The Impact of COVID-19 Pandemic on Physical Activity Levels Among Health Care Workers

Longitudinal Results From the SHAHWAR Study

Fariba Zare, MSc, Farideh Sadeghian, PhD, Reza Chaman, MD, PhD, and Seyed Mohammad Mirrezaie, MD

Objective: The aim of the present study was to investigate physical activity (PA) changes during the COVID-19 pandemic among health care workers. **Methods:** In a follow-up study, staff PA was compared before and during the COVID-19 pandemic. Logistic regression model was used to determine the related factors with PA changes. **Results:** Total PA (MET minutes a week) among participants (n = 449) showed a statistically significant decrease during the pandemic compared with before the pandemic: 3785.5 ± 2237.09 versus 2363 ± 2452.90, $P < 0.0001$. Although transport-related PA decreased in medical and administrative department staff (3851 ± 22.83.4 vs 2446.7 ± 2477.6, $P < 0.0001$ and 3593.8 ± 2094.3 vs 2122.6 ± 2373.8, $P < 0.0001$, respectively), the decrease was associated with employment in the administrative and nonshift sectors with odds ratios of 2.37 (1.38 to 4.08) and 2.04 (1.28 to 3.26), respectively. **Conclusion:** Promoting PA at home and leisure is especially recommended to achieve the recommended PA levels.

Keywords: cohort, COVID-19, HCWs, Iran, pandemic, physical activity

LEARNING OUTCOMES

- To determine the effect of the COVID-19 pandemic on the health care workers' physical activity
- To determine the difference in physical activity changes in different groups of health care workers during the COVID-19 pandemic

The COVID-19 pandemic, as a major viral outbreak in the 21st century, has led to unprecedented threats to physical and mental health worldwide.[1] In February 2020, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2; COVID-19), initiated in China, began to spread in Iran. On March 12, 2020, the World Health Organization classified COVID-19 as a pandemic disease.[2] Similar to other countries, Iran carries out an amount of preventive measures such as closing most business services, schools, universities, parks, pools, playgrounds, gymnasiums, and fitness centers and requesting that people stay at home and work from home. Also, to prevent the community-based transmission, social distancing and avoiding social meetings were implemented.[3]

Regular physical activity (PA) is a practical way to improve health, especially physical and mental health. By implementing the preventive measures and staying at home to prevent the spread of the virus, being largely physically inactive, unintended consequences are not far from expectation. Inactivity can actually increase the risk of infection and exacerbate poor health conditions, including immune system dysfunction.[4]

Numerous studies have reported changes in people's PA during the pandemic.[5–10] In a study among 2002 adults in the United Kingdom from April to May 2020 during the COVID-19 pandemic, participants reported changes in weight-bearing behaviors compared with prelockdown. A large number of participants reported negative changes in PA behavior.[6] Amini et al[7] in a study among Iranian population showed a significant decline of 67.49% in PA levels from before COVID-19 to during the COVID-19 pandemic in all subjects ($P < 0.001$). Before COVID-19, 50.9%, 21.1%, and 28% of all subjects were low, moderately, and greatly active, respectively. For the period of the COVID-19 pandemic, results revealed an increase of 27.1% of low-active subjects, with related decreases of 7.7% and 19.4% of moderately and highly active subjects, respectively.[7]

In a study in Brazil among 377 people, 24.4% reported leisure-time PA (LTPA) during the pandemic. Prevalence of LTPA among men was 20% higher than women and 40% higher among those with higher education than those with lower education. No differences were found between LTPA and level of social distancing.[5] However, in another study, a decrease in PA levels due to social distancing measures has been reported. Lesser and Nienhuis in a study among the Canadian population showed that during the COVID-19 pandemic 40.5% of inactive persons came to be less active and 22.4% of active persons became less active. Also, 33% of inactive persons became more active, whereas 40.3% of active persons came to be more active.[8]

The present challenges of PA engagement over restricted situations of this pandemic are a serious public health problem in all countries that lead to increased chronic diseases and adverse humanity and economic consequences.[11] Also, social isolation regularly leads to psychological disorders and anxiety.[12]

As the number of employed people who could work from home during quarantine increased,[13,14] it is important to evaluate the impact of closures on employees' PA. Few studies about PA during the COVID-19 pandemic have been done among Iranian population,[7,15] but comparison with prelockdown among specific groups of occupation and domains of PA is very limited. This is the first study that has measured the PA of specific employees according to longitudinal data in prelockdown and during lockdown of the COVID-19 pandemic. The aim of this study was to compare PA and its domains before and during COVID-19 lockdown in different job positions of employees of Shahroud University of Medical Sciences (SHMU) located in Shahroud, Northeast of Iran. We hypothesized that PA in health sector employees would decrease during lockdown because of the pandemic. The results of this study could be very useful for cases where PA is prohibited outside the home because of a future resurgence of

From the Center for Health Related Social and Behavioral Sciences Research, Shahroud University of Medical Sciences, Shahroud, Iran (F.Z., F.S., S.M.M.); Department of Epidemiology, School of Public Health, Shahroud University of Medical Sciences, Shahroud, Iran (R.C.); and Clinical Research Development Unit, Imam Hossein Hospital, Shahroud University of Medical Sciences, Shahroud, Iran (S.M.M.).

Ethical considerations and disclosures: This study was approved by the ethics committee of Shahroud University of Medical Sciences (IR.SHMU.REC.1399.115).

Funding sources: This work was funded by Iran's Ministry of Health and Medical Education. The Shahroud University of Medical Sciences deputy research contributed in funding used in the SHAHWAR cohort through grants 9738 and 9921.

Conflicts of interest: None declared.

Address correspondence to: Seyed Mohammad Mirrezaie, MD, Center for Health Related Social and Behavioral Sciences Research, Shahroud University of Medical Sciences, Shahroud, Iran (mirrezaie@shmu.ac.ir).

DOI: 10.1097/JOM.0000000000002740

the coronavirus or other major events, to design and implement methods to ensure that the target population can achieve adequate levels of PA in lockdown mode.

METHODS

Study Setting

The present work as a follow-up study was conducted based on previously collected data in a cohort research, among health sector staff of SHMU. We used data from SHAHWAR (SHAhroud Health care Workers Associated Research) cohort study. SHAHWAR is a branch of the PERSIAN/Employees' Health Cohort Study. PERSIAN Study is a prospective cohort study evaluating the risk factors of noncommunicable diseases among the staff of medical universities across the country launched by the Research Deputy of the Ministry of Health, Treatment, and Medical Education.[16] Shahroud University of Medical Sciences designed the SHAHWAR cohort study,[17] to serve as one of the centers of PERSIAN/Employees' Health Cohort Study in northeast Iran.

In summary, the SHAHWAR cohort study was designed in 2018 and began in October 2019. Potential participants were all of permanent health care workers (HCWs) of SHMU aged between 20 and 65 years. Study participants, after entering the first phase of the study, will be followed up for at least 15 years with three follow-ups at 5-year intervals. The collected data in the SHAHWAR study were obtained through interviews and examinations. These data include obtaining a medical history, complete physical examination, and anthropometric evaluation and completing questionnaires related to socioeconomic status and social capital, medical history, lifestyle (including nutrition, PA, smoking, and hookah), and occupational exposure (including psychosocial factors at work and work-family conflicts). Also, various aspects of physical, mental, and occupational health were evaluated.

Participants

All the employees of SHMU who enrolled in the first wave of the SHAHWAR cohort study and had completed the International Physical Activity Questionnaire (IPAQ) (baseline) were invited to complete the follow-up questionnaire (pandemic phase) to assess the PA again. Among 1054 invited individuals, 453 persons (43%) including physicians, nurses, service staff/cleaning workers or cleaners, administrative people, primary health care providers, laboratory workers, and kitchen workers accepted the invitation and completed the survey.

In this study, enrolled employees were divided into two groups based on having the opportunity to do work from home in the COVID-19 pandemic. The medical group consisted of health care personnel who had to be present at work anyway, and the second administrative group consisted of individuals who had the opportunity to perform all or part of their work in the form of work from home.

Variables and Measures

All the data were obtained through an interview by means questionnaires whose validity and reliability were approved by a group of experts in the field.[16] Demographic and PA questionnaires were completed as follows: The demographic data included the study participant's age, gender, education, marital status, employment status, place housing, length of work experiences, time spent on social media/watching TV per day, shiftworking experience in the past month, and history of infection with COVID-19 in participant's and his/her family.

In the SHAHWAR cohort study, data for participants' PA were measured using the Persian version of the IPAQ, a valid and reliable questionnaire that was prepared to assess the participants' PA in the PERSIAN cohort study.[18] The International Physical Activity Questionnaire measures four domains of PA: work-related PA (WRPA), transport-related PA (TPA), domestic and gardening PA (DGPA), and LTPA. According to the standard IPAQ protocols, PA in each domain was converted into metabolic equivalent rates (METs), which were summed up to calculate the total PA. A MET is equivalent to a resting metabolic rate, the amount of oxygen used at rest, which is approximately 3.5 mL of oxygen per kilogram of body weight per minute.[19] The number of days per week and time per day were calculated in each domain at work, during transportation, and in leisure time; afterward, PA information was changed into energy expenditure estimates as MET minutes a week (MET-min/wk) for each type of PA (3.3, 4.0, and 8.0 for walking, moderate-intensity PAs, and vigorous-intensity PAs, respectively). Then, total PA (sum of walking, moderate-intensity PAs, and vigorous-intensity PAs) and ΔMET were calculated to indicate the PA level difference between before and during the pandemic. To calculate MET-min/wk, the following formula was used: given walking = 3.3, moderate activity = 4, vigorous activity = 8 × minutes the activity was carried out × number of days that that activity was undertaken. Finally, based on the IPAQ guidelines, the PA score was classified in three categories considering the total MET-min/wk activities: low-active (<600 MET-min/wk), moderately active (600 MET-min/wk), and highly active (3000 MET-min/wk).[20] The IPAQ Persian version had been validated by recent studies.[21] Severe PA in this study included lifting heavy objects, digging, climbing stairs for at least 10 minutes a day, carrying and moving heavier loads from 20 kg, chopping firewood, snow removal or activities such as plowing the garden or backyard, aerobics, running, fast cycling, fast swimming, and football. Moderate PA included carrying light loads, sweeping, cleaning windows, cycling with average speed, average speed swimming, tennis, and volleyball.[22]

Data Collection

Baseline data were collected in the first wave of the SHAHWAR cohort study: October 2019 to February 2020. During the COVID-19 pandemic at the end of April 2020, after 8 weeks of initiation of the COVID-19 pandemic in Iran, follow-up data collection was conducted. This process lasted for 2 weeks.

Ethical Considerations

Ethical approval was done by the ethics committee of SHMU (IR.SHMU.REC.1399.115), and all participants signed the informed consent before participation.

Statistical Analysis

A descriptive analysis was performed, and categorical variables are presented as percentages, and quantitative variables are reported as mean with SD. Paired *t* tests were used to compare the PA before and during the COVID-19 pandemic in health staff.

Comparing between groups and determining the associations between the categorical variables and dependent variables were assessed using the χ^2 test. To investigate the relationship between changes in PA during COVID-19 pandemic, we used a logistic regression model. The dependent variable considered in this model was the differences in PA of HCWs (PA during the pandemic minus prepandemic PA). Then, to convert this constructed variable into a binary variable, if the ΔPA (MET-min/wk) was positive or negative, a score of 1 or 0 was given, respectively. All analyses were performed using IBM SPSS version 26 (IBM Corp, Armonk, NY). For all the analyses, the level of significance was set at 0.05.

RESULTS

A total of 453 health staff subjects from different sectors of SHMU accepted to join the follow-up study and completed the questionnaires. Four subjects because of PA level of more than 960 minutes (16 hours) or activities of less than 10 minutes per day from each domain were excluded from the final analysis according to the IPAQ criteria; therefore, the analysis was performed on 449 HCWs (Fig. 1).

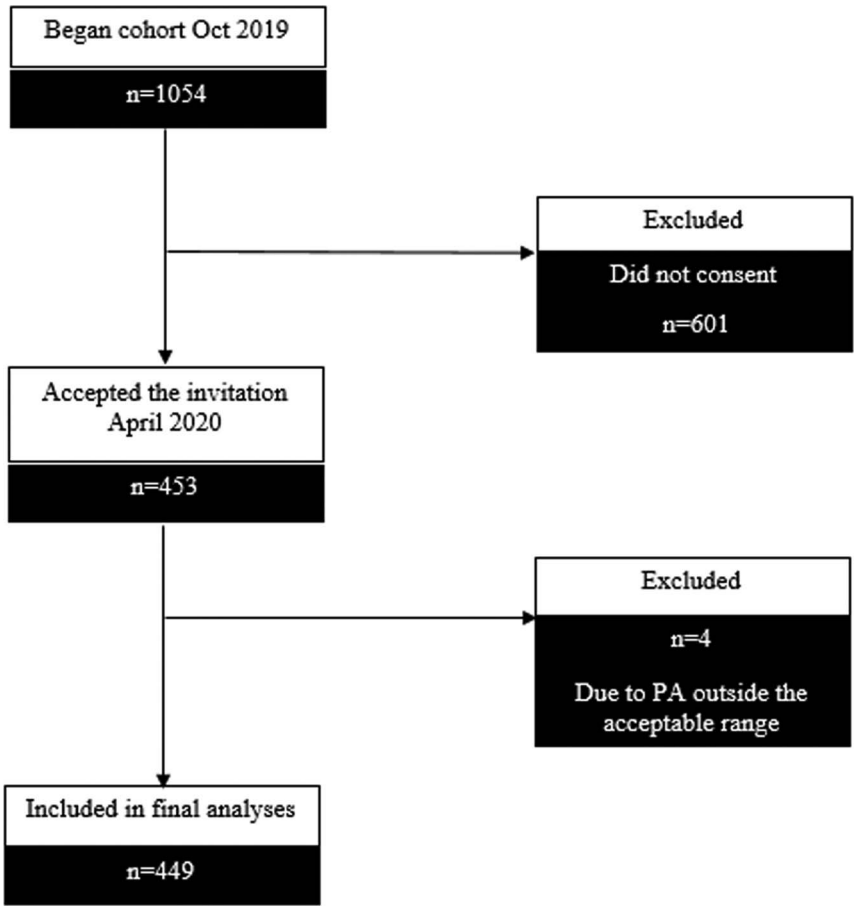

FIGURE 1. Diagram of sample participation.

Two hundred sixty-one (58.1%) of the participants were female. Regarding work from home classification, 74.4% of the participants were from the medical department and 25.6% from the administrative department. Demographic variables and habits of the participants are presented in Table 1. Details of this table are mentioned elsewhere.[17]

Comparisons between self-reported energy expenditures (MET-min/wk) for each of the four different domains from the IPAQ are presented in Table 2.

Work-related PA (MET-min/wk), TPA (MET-min/wk), and LTPA (MET-min/wk) in both job groups (medical and administrative) were decreased during the pandemic; however, DGPA (MET-min/wk) showed an increase at the same duration (Fig. 2).

As shown in Table 3, total PA in MET-min/wk demonstrated a statistically significant difference between before and during the COVID-19 pandemic: 3851 ± 22.83.4 versus 2446.7 ± 2477.6 MET-min/wk ($P < 0.0001$) and 3593.8 ± 2094.3 versus 2122.6 ± 2373.8 MET-min/wk ($P < 0.0001$) among medical and administrative groups, respectively. Also, the mean of MET-total in the study participants (n = 449) showed a statistically significant decrease during the pandemic compared with before the pandemic: 3785.5 ± 2237.09 versus 2363 ± 2452.90 ($P < 0.0001$).

Although the mean total PA (MET-min/wk) of the study participants during the COVID-19 pandemic was lower than before, results showed that there is no significant difference between PAs (MET-min/wk) among both job group categories (medical and administrative) before (3851.4 ± 2283.4 vs 3593.8 ± 2094.3; $P = 0.26$) and during the COVID-19 pandemic (2446.7 ± 2477.6 vs 2122.6 ± 2373.8; $P = 0.12$).

MET-vigorous was decreased during the pandemic, and the difference was significant in the medical group ($P < 0.0001$); however, in office workers, this association was not statistically significant ($P = 0.22$). In addition, MET-moderate and MET calculated for walking had decreased significantly during the pandemic and lockdown compared with before in both job group classifications ($P < 0.0001$) (Fig. 3).

Results of the IPAQ scoring showed that before the COVID-19 pandemic 1.6% of total participants were low-active (<600 MET-min/wk); however, during the pandemic, this ratio reached 27.6%, which indicates an increase of more than 17 times in low-active participants.

The percentage of moderately active person (600 MET-min/wk) did not show significant difference before and during the pandemic (42.1% vs 41.2%, respectively), whereas in vigorous activity (3000 MET-min/wk), it was 56.3% before versus 31.2% during the pandemic, which showed that the level of vigorous activity among participants has decreased during the pandemic (Table 4).

As shown in Table 5, logistic regression models were applied to estimate the odds ratios and 95% confidence intervals of ΔPA. In the univariate logistic model, the variables of gender, shiftworking, and medical job showed a significant relationship with changes in PA (ΔPA) before and during the COVID-19 pandemic; thus, being a woman, having shiftwork, and medical role were protective factors against decreasing changes in PA. Similar results were obtained in the multivariate logistics model.

DISCUSSION

To our knowledge, this is the first study to assess the impact of the COVID-19 pandemic restrictions on the PA behavior of Iranian HCWs. Although many cohort studies have been performed on the

TABLE 1. Characteristics and Levels of Physical Activity Among Study Participants

Demographic variable	n (%)	Levels of Physical Activity			*P*
		Low, n (%)	Moderate, n (%)	High, n (%)	
Age					
20–29 y	35 (7.8)	9 (7.3)	15 (8.1)	11 (7.9)	0.8
30–39 y	206 (45.9)	62 (50)	82 (44.3)	62 (44.3)	
40–49 y	154 (34.3)	41 (33.1)	61 (33)	52 (37.1)	
≥50 y	54 (12)	12 (9.7)	27 (14.6)	15 (10.7)	
Sex					
Male	188 (41.9)	46 (37.1)	73 (39.5)	69 (49.3)	0.09
Female	261 (58.1)	78 (62.9)	112 (60.5)	71 (50.7)	
Work experience					
<5 y	61 (13.6)	14 (11.3)	28 (15.1)	19 (13.6)	0.2
6–15 y	209 (46.5)	65 (52.4)	84 (45.4)	60 (42.9)	
16–24 y	120 (26.7)	36 (29)	48 (25.9)	36 (25.7)	
≤25 y	59 (13.1)	9 (7.3)	25 (13.5)	25 (17.9)	
Marital status					
Never married/cohabiting	40 (8.9)	6 (4.8)	24 (13)	10 (7.1)	0.1
Married	393 (87.5)	114 (91.9)	154 (83.2)	125 (89.3)	
Divorced/separated/widowed	16 (3.6)	4 (3.2)	7 (3.8)	5 (3.6)	
Family members dead					
Yes	36 (8)	16 (12.9)	8 (4.3)	12 (8.6)	0.02
No	413 (92)	108 (87.1)	177 (95.7)	128 (91.4)	
Positive history of COVID-19					
Yes	30 (6.7)	9 (7.3)	13 (7)	8 (5.7)	0.8
No	419 (93.3)	115 (92.7)	172 (93)	132 (94.3)	
Family history of COVID-19					
Yes	121 (26.9)	39 (31.5)	46 (24.9)	36 (25.7)	0.4
No	328 (73.1)	85 (68.5)	139 (75.1)	104 (74.3)	
Time spent focusing on the COVID-19 news per day					
Nonuser	36 (8)	14 (11.3)	12 (6.5)	10 (7.1)	0.3
≤2 h	338 (75.3)	95 (46.6)	137 (74.1)	106 (75.7)	
>2 h	75 (16.7)	15 (12.1)	36 (19.5)	24 (17.1)	
Educational attainment					
Diploma or less	104 (23)	24 (19.5)	49 (26.6)	31,922.1)	0.3
University	257 (57.4)	789 (63.4)	103 (56)	76 (54.3)	
Postgraduate	86 (19.2)	21 (17.1)	32 (17.4)	33 (23.6)	
Shiftwork					
Yes	274 (61)	59 (47.6)	118 (63.8)	97 (69.3)	0.001
No	175 (39)	65 (52.4)	67 (36.2)	43 (30.7)	
Job group					
Medical	334 (74.4)	86 (69.4)	139 (75.1)	109 (77.9)	0.27
Administrative	115 (26.6)	38 (30.6)	46,924.9)	31 (22.1)	

health of medical staff, to our knowledge, in Iran no study has been conducted with a comparative approach to the effect of this pandemic on the amount of PA of health staff before and during the pandemic. The studies that have been published in this field until now have been either on the whole population or on a specific age group.[23–26] To date, the only longitudinal study to investigate the effect of the pandemic on PA has been performed by Meyer et al.[27]

Our results illustrate that the total PA in participants during the pandemic period was 36.5% lower than that before COVID-19. The present study showed that PA decreased during the pandemic compared with before in both groups of HCWs (medical and administrative), and this decrease was seen in three domains of PA including WRPA, TPA, and LTPA. We found that participants who became more inactive on PA levels during the COVID-19 pandemic were most likely men, nonshiftworkers, and employed in the administrative department.

With the news of the transmission of COVID-19 virus to other parts of the world, a wave of anxiety and panic swept through all countries. After a short time, the virus entered Iran and quickly infected all its provinces and cities and spread to all parts of the country.[3]

The high mortality rate of the virus, as well as the high prevalence of the virus, led the authorities' establishment to quarantine individuals and cities to be able to reduce the spread of the virus. With the implementation of the lockdown and restriction program in Iran, people's lives went

TABLE 2. Levels of the Physical Activity According to Domains Before and During COVID-19 Epidemic

	Prior COVID-19, Mean ± SD	During COVID-19, Mean ± SD	*P* (Paired *t* Test)
WRPA (MET-min wk)			
Medical	1,418.6 ± 1,731.5	267.2 ± 1,113.4	0.0001
Administrative	679.9 ± 1,235.3	85 ± 547.1	0.0001
Total (n = 449)	1,229.4 ± 1,649.6	220.5 ± 1,002.0	0.0001
TPA (MET-min wk)			
Medical	1,994.9 ± 1,463.2	908.05 ± 1,268.2	0.0001
Administrative	2,179.8 ± 1,397.1	775.8 ± 1,000.0	0.0001
Total (n = 449)	2,042.2 ± 1,447.3	874.1 ± 1,205.5	0.0001
DGPA (MET-min wk)			
Medical	354.9 ± 468.6	846.1 ± 1,276.5	0.0001
Administrative	309.2 ± 539.04	816.4 ± 1,157.1	0.0001
Total (n = 449)	343.2 ± 487.4	838.5 ± 1,245.9	0.0001
LTPA (MET-min wk)			
Medical	598.6 ± 1,019.2	425.2 ± 863.6	0.002
Administrative	683.8 ± 993.9	445.4 ± 1,026.7	0.03
Total (n = 449)	620.4 ± 1,012.4	430.4 ± 907.06	0.0001

DGPA, domestic and gardening physical activity; LTPA, leisure-time physical activity; MET, metabolic equivalent; TPA, transport-related physical activity; WRPA, work-related physical activity.

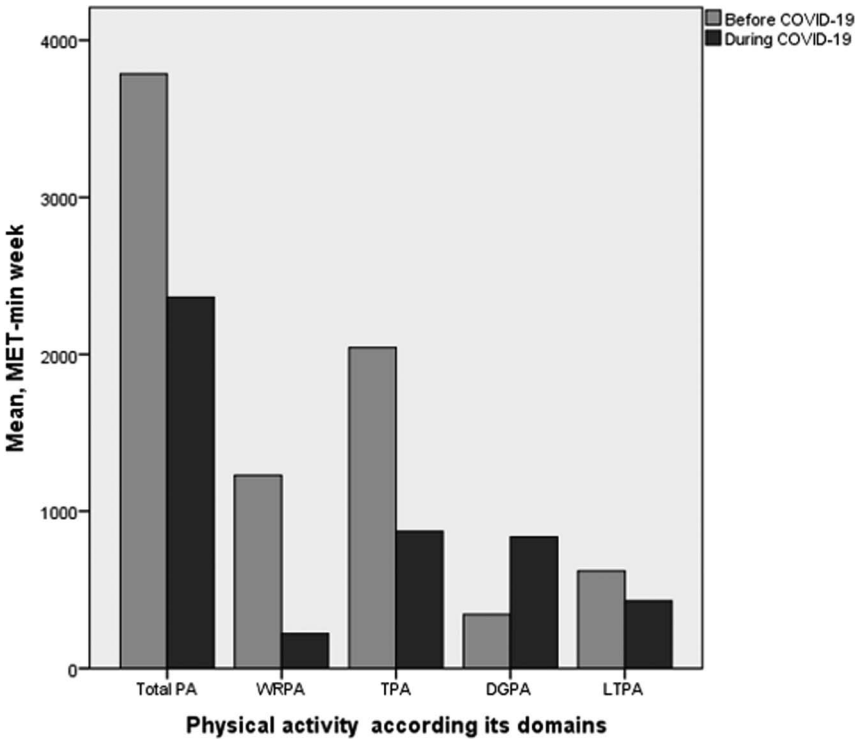

FIGURE 2. Physical activity among study's participation according to domains.

out of the ordinary and were disrupted in general, and they had to spend many hours at home without any activity outside the house.[28]

One of the most serious threats of this pandemic is its impact on PA at work and outside the home that many researchers pointed to and considered the necessary measures to solve this problem as one of the basic measures.[29] With the implementation of quarantine, the activities of businesses were very limited, and some of them were completely closed. People with governmental jobs were divided into two groups: the first group comprised those with medical and paramedical occupations who had to be present at work all the time, and the other group comprised those employees who were able to work remotely and via working from home also.[30] In studies conducted on different populations, the effects of quarantine on nutrition, mental health, and sleep have also been shown.[29,31,32]

We showed that total PA in participants in this study decreased by more than one-third during the pandemic period. This finding was consistent with the results of a study conducted by Meyer et al.[27] According to their report, a decrease in PA at the post-COVID period was seen among previously active participants; however, no change was observed among previously inactive participants. This difference is probably due to working from home among our administrative subjects, which has led to a further reduction in PA in the post-COVID period.

Also, in a study by Lesser and Nienhuis,[8] 40% of participants reported a decrease in PA after the pandemic. Our study showed that PA decreased during the pandemic compared with before in both groups of HCWs (medical and administrative), and this decrease was seen in three domains of PA, including WRPA, TPA, and LTPA. This finding is consistent with the results of a study by Romero-Blanco et al,[31] whereas in our study DGPA domain showed an increase. In fact, due to restrictions, such as in going to public places, clubs, walking, and taking children to recreational places and parks, people were forced to provide some of this entertainment indoors for themselves and their children; for example, they were spending many hours to play with their children or were follow club-related activities through social media at home. It seems to be the main reason for increased PA at home.[8,32]

TABLE 3. Comparison of Physical Activity in Medical and Administrative Job Groups Before and During COVID-19

MET, min/wk	Medical	*P*	Δ-MET	Administrative	*P*	Δ-MET
Vigorous	564.4 ± 1,232.9	0.006	221.84 ± 1,451.6	346.4 ± 645.9	0.22	110.53 ± 971.1
Pre–COVID-19						
During COVID-19	342.5 ± 989.3			235.9 ± 798.7		
Moderate	2,318.5 ± 1,517.1	0.001	713.2 ± 2,269.8	2,443.6 ± 1,505.1	0.001	976.4 ± 2,191
Pre–COVID-19						
During COVID-19	1,605.2 ± 1,810.6			1,467.1 ± 1,632.5		
Walking	1,018.5 ± 1,145.5	0.0001	519.6 ± 1,228.7	828.01 ± 965.05	0.001	408.3 ± 1,161.7
Pre–COVID-19						
During COVID-19	498.9 ± 728.06			419.6 ± 703.3		
Total	3,851.4 ± 2,283.4	0.0001	1,404.7 ± 3,250.2	3,593.8 ± 2,094.3	0.0001	1,471.1 ± 3,152.08
Pre–COVID-19						
During COVID-19	2,446.7 ± 2,477.6			2,122.6 ± 2,373.8		

MET, metabolic equivalent.

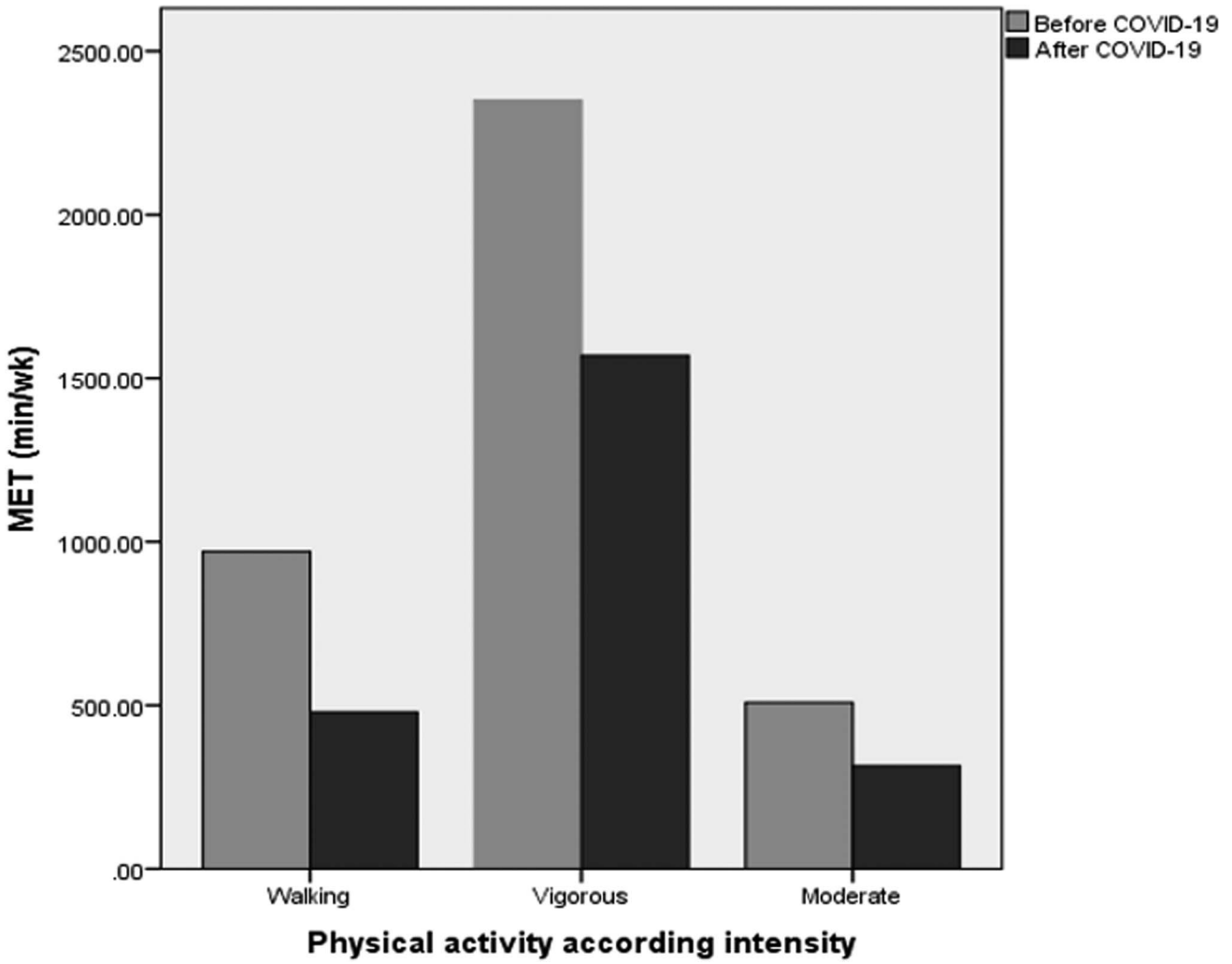

FIGURE 3. Physical activity among study's participation according to intensity.

In this study, the classification of PA was based on the overall score obtained from the calculation of the MET into three categories: moderate, severe, and the amount of energy expenditure during walking; the results indicated that energy expenditure and time spent in PA decreased at all three levels and in both occupational groups compared with before the pandemic, as shown in other studies.[28,33]

Although the main reason for the decrease in PA during the COVID-19 pandemic was the imposed restrictions,[34] PA among administrative staff was decreased because of the possibility of working at home during the pandemic; however, clinical HCWs who were exposed to patient suffering and death, outbreak anxiety, family involvement with COVID-19, and loss of family and relatives seem to have less motivation to engage in leisure activities and ultimately become less active.[34,35]

Based on the qualitative classification of PA, it was also observed that the number of people who had previously reported moderate to severe activity decreased during the pandemic period. Instead, the number of inactive people increases. This finding was consistent with the results of other studies[27,31,33,34,36] It seems being in quarantine situation leads to a sedentary lifestyle, which is not good for health.[37]

Our results suggest the high level of PA related to men; this finding is in line with the results of the study by Constandt et al.[36] However, the decrease in PA occurred less in women than in men

TABLE 4. Classification of Participants According to IPAQ Scoring Prior and During COVID-19

	Total (n = 449)	Medical (n = 334)	Administrative (n = 115)
Low-active level before COVID-19	7 (1.6)	4 (1.2)	3 (2.6)
Low-active level during COVID-19	124 (27.6)	86 (25.7)	38 (33)
Moderately active level before COVID-19	189 (42.1)	144 (43.1)	45 (39.1)
Moderately active level during COVID-19	185 (41.2)	139 (41.6)	46 (40)
Highly active level before COVID-19	253 (56.3)	186 (55.7)	67 (58.3)
Highly active level during COVID-19	140 (31.2)	109 (32.6)	31 (27)

IPAQ, International Physical Activity Questionnaire.

TABLE 5. Association Between PA Differences and Its Related Risk Factors Using Univariate and Multivariate Logistic Regression Before and During the COVID-19 Epidemic Among HCWs

PA Differences Characteristic Variable	PA Decreasing, n (%)	*P*	OR (95% CI)
Gender			
Female	199 (76.2)	**0.006**	0.563 (0.372–0.850)
Male	121 (64.4)		1
Age categories			
20–29 y	25 (71.4)	0.499	1.4 (0.528–3.709)
30–39 y	142 (68.9)	0.206	1.577 (0.779–3.196)
40–49 y	111 (72.1)	0.415	1.356 (0.652–2.819)
≤50 y	42 (77.8)		1
Shiftworking			
Yes	182 (66.4)	**0.005**	0.530 (0.341–0.824)
No	138 (78.9)		1
Marital status			
Never married	29 (72.5)	0.779	0.834 (0.236–2.955)
Married	280 (71.2)	0.829	0.888 (0.302–2.613)
Divorced/separated/widowed	11 (68.8)		1
Educational attainment			
Diploma or less	70 (67.3)	0.591	1.185 (0.637–2.203)
University	187 (72.8)	0.742	0.913 (0.532 –1.568)
Postgraduate	61 (70.9)		1
Job group			
Medical	229 (68.6)	**0.032**	0.575 (0.347–0.954)
Administrative	91 (79.1)		1
Work experiences			
≥5 y	40 (65.6)	0.744	0.883 (0.419–1.863)
6–15 y	155 (74.2)	0.087	0.586 (0.318–1.080)
16–24 y	88 (73.3)	0.147	0.612 (0.315–1.189)
≤25 y	37 (62.7)		1
Family members dead			
Yes	25 (69.4)	0.801	0.909 (0.433–1.907)
No	295 (71.4)		1
Positive history of COVID-19			
Yes	24 (80)	0.208	1.662 (0.663–4.167)
No	296 (70.6)		1
Family history of COVID-19			
Yes	88 (72.7)	0.678	1.103 (0.693–1.757)
No	232 (70.7)		1
Time spent focusing on the COVID-19 news per day			
Nonuser	23 (63.9)	0.387	1.453 (0.632–3.389)
≤2 h	243 (71.9)	0.985	1.605 (0.576–1.755)
>2 h	54 (72)		

Multivariate Logistic Regression Variables	*B*	SE	*P*	OR (95% CI)
Gender				
Female	0.618	0.215	**0.004**	0.538 (0.354–0.821)
Male				1
Shiftworking				
Yes	0.714	0.239	**0.003**	0.490 (0.306–0.783)
No				1
Job group				
Medical	0.865	0.277	**0.002**	0.421 (0.255–0.725)
Administrative				1
Positive history of COVID-19				
Yes	0.230	0.458	0.616	0.795 (0.324–1.950)
No				1

CI, confidence interval; HCW, health care worker; OR, odds ratio; PA, physical activity.

during the pandemic, which may be due to the fact that most of the female HCWs in our samples had medical roles with shiftworking schedules, and they were less able to work from home. Therefore, the orientation of education and advertising to increase PA will be with priority for men and administrative department employees.

In the present study, according to the data of the HCWs' cohort study (SHAHWAR) in which complete medical and psychological information of the staff of SHMU was collected, we were able to compare the PA of the samples in two time periods: before and after the pandemic. Its factor can help reduce bias in our study and strengthen its power. However, there are some limitations that need to be noted. First, the reported PAs were subjective, and we could not measure the objective components of PA. Second, because the data of the present study are derived from a single-center survey, its generalizability should be approached with caution.

CONCLUSION

Physical activity levels in HCWs generally decreased in the first weeks of COVID-19 in the present study. Promoting PA at home and leisure by designing and implementing methods to ensure that the target population can achieve adequate levels of PA recommended by the World Health Organization in situations such as lockdown among various groups of people in the community is recommended.

ACKNOWLEDGMENTS

The authors thank the managers and staff of the SHAHWAR cohort study for helping them to conduct this study.

REFERENCES

1. Del Rio C, Collins LF, Malani P. Long-term health consequences of COVID-19. *JAMA*. 2020;324:1723–1724.
2. Blaisdell LL, Cohn W, Pavell JR, Rubin DS, Vergales JE. Preventing and mitigating SARS-CoV-2 transmission—four overnight camps, Maine, June–August 2020. *Morb Mortal Wkly Rep*. 2020;69:1216–1220.
3. Sadeghian F, Mirrezaie SM, Khoramrooz M, Fardid M, Zare F, Rohani-Rasaf M. SARS-CoV2 among Health sector workers and related factors in a referral hospital in Northeast of Iran: a retrospective analysis. *Hosp Top*. 2022; 100:35–43.
4. Siordia JA Jr. Epidemiology and clinical features of COVID-19: a review of current literature. *J Clin Virol*. 2020;127:104357.
5. Crochemore-Silva I, Knuth AG, Wendt A, et al. Physical activity during the COVID-19 pandemic: a population-based cross-sectional study in a city of South Brazil. *Cien Saude Colet*. 2020;25:4249–4258.
6. Robinson E, Boyland E, Chisholm A, et al. Obesity, eating behavior and physical activity during COVID-19 lockdown: a study of UK adults. *Appetite*. 2021;156:104853.
7. Amini H, Isanejad A, Chamani N, et al. Physical activity during COVID-19 pandemic in the Iranian population: a brief report. *Heliyon*. 2020;6:e05411.
8. Lesser IA, Nienhuis CP. The impact of COVID-19 on physical activity behavior and well-being of Canadians. *Int J Environ Res Public Health*. 2020;17:3899.
9. Forsyth JJ, Makay L, Riley V. Perceptions of physical activity changes due to COVID-19 restrictions among women in the United Kingdom. *Women Sport Phys Act J*. 2021;1:1–10.
10. Alah MA, Abdeen S, Kehyayan V, Bougmiza I. The impact of changes in work arrangements during COVID-19 pandemic on the lifestyle of Qatar's working population. *J Occup Environ Med*. 2022;64:e53.
11. Woods J, Hutchinson NT, Powers SK, et al. The COVID-19 Pandemic and Physical Activity. *Sports Med Health Sci*. 2020;2:55–64.
12. Dowlati Y, Herrmann N, Swardfager W, et al. A meta-analysis of cytokines in major depression. *Biol Psychiatry*. 2010;67:446–457.
13. Stockwell S, Trott M, Tully M, et al. Changes in physical activity and sedentary behaviours from before to during the COVID-19 pandemic lockdown: a systematic review. *BMJ Open Sport Exerc Med*. 2021;7:e000960.
14. Schwartz RM, McCann-Pineo M, Bellehsen M, et al. The impact of physicians' COVID-19 pandemic occupational experiences on mental health. *J Occup Environ Med*. 2022;64:151.
15. Halabchi F, Ahmadinejad Z, Selk-Ghaffari M. COVID-19 epidemic: exercise or not to exercise; that is the question. *Asian J Sports Med*. 2020;11:e102630.
16. Poustchi H, Eghtesad S, Kamangar F, et al. Prospective epidemiological research studies in Iran (the PERSIAN cohort study): rationale, objectives, and design. *Am J Epidemiol*. 2018;187:647–655.
17. Zare F, Sadeghian F, Alatab S, Chaman R, Mirrezaie SM. COVID-19 epidemic effects on sleep quality among health sector workers: a follow up study. *Chronobiol Int*. 39:1015–1026.
18. Karyani AK, Matin BK, Soltani S, et al. Socioeconomic gradient in physical activity: findings from the PERSIAN cohort study. *BMC Public Health*. 2019; 19:1312.
19. Jetté M, Sidney K, Blümchen G. Metabolic equivalents (METS) in exercise testing, exercise prescription, and evaluation of functional capacity. *Clin Cardiol*. 1990;13:555–565.
20. Forde C. Scoring the International Physical Activity Questionnaire (IPAQ). 2018.
21. Gholami Fesharaki M, AzadMarzabadi E. Evaluation of the reliability and validity of Azad-Fesharaki's Physical Activity Questionnaire (AFPAQ). *J Arak Uni Med Sci*. 2011;14:36–44.
22. Teh KC, Aziz AR. Heart rate, oxygen uptake, and energy cost of ascending and descending the stairs. *Med Sci Sports Exerc*. 2002;34:695–699.
23. Abu Saad H, Low PK, Jamaluddin R, Chee HP. Level of physical activity and its associated factors among primary healthcare workers in Perak, Malaysia. *Int J Environ Res Public Health*. 2020;17:5947.
24. Kunene SH, Taukobong NP. Level of physical activity of health professionals in a district hospital in KwaZulu-Natal, South Africa. *S Afr J Physiother*. 2015;71:234.
25. Castañeda-Babarro A, Arbillaga-Etxarri A, Gutiérrez-Santamaría B, Coca A. Physical activity change during COVID-19 confinement. *Int J Environ Res Public Health*. 2020;17:6878.
26. Srivastav AK, Sharma N, Samuel AJ. Impact of coronavirus disease-19 (COVID-19) lockdown on physical activity and energy expenditure among physiotherapy professionals and students using Web-based open E-survey sent through WhatsApp, Facebook and Instagram messengers. *Clin Epidemiol Glob Health*. 2021;9:78–84.
27. Meyer J, McDowell C, Lansing J, et al. Changes in physical activity and sedentary behavior in response to COVID-19 and their associations with mental health in 3052 US adults. *Int J Environ Res Public Health*. 2020;17:6469.
28. Ammar A, Brach M, Trabelsi K, et al. Effects of COVID-19 home confinement on eating behaviour and physical activity: results of the ECLB-COVID19 international online survey. *Nutrients*. 2020;12:1583.
29. Margaritis I, Houdart S, El Ouadrhiri Y, Bigard X, Vuillemin A, Duché P. How to deal with COVID-19 epidemic-related lockdown physical inactivity and sedentary increase in youth? Adaptation of Anses' benchmarks. 2020;78:52.
30. Jaiswal A, Arun CJ. Unlocking the COVID-19 lockdown: work from home and its impact on employees. 2020. https://doi.org/10.21203/rs.3.rs-34556/v1.
31. Romero-Blanco C, Rodríguez-Almagro J, Onieva-Zafra MD, Parra-Fernández ML, Prado-Laguna MDC, Hernández-Martínez A. Physical activity and sedentary lifestyle in university students: changes during confinement due to the COVID-19 pandemic. *Int J Environ Res Public Health*. 2020;17:6567.
32. Brouard S, Vasilopoulos P, Becher M. Sociodemographic and psychological correlates of compliance with the COVID-19 public health measures in France. *Can J Polit Sci*. 2020;53:253–258.
33. Cheval B, Sivaramakrishnan H, Maltagliati S, et al. Relationships between changes in self-reported physical activity, sedentary behaviour and health during the coronavirus (COVID-19) pandemic in France and Switzerland. *J Sports Sci*. 2021;39:699–704.
34. Coughenour C, Gakh M, Pharr JR, Bungum T, Jalene S. Changes in depression and physical activity among college students on a diverse campus after a COVID-19 stay-at-home order. *J Community Health*. 2021;46:758–766.
35. Galehdar N, Kamran A, Toulabi T, Heydari H. Exploring nurses' experiences of psychological distress during care of patients With COVID-19: a qualitative study. *BMC Psychiatry*. 2020;20:489.
36. Constandt B, Thibaut E, De Bosscher V, Scheerder J, Ricour M, Willem A. Exercising in times of lockdown: an analysis of the impact of COVID-19 on levels and patterns of exercise among adults in Belgium. *Int J Environ Res Public Health*. 2020;17:4144.
37. Khoramipour K, Basereh A, Hekmatikar AA, Castell L, Ruhee RT, Suzuki K. Physical activity and nutrition guidelines to help with the fight against COVID-19. *J Sports Sci*. 2021;39:101–107.