an online, hybrid, job site, and not working.

The bivariate associations between sociodemographic factors and the IPAQ-SF scores were tested and quantified by parametric tests based on comparisons of means. Specifically, mean IPAQ-SF scores were compared via the Student t-test (for comparing two independent means) or robust ANOVA, followed by post hoc Bonferroni (for comparing more than two independent means). Effect sizes were computed using Cohen's d and eta-squared. All statistical analyses were carried out using SPSS version 27.0 for Windows.

3. Results

3.1. Sociodemographic factors and children’s developmental outcomes

The main results of the study are presented in Table 1. It shows that men declared significantly higher vigorous ($t(252.54) = 2.27$; $p = 0.02$; $d = 0.23$) and moderated ($t(253.51) = 2.44$; $p = 0.02$; $d = 0.25$) physical activity than women. A statistically significant effect of the people's age on vigorous physical activity ($F(2,480) = 6.69$; $p = 0.001$; $\eta^2 = 0.03$) was also found. In this regard, the group of people aged 18 to 25, emerging adulthood, showed significantly higher scores in vigorous physical activity than those aged 26 to 45 (young adulthood).

Additionally, there was a significant association between the fact that people were not cohabiting with a partner or unmarried and scores corresponding to vigorous physical activity ($t(477.70) = 3.5377$; $p \leq 0.001$; $d = 0.36$). Expressly, single people declared they performed significantly higher levels of vigorous activity.

For socioeconomic status, was found higher mean scores in vigorous physical activity in people with the lowest compared with the middle household income ($F(2,480) = 4.26$; $p = 0.01$; ($\eta^2 = 0.02$). Respecting working mode, people working in their job site showed higher mean scores on walking than people working in hybrid mode ($F(2,480) = 4.26$; $p = 0.001$; ($\eta^2=0.02$), online ($F(2,480) = 4.26$; $p = <0.001$; ($\eta^2=0.02$), and not working ($F(2,480) = 4.26$; $p = 0.005$; ($\eta^2=0.02$).

Table 1. Descriptive summary of IPAQ-SF scores by sociodemographic factors.

	Vigorous	Moderate	Walking
	M ± (SD)	M ± (SD)	M ± (SD)
	(Min-Max)	(Min-Max)	(Min-Max)
Sex			
Men (n=159)	1161.51±1772.48* (0 – 10080)	569.76±989.89* (0 – 5040)	524.78±.694.34 (0 – 4158)
Women (n=324)	799.63±1362.55 (0 – 864)	352.31±764.91 (0 – 5040)	503.50±931.94 (0 – 4158)
Adulthood stage categories			
Emerging (n=100)	1376±1726.12++ (0 – 8640)	487.80±815.85+ (0 – 4200)	453.42±590.84 (0 – 2772)
Young (n= 283)	740.78±1302.10++ (0 – 7200)	372.23±823.72+ (0 – 5040)	488.88±922.38 (0 – 4158)
Older (n=100)	965.20±1760.50 (0 – 10080)	506.20±952.24 (0 – 5040)	628.82±.901.22 (0 – 4158)
Marital status			
Single (n=280)	1116.43±.1637.52+ (0 – 10080)	478.00±.886.52 (0 – 5040)	499.18± 786.81 (0 – 4158)
Cohabiting/married (n=203)	646.11±1289.43 (0 – 7200)	349.26 ±794.88 (0 – 5040)	526.13 ±954.26 (0 – 4158)
Educational level			
Completed High School (n=157)	1747.77±1668.93 (0 – 8640)	528.28±882.49 (0 – 5040)	579.60±849.27 (0 – 4158)
Graduated (n=225)	821.87±1375.97 (0 – 7200)	348.27±762.47 (0 – 5040)	499.62±887.88 (0 – 4158)
Postgraduated (n=101)	778.61±1546.21 (0 – 1080)	430.10±970.21 (0 – 5040)	427.37±813.45 (0 – 4158)
Working mode			
Without modality (n=70)	849.14± 1346.83 (0 – 8640)	336.29±616.05 (0 – 3360)	525.17±849.94 (0 – 4158)

Online (n=273)	934.95±1449.85 (0 – 8400)	379.41±756.84 (0 – 5040)	412.80±738.63 (0 – 4158)
Hybrid (n=90)	777.33±1495.46 (0 – 7200)	477.33±1034.33 (0 – 5040)	497.93±796.44 (0 – 4158)
On site (n=50)	1182.40±2062.12 (0 – 1080)	693.20±1166.57 (0 – 5040)	1046.10±1317.64 (0 – 4158)
Socioeconomic Status			
Low (n=131)	1210.99±1646.52 (0 – 8640)	546.41±934.79 (0 – 5040)	590.60±929.60 (0 – 4158)
Middle (n=221)	727.96±1358.00 (0 – 1080)	381.23±849.75 (0 – 5040)	518.22±912.19 (0 – 4158)
High (n=131)	948.40±1604.45 (0 – 8400)	373.34±752.90 (0 – 5040)	417.41±675.73 (0 – 4158)

4. Discussion

Comparative analyses showed significant differences between vigorous, moderate, and walking activities declared by Chilean adults based on certain sociodemographic variables, especially on vigorous activities. Specifically, our results showed that men perceived that they performed more vigorous and moderated physical activity than women. There is solid evidence from studies of different cultures before the COVID-19 pandemic showing that men are usually more active than women [32–34], concordant with our results. Moreover, the evidenced difference found in this study could be emphasized by the evidence provided by a recent study in Chile showing that women have significantly decreased their physical activity during the COVID-19 pandemic lockdown [35]. Despite this result, it is crucial to consider that the difference between men and women could be, possibly because men usually feel more intrinsically motivated to participate in activities requiring more vigorous movements than women [36].

Regarding the difference in physical activity between participants' ages, previous studies found that people are more physically active when younger, but this activity decreases with age [37,38]. This situation might be explained by the possibility of a low level of physical activity being related to physiological changes in the musculoskeletal system as age progresses, imposing consequences such as reduced physical activity [39]. However, no significant differences were found with subjects in older adulthood (46-69 years old). In a study conducted by McCarthy et al. [40], older people were likelier to maintain or increase their physical activity levels during confinement than younger people who decreased it substantially. This was probably because younger people had a higher activity level before implementing the lockdown, which matched the older age groups who maintained it. After all, it was already low before the pandemic.

Despite this, our hypothesis that young people would report higher physical activity levels than older people was partially fulfilled. In particular, the emerging adulthood group, aged between 18 and 25, reported a higher level of vigorous activity than those in emerging adulthood (26-45 years old). These differences were probability found because life transitions during adulthood used to be associated with lower physical activities, including the beginning of the working world, responsibilities in the home, marriage, or parenthood [41]. In any case, these findings are interesting because we have noted that the pandemic affected younger people in terms of physical activity. This decrease was so low that there were no significant differences with older people. However, there were differences among younger groups due to sociodemographic factors such as changing lifestyles. Therefore, it is interesting to consider that the pandemic may have affected the level of physical activity in emerging adults.

Our results also showed that unmarried or non-cohabiting people declared more vigorous physical activity than married or cohabiting participants. Previous studies before the COVID-19 pandemic demonstrated similar results to ours [42,43]. A possible cause of this association could be the type of leisure and time physical activity in married people, linked to responsibilities and roles

appropriately related to their identity ([44]. Future research must consider the type of physical activity performed by married and unmarried people; variables not analyzed in this study could provide relevant information regarding the relationship of these variables with the level of physical activity declared as a consequence after a period of confinement in the pandemic.

Another aspect to consider in this research is the association between physical activity, SES, and educational level. Our results differed from what we hypothesized, and we did not find a significant difference between higher and lower levels of SES and education regarding physical activity. Previous literature has described that there are significant differences between physical activity levels according to socioeconomic level and educational level since people with fewer resources tend to have a lower educational level and, in turn, tend to have less healthy habits, including physical inactivity [45], it is helpful to specify in which tasks people are more or less active according to their routine. For example, it has been found that middle-class people perform more intense physical activity in occupational activities, while people with fewer resources perform more household chores; and those with higher incomes perform more exercise, are more active when moving, but spend more time sitting [46]. It is essential to analyze, in the Chilean context, what activities they perform in their daily lives because it is well known that the pandemic led to subjects spending more time sitting, especially in the workplace [47], while people of lower socioeconomic level tend to work in unskilled jobs in which they need to perform face-to-face work. In fact, in Chile, it was found that 92% of unskilled workers performed face-to-face work, compared to only 29% of senior executives and entrepreneurs [48], probably bringing as a consequence that people who perform unskilled work are more mobile at work.

Considering the preceding, our results showed that people working in job in-site mode walked more than those working in hybrid, online, and non-working modes. A systematic review that analyzed research from different countries concluded that confinement and working from home affected workers' physical activity levels [49]. This could explain why, in our sample, those who maintained working at their job site walked significantly more than those who did not. This finding is interesting since it has been shown that commuting to work, which could include higher intensity activities, would affect workers who do not attend work on their job site [50]. Therefore, it is important to continue researching the association between work modalities, physical activity, and sedentary habits since the confinement that occurred due to the COVID-19 pandemic may have long-term repercussions on this issue.

5. Limitations and future directions for research

The present research contributes to the state of the art on the importance of sociodemographic factors on the physical activity affected by the COVID-19 pandemic. However, the study presented several limitations when interpreting the results. First, cause-effect relationships cannot be determined because only associations between sociodemographic variables and IPAQ were calculated. Nevertheless, our results were supported by previous studies that have analyzed the relationships between sociodemographic variables and physical activity [6,8,35].

Another limitation is that the instrument we used to measure physical activity- IPAQ-SF, was a self-report rather than an objective observation measurement tool, as applied in other studies [18,51]. However, the IPAQ-SF is a recommended and qualified instrument for investigating perceived physical activity because it is one of the most widely used self-report questionnaires in people between 16-69 years of age in different countries to assess physical activity [27].

One of the drawbacks that could affect the interpretation of the results of our study was that the effect sizes were small. Therefore, the strength of the relationship between the sociodemographic variables and the level of physical activity was low to medium [52], even though there were statistically significant differences when the groups of the population studied were compared. In this context, the relevance of the complement between reporting effect sizes and statistical significance is that the findings are not due to chance [53], which was probably the case in this study.

6. Conclusions

Sociodemographic factors continue to influence physical activity, as before the COVID-19 pandemic. However, the public health measures that have been implemented have had a negative impact on motor behaviors of higher intensity. The most common sociodemographic variables related to physical activity were sex, age, marital status, and SES. Nevertheless, the absence of on-site work may affect walking intensity or the ability to engage in strenuous activity during work. This is a critical issue in studies related to physical activity in the context of the COVID-19 pandemic. Therefore, our results strongly advocate promoting strategies that increase physical activity during a pandemic to avert potential health problems.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of Universidad Católica de la Santísima Concepción (2022/50 october 2022) for studies involving humans.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data supporting this study can be requested from the corresponding author. The data are not publicly accessible because they contain sensitive information. An anonymized version of the database, including the relevant variables for reproducing the analyses, has been created and is available upon request.

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