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Research article

Physical activity during COVID-19 pandemic in the Iranian population: A brief report

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ABSTRACT

COVID-19 pandemic and restrictive public health measures due to it can have many effects on physical activity. Our study aimed to compare the levels of physical activity levels (expressed as MET–minute/week), among Qom city (Iran) adults in pre and during the COVID-19 pandemic (January 2020 and 20 to 29 May 2020, respectively). 670 adults were included in this study and grouped based on age and gender. The short-form International physical activity questionnaire (IPAQ, SF) was distributed to the participants through an online survey. The Wilcoxon signed-rank test was used for statistical analyses. The present study showed that the level of physical activity decreased significantly during COVID-19 compared to pre-COVID-19 in both sexes and age groups ($p < 0.001$). Also, this study found that a total of 78% of the participants did not meet the physical activity guidelines during COVID-19 in Iran. Our results indicate the necessity to consider an integrated and comprehensive approach to reduce the inactivity caused by COVID-19.

1. Introduction

Coronaviruses are a large family of viruses that cause illness in mammals and birds. In humans, these viruses can cause illness ranging from the common cold to more severe diseases and respiratory tract infections [1]. In the last days of 2019, new pneumonia caused by coronavirus appeared in Wuhan city of China [1]. The World Health Organization (WHO) gave the name COVID-19 to the disease caused by this virus [2]. As of 31 May 2020, more than 6,000,000 cases have been diagnosed and at least 371,364 deaths caused by this virus have been confirmed in the world, with major outbreaks in the USA, Brazil, Russia, and Spain [3]. The first official announcement of deaths from COVID-19 in Iran was on 19 February 2020, in Qom city. In Iran and as of 4 June 2020, 164217 people have been diagnosed with COVID-19, with 8071 fatalities [4].

In Iran and many countries, governments have adopted restrictive measures such as quarantine, isolation, and physical distancing, the suspension of any social event, and the closure of schools and universities to reduce transmission of the virus, because no effective medicines or vaccines have been created so far [5]. Also, access to gyms, sports centers, swimming pools, public parks, and gardens was prohibited. All of these public health restrictions likely reduce access to physical activity opportunities.

A recent study from Giustino et al (2020) indicated a significant decrease in the total weekly energy expenditure during the COVID-19 in the Sicilian active population [6]. Also, in another study from Fitbit Inc., a 12% reduction in step count across the US was observed during the week of 22 March [7].

It is well known that regular and sustained physical activity affects almost every facet of health across the lifespan and the prevention of mortality. Moreover, it improves defense activity, metabolic health, and mental health [6].

However, data are not yet available to indicate changes in physical activity due to pandemic-related public health restrictions in the Iranian population. Given the lack of data and the rapidly evolving response to COVID-19, this study was designed to evaluate the impact of COVID-19-public health restrictions on physical activity levels in the Iranian population.

2. Materials and methods

2.1. Study design

This study is a cross-sectional online survey conducted using the Google Drive web survey platform.

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2.2. Procedure and participants

From a previous study (unpublished study), we had data of 1,200 adults (aged 18 years and over) in Qom city. This data, which was collected in January 2020, included age, sex, and physical activity level (measured by short-form International physical activity questionnaire).

From 20 to 29 May 2020, the online survey was shared with the personal contacts of these adults via social media such as WhatsApp and Telegram. Adults were deemed eligible if they were aged 18 to 64 and currently residing in the Qom city.

This online survey form begins with a brief description of the study and its purpose. Participants self-reported age, sex, stay-at-home days, and physical activity levels. In the present study, the pre-COVID-19 and during COVID-19 periods were defined as January 2020 and 20 to 29 May 2020, respectively. During this study, social distancing was implementing. It means maintaining distance (approximately 2 m from others when possible), avoiding mass gatherings, remaining out of congregate settings, closure of gym, parks, pools, and so on. The protocol was approved by the local Ethics Committee of Qom Medical University.

2.3. Physical activity measurement

We used a short-form International physical activity questionnaire (IPAQ, SF) for measuring physical activity. This questionnaire is a 9-item scale that assessing the number of minutes spent in vigorous and moderate-intensity activity and walking on weekdays during the last 7 days. The questionnaire and its interpretation methods have already been reported [8]. In healthy adults, IPAQ, SF had good test-retest reliability (Spearman $p = 0.80$) and moderate criterion validity (Spearman $p = 0.30$) with an accelerometer [9].

2.4. Statistical methods

To analyze survey data, age was re-coded. Age classifications were grouped into 2 categories: adults aged 18–34 years and those aged 35–64 years [6]. The summary statistics (percentiles, means, and standard deviations) were used to represent the physical activity level (expressed in MET–min/wk) for the categorical variables.

The Wilcoxon signed-rank test was used to compare physical activity (MET–min/wk) pre and during COVID-19. Also, we carried out a bivariate analysis to analyze the relationship between gender and age classifications and the physical activity (MET–min/wk). The level of statistical significance was accepted at $p < 0.05$. The statistical analysis was performed with SPSS version 24.0 (SPSS, Inc., Chicago, IL, USA).

3. Results

A total of 1,200 adults that online survey was shared with them, 700 participants completed the online survey. After excluding missing outcome data, a total of 670 with complete data were analyzed (a completion rate of 58.3% with 55.8% after exclusions). The participants of the study comprised 518 females (77.4%) and 152 males (22.6%) with the age of 29.24 ± 9.5 years. Based on age classifications used, participants of this study were grouped into: 18–34 years: n = 473 (70.5%); 35–64 years: n = 197 (29.5%).

The physical activity level of the participants in pre and during COVID-19 was reported in Table 1.

Table 1 shows a decrease of 67.49% physical activity level (850.52 MET. minutes/week) from pre- the COVID-19 to during the COVID-19 in all participants. The results of the Wilcoxon signed-rank test showed a significant difference in these conditions ($p < 0.001$). In pre-COVID-19, 50.9%, 21.1%, and 28% of all participants were low, moderately, and highly active, respectively. During COVID-19, results showed an increase of 27.1% of low active participants, with a related decrease of 7.7% and 19.4% of moderately and high active participants, respectively (Table 2).

For gender, a decrease of 67.39% and 67.92% physical activity level (803.58 and 1068.95 MET. minutes/week in females and males) was found in female and male participants, respectively (Table 1). In both sexes, this decrease was significant ($p < 0.001$).

Female participants in pre-COVID-19 and male participants during COVID-19 showed higher values of physical activity. However, the bivariate analysis between gender and physical activity showed no significant difference in pre and during the COVID-19 for males and females ($p = 0.13$).

In pre-COVID-19, 50.2%, 21.2%, and 28.6% of female participants were low, moderately, and highly active, respectively. During COVID-19, results showed an increase of 28.8% of low active female participants, with a decrease of 7.7% and 21.1% of moderately and highly active female participants, respectively (Table 2). This pattern was similar in men.

Regarding the age classifications, two groups showed a significant reduction the MET–min/wk from pre to during COVID-19 (from 1429.36 ± 2144.87 to 463.31 ± 995.31 in the 18–34 years group and from 1058.67 ± 1416.73 to 337.21 ± 564.73 in 35–64 years group) ($p < 0.001$). We found a significant difference MET–min/wk in pre-COVID-19 ($p < 0.001$). Participants of the 18–34 years group showed higher values of physical activity. In pre-COVID-19, 48%, 22%, and 30% of the 18–34 years participants and 58.4%, 18.6%, and 23% of 35–64 years participants were low, moderately, and highly active, respectively. During COVID-19, results showed an increase of 30% of low active participants and a decrease of 11.5% and 18.5% of moderately and high active participants in the 18–34 years group. In the 35–64 years group, there was an increase of 19.6% and 2.4% of low and moderately active participants and a decrease of 22% of highly active participants (Table 2).

4. Discussion

To our knowledge, our study was among one of the first studies to investigate the impact of the COVID-19 pandemic on physical activity in Iran. In agreement with previous studies [6, 7], the present study showed that the level of physical activity decreased significantly during COVID-19 compared to pre-COVID-19 in both sexes and age groups. Also, this study found that a total of 78% of the participants did not meet the physical activity guidelines during COVID-19 in Iran. Previous studies have identified that about 33% of the adult population of Iran did not meet physical activity guidelines [10], whereas the present study showed that this level was at 78% during COVID-19.

Table 1. Physical activity level pre- and during COVID-19 (MET. minutes/week).

All		Before (Mean ± SD)	During (Mean ± SD)
		1260.16 ± 1728.1	409.64 ± 874.78
Characteristics			
Sex	Female	1192.46 ± 1553.89	388.88 ± 824.14
	Male	1573.77 ± 2287.45	504.82 ± 1066.11
Age	18–34 years	1429.36 ± 2144.87	463.31 ± 995.31
	35–64 years	1058.67 ± 1416.73	337.21 ± 564.73

Table 2. Physical activity level classifications.

	Level	Pre	During
All n (%)	Low	341 (50.9%)	523 (78%)
	Moderate	141 (21.1%)	90 (13.4%)
	High	188 (28%)	57 (8.6%)
Female n (%)	Low	260 (50.2%)	410 (79%)
	Moderate	110 (21.2%)	70 (13.5%)
	High	148 (28.6%)	38 (7.5%)
Male n (%)	Low	81 (53.3%)	113 (75%)
	Moderate	31 (20.4%)	20 (12.7%)
	High	40 (26.3%)	19 (12.3%)
18–34 years n (%)	Low	226 (48%)	369 (78%)
	Moderate	104 (22%)	50 (10.5%)
	High	143 (30%)	54 (11.5%)
35–64 years n (%)	Low	115 (58.4%)	154 (78%)
	Moderate	37 (18.6%)	40 (21%)
	High	45 (23%)	3 (1%)

There are different causes of the lower physical activity levels during COVID-19. For example, some people went to sports centers and clubs for physical and sports activities. With the closure of these places and clubs in social distancing, people's access to coach/personal trainer/instructor/training partner and equipment has decreased, and as a result, one of the opportunities for physical activity has been lost.

Also, some people went to parks and recreation centers for physical activity. These centers were also closed during COVID-19 social distance. So another opportunity for physical activity is missed. In some countries, people can walking and cycling during COVID-19 social distance. However, due to the lack of safe walking and cycling routes in Qom and many cities of Iran, people can not have safe walking and cycling (both in pre and during COVID-19).

This increase in inactivity during the COVID-19 pandemic could be problematic. Some studies showed that Upper Respiratory Tract Infection (URTI), which is one of the main complications of COVID-19, can be affected by physical activity [11]. In this regard, Nieman and Wentz (2019) showed that the number of days with URTI was 43% lower in active individuals compared to sedentary individuals [11]. Also, several epidemiologic studies in accordance with rodent-based studies have shown that regular physical activity reduced mortality and incidence rates for pneumonia and influenza and improved host responses to influenza and pneumonia infection [12, 13]. There is also increasing support for increase antibody responses to influenza immunization in active elderly adults [14]. Although there are many differences between COVID-19 and influenza, it can be said that regular physical activity can strengthen the body's immune system through different processes and leads to a better reaction of the body's immune system to the virus.

Also, about 70% of all deaths due to COVID-19 occurred in people with pre-existing health conditions including cardiovascular diseases and diabetes [15]. Since inactivity is one of the risk factors for these conditions [16], then we can assume that deaths due to COVID-19 is higher in sedentary people.

Also, since physical inactivity is one of the four major risk factors of Non-Communicable Diseases (NDCs) [17], so it can be expected that the prevalence of non-communicable diseases will increase soon. Our results indicate the necessity to consider an integrated and comprehensive approach to reduce the inactivity caused by COVID-19. In this approach, plans and programs must be made to correct the lifestyle created during the COVID-19 pandemic. One of these programs is media attention to physical activity. In the Iranian media, more attention is paid to prevention methods as well as the risk of QOVID-19, while less attention is paid to effective issues such as physical activity and a healthy lifestyle.

The media can increase people's awareness about the effects of physical activity. It also can introduce various forms of physical activity specific to this period (for example home-based exercise training).

As far as possible, the government allocates parks and nature centers outside the city for walking and cycling; so people can take advantage of these physical activity opportunities (by following health protocols of COVID-19).

Our study suffered from the limitations associated with the small number of the sample size and self-report physical activity level of participants and thus potentially introducing self-reporting bias into the findings. Therefore, these funding must be interpreted in light of the study limitations.

5. Conclusion

This study showed that the COVID-19 pandemic leads to a decrease in physical activity. Increased inactivity during the COVID-19 pandemic can have many negative effects. For this reason, we believe that policymakers should pay attention to the prevalence of this inactivity. Also, we strongly urge that health workers should include physical activity promotion as part of their follow-up after the pandemic.

Declarations

Author contribution statement

H. Amini: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

A. Isanejad: Conceived and designed the experiments; Analyzed and interpreted the data.

N. Chamani, F. Movahedi-Fard, F. Salimi, M. Moezi and S. Habibi: Performed the experiments.

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Declaration of interests statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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