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Physical activity levels and related sociodemographic factors among Iranian adults: Results from a population-based national STEPS survey

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Abstract

Background: Physical inactivity (PA) is one of the leading modifiable risk factors for noncommunicable diseases (NCDs) worldwide. This study aimed to determine PA levels and related sociodemographic factors as risk factors for NCDs among Iranian adults.

Methods: In this cross sectional study, data were collected from the sixth nationwide STEPS survey in 31 provinces of Iran. A total of 6100 individuals aged 18-64 years were selected by a multistage cluster sampling method, and their PA levels were assessed using the Global Physical Activity Questionnaire (GPAQ). Data were analyzed using descriptive methods and analytical tests, including chi-square, ANOVA, and independent t tests in SPSS version 21 software.

Results: The prevalence of vigorous, moderate, and low levels of PA was 36.3% (95%CI:35.1-37.5), 29.2% (95%CI:28-30.3), and 34.5% (95%CI:33.3-35.7) in participants, respectively. The mean ± SD of total MET-min/week was 1842.3±2619.3. Total mean ± SD duration of PA was 98.2 ± 115 min/week (125.8±142.6 and 77.2±84.5 min/week in men and women, respectively). Transport-related PA and severe PA at work had large and small contributions to overall PA, respectively. Urbanization, sex, age, family size, and occupation status were identified as factors associated with PA levels ($p<0.001$).

Conclusion: This study revealed a significant prevalence of low PA among the target population and some sociodemographic characteristics identified as factors associated with PA. Identification of these factors can develop more effective interventions to promote PA.

Keywords: Physical activity, Noncommunicable diseases, Population surveillance, STEPs Survey

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Introduction

Insufficient physical activity (PA) is an established modifiable risk factor for noncommunicable diseases (NCDs), such as cardiovascular diseases (CVDs), some cancers, and type 2 diabetes mellitus (1-3). Regular PA plays an important role in prevention of these diseases via effect on body mass index (BMI), body fat mass, blood pressure, blood glucose, insulin sensitivity, lipid profile, low-density lipoprotein cholesterol, etc., and generally it

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↑What is "already known" in this topic:
Insufficient physical activity (PA) is a modifiable determinant for noncommunicable diseases, and regular PA plays an important role in its prevention. Most studies reported that Iranian adults do not meet the global recommendations of PA. The association between sociodemographic characteristics and level/intensity of PA has been established in previous studies.

→What this article adds:
This study revealed the prevalence of vigorous, moderate, and low-level PA among Iranian adult population. In addition, this study can help to describe sociodemographic factors for insufficient PA. Highlighting these characteristics will provide evidence for public health efforts to improve PA levels in the Iranian population.

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has been associated with reducing medical care costs and improving health-related variables (2, 4-6). However, unfortunately, according to the World Health Organization (WHO) report, worldwide, 1 in 4 adults is not physically active enough (1). In the Middle East region, high prevalence rates of physical inactivity has been reported (7). Most studies also reported that Iranian adults do not meet the global recommendations of PA (8). Results of studies have shown that the levels of PA among adults has declined in recent decades and an increase in the prevalence of insufficient PA was seen (9,10).

Metabolic equivalents (METs) are used to calculate intensity of total PA, which is defined as the ratio of a person's working metabolic rate during exercise to the metabolic rate at rest (2,11,12). One MET is defined as the energy cost of sitting quietly and is equivalent to a caloric consumption of 1 kcal/kg/hour. MET is used for the analysis of global physical activity questionnaire (GPAQ) data. According to the GPAQ scoring protocol, if total PA MET minutes per week is < 600, it does not meet WHO recommendations on PA for health (13).

The WHO STEPwise approach to surveillance (STEPS) is an effective method for collecting and analyzing data. The conceptual framework of this approach includes three steps of risk factor data assessment: (1) ecological and behavioral risk factors measurement, (2) physical measurement, and (3) biochemical measurement. Use of this approach allows monitoring risk factors for NCDs and uptaking prevention and control activities (14,15).

Social determinants, including sociodemographic variables, are associated with the prevalence of NCDs, and in this context, the association between sociodemographic characteristics and the level and intensity of PA was established in previous studies (6,16).Therefore, a nationwide population-based survey can be helpful in determining the distribution of sociodemographic determinants of these diseases (17). Considering the increase in the incidence and prevalence of NCDs worldwide and, consequently in Iran, conducting such studies can be useful in identifying some social determinants of these diseases and their risk factors. Conducting surveillance studies and identifying these characteristics can provide valuable nationwide information for planning effective public health policies and intervention and monitoring efforts to promote PA among high-risk population groups according to the such social pattern (3,18,19).Therefore, this study was conducted to determine PA levels and related sociodemographic factors among Iranian adults.

Methods

Design and population

In this cross sectional study, data were analyzed from the sixth-round nationwide survey on NCDs risk factors using STEPS approach in Iran. In the main survey, all Iranian people aged 6 to 70 years living in 31 provinces of Iran were considered as the target population. In this study, data about adults aged 18-64 years were analyze, according to global recommendations on PA (20). A total of 12 000 Iranian people were selected via multistage cluster random sampling and participated in this survey. At first, every big city or several small cities were considered as primary sampling units (PSUs). Then, a systemic random sample was selected from the PSU list and urban/rural was considered as the secondary sampling unit (SSU); thus, 12 SSU were selected from each PSU using systematic random method. Next, executive clusters, consisting of 20 households in each SSU,were determined and 20 samples were placed in each executive cluster. Households were randomly selected based on postal code. Then, the qualified person was randomly selected from each selected household by KISH method.

In KISH method, first, a list of eligible people per household was provided. At each age group, men and women were sorted in order of age. In KISH table, we looked up the column for the digit on the right side of the household code, and the row for the total number of eligible people of households from that age group. The number in the cell where the column and row meet was the person to interview.

Implementation and data collection

In the main survey, data were collected based on 3 phases of STEPS approach: (1) demographic information, (2) behavioral risk factors measurements, and (3) physical and biochemical measurements. In this study, only the first step of data collection was discussed.

Prior to the implementation of the survey, all interviewers and executive teams were trained in the field of all stages of survey, including the 3 steps measurements. During the survey, these measurements were controlled and monitored periodically by city and province observers; then, they were reported to higher level officials. At first, all trained interviewers explained the goals of the survey and obtained verbal informed consents from eligible participants. Interviewers completed a standard questionnaire via a face-to-face interview. Finally, they measured physical and biochemical factors.

Questionnaire

In this study, PA levels were assessed using GPAQ. This questionnaire has been developed by WHO and has been used in most population-based studies using STEPS approach (21). The questionnaire included 16 questions about the frequency and duration of PA (min/day) and 3 different domains, including PA at work, PA at travel to and from places, and recreational activities in a normal active week for the participants. The frequency and duration of PA (min/day) of participation in these domains over a typical week are recorded. According to GPAQ protocol, low-level PA is assigned a score below 600 METminutes/week, moderate level PA a score of 600-1500 MET-minutes/week, and vigorous level PA a score more than 1500 MET-minutes/week (13,22). To analyze GPAQ data, 4 METs are assigned to the time spent in moderate activities and 8 METs to the time spent in vigorous activities. To calculate a categorical indicator, the total time spent in PA during a typical week and the intensity of the PA are taken into account. Total PA MET-minutes/week is the sum of the total MET/minutes/week of activity computed for each setting (13).

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Statistical analysis

Collected data were analyzed in SPSS version 21 (IBM Corp., Chicago, IL, USA). For data analysis, descriptive methods such as the mean ± SD and frequency (%) and analytical tests, including chi-square, ANOVA, and independent t tests, were used.

Ethical consideration

The study protocol conformed to the ethical guidelines of the 1975 Declaration of Helsinki, and it was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences. Moreover, consent of the participants, confidentiality of personal data, and free measurements were considered.

Results

The data of 6100 people aged 18-64 years (43.1% men and 56.9% women) were analyzed. Of the participants, 24.6% were 25-34 years old, and the majority (69.7%) of the participants lived in urban areas. Family size of 66.3% of the participants was 2-4. Also, 48.6% of the participants had Fars ethnicity. In terms of education level and occupation status, 36.2% of the participants did not finish high school and 43.6% were housewives.

The prevalence of vigorous level PA in participants was 36.3% (95%CI:35.1-37.5). Further, 29.2% (95%CI:28-30.3) of the participants had moderate level PA and 34.5% (95%CI:33.3-35.7) low level PA. Also, 37.6% of the participants aged 25-34 years had low level PA (Table 1). Moreover, 40.1% of the participants aged 55-64 years and 38.5% of those aged 18-24 years had vigorous PA. The highest rate of vigorous level PA was found among rural residents (40.1%). Lor ethnicity had the highest rate of vigorous level PA (53.3%), while 44.3% of people with Baloch ethnicity had low-level PA. In terms of family size, 40.7% of single or divorced people had low-level PA, whereas 40.5% of the participants with 5 and above family size had vigorous low-level PA. In terms of occupation status, 41.6% of homemakers had the highest low-level PA.

In this study, the mean ± SD of the total MET-min/week was 1842.3±2619.3. Total mean ± SD duration of PA was 98.2±115 min/week. The highest mean±SD duration of PA was related to transport-related PA (56.3±62.9 min/week), which was higher in men than in women (66.7±77.4) vs 48.4±47.6) min/week, t=10.6, p<0.001, 95% CI: 14.9-21.6) Tables 2 and 3). The lowest mean ± SD duration of PA was related to severe PA at work, which was also higher in men than in women (4.7±34.5 vs 1.3 ± 18.8 min/week, t=4.5, p<0.001, 95% CI: 1.9-4.8). Accordingly, the highest mean ± SD of MET-min/week belonged to transport related PA (1116.1±1475.5) and the

*Table 1.*PA levels according to sociodemographic characteristics in the population study

Characteristics		PA level			p*
		Low level PA	Moderate-intensity PA	Vigorous-intensity PA	
		n (%)	n (%)	n (%)	<0.001
Age groups (year)	18-24	432(33.4)	363(28.1)	497(38.5)	
	25-34	564(37.6)	424(28.3)	512(34.1)	
	34-44	360(37.2)	306(31.6)	303(31.3)	
	45-54	336(34.1)	287(29.2)	361(36.7)	
	55-64	413(30.5)	399(29.4)	543(40.1)	
Residency	Urban	1454(34.2)	1324(31.1)	1476(34.7)	<0.001
	Rural	651(35.3)	455(24.6)	740(40.1)	
Sex	Male	688(26.1)	726(27.6)	1217(46.3)	<0.001
	Female	1417(40.9)	1053(30.4)	998(28.8)	
Ethnicity	Baloch	70(44.3)	46(29.1)	42(26.6)	<0.001
	Turk	460(33)	417(29.9)	519(37.2)	
	Turkoman	32(42.1)	24(31.6)	20(26.3)	
	Sistani	17(36.2)	17(36.2)	13(27.7)	
	Arab	30(33)	21(23.1)	40(44)	
	Fars	1096(37.3)	869(29.5)	977(33.2)	
	Kurd	172(32.3)	152(28.6)	208(39.1)	
	Gilak	84(31)	83(30.6)	104(38.4)	
	Lor	108(21.3)	129(25.4)	270(53.3)	
	Multiethnic	14(40)	10(28.6)	11(31.4)	
Education Level	Illiterate	439(36.4)	324(26.8)	444(36.8)	0.053
	Under Diploma	778(35.3)	631(28.6)	798(36.2)	
	Diploma	563(34.4)	481(29.4)	594(36.3)	
	Academically	324(31)	342(32.7)	379(36.3)	
Family size	1	66(40.7)	52(32.1)	44(27.2)	<0.001
	2-4	1451(36)	1182(29.3)	1403(34.8)	
	5 and above	584(30.9)	543(28.7)	766(40.5)	
Occupation Status	Housewife	1098(41.6)	785(29.7)	758(28.7)	<0.001
	Retried	95(22.9)	123(29.7)	196(47.3)	
	Unemployed	103(28.5)	95(26.2)	164(45.3)	
	Worker and employee	266(31.6)	251(29.8)	325(38.6	
	Self-employed	321(27.5)	330(28.2)	518(44.3)	
	Student and soldier and unpaid work	206(32.6)	183(29)	243(38.4)	

*p-values are from chi-square test.

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Table 2. Comparison of PA duration by sex in the population study

PA Duration in minutes	Male Mean±SD*	Female Mean±SD	Total Mean±SD	p
Severe PA at work	4.7±34.5	1.3±18.8	2.7±26.8	<0.001
Moderate PA at work	9.5±50.5	6.9±34.7	8±42.2	0.020
Transport-related PA	66.7±77.4	48.4±47.6	56.3±62.9	<0.001
Severe recreational PA	15.4±48.8	3±19	8.4±35.7	<0.001
Moderate recreational PA	29.4±55.4	17.4±42.1	22.6±48.6	<0.001

* SD: Standard Deviation

Table 3. Comparison of PA pattern by sex in the population study

PA pattern (MET-Min/week)	Male Mean±SD	Female Mean±SD	Total Mean±SD	p
Severe PA at work	174.9±1456.9	35.1±570	95.4±1051.3	<0.001
Moderate PA at work	188.3±1112.3	136.7±762	159±929.8	0.040
transport-related PA	1396.4±1792.1	903±1134	1116.1±1475.5	<0.001
Severe recreational PA	317.5±1165.7	69.4±572.9	176.5±887.7	<0.001
Moderate recreational PA	351.6±767.8	252.3±737.1	295.3±752.1	<0.001

lowest mean ± SD of MET-min/week to severe PA at work (65.4±1051.3).

The mean ± SD duration of PA among men and women was 125.8±142.6 and 77.2±84.5 min/week, respectively, and this time was significantly higher among men than in women (t=15.5, p<0.001, 95% CI: 42.4-54.7). Participants aged 18-24 years had the highest total MET-min/week (F=3.1, p<0.001). Rural residents had higher mean ± SD of total MET-min/week than others (t=-4.2, p<0.001, 95% CI: -485.6-177.3). The mean ± SD of total MET-min/week was significantly higher in men than in women (t=14.6, p<0.001, 95% CI: 893.6-1170). The highest mean ± SD of total MET-min/week was found among Lor ethnicity (F=10.9, p<0.001). On occupation status, self-employed people had the highest mean ± SD of total MET-min/week (F=34, p<0.001). Higher family size was also associated with higher mean ± SD of total MET-min/week, so this mean was higher among participants with 5 and above family size (F=11.5, p<0.001). Table 4 shows total MET-min according to sociodemographic characteristics of the population study.

Table 4. Total MET-min according to sociodemographic characteristics in the population study

Characteristics		Total MET-min Mean±SD	p <0.001
Age groups (year)	18-24	2011.3±2753.7	
	25-34	1872.5±29.3	
	34-44	1642.6±2361.3	
	45-54	1749.1±2336.1	
	55-64	1858±2516.4	
Residency	Urban	1742±2446.1	<0.001
	Rural	2073.5±2968.1	
Sex	Male	2429±3187	<0.001
	Female	1396.9±197535	
Ethnicity	Baloch	1423±3120.7	<0.001
	Turk	1914.4±2773.4	
	Turkoman	1279.5±1533.1	
	Sistani	1775.7±2670.4	
	Arab	1885.7±2205.7	
	Fars	1653.7±2378.8	
	Kurd	1937.6±2750.7	
	Gilak	2007±2794.7	
	Lor	2825.3±3120	
	Multiethnic	1420±1721	
Education Level	Illiterate	1788±2622.8	0.800
	Under Diploma	1864.7±2682.9	
	Diploma	1852±2502.6	
	Academically	1824.4±2584.6	
Family size	1	1412.7±1779.2	<0.001
	2-4	1754.1±2543.3	
	5 and above	2068.2±2820.8	
Occupation Status	Housewife	1366.6±1884.9	<0.001
	Retried	2025±2619.8	
	Unemployed	2187.8±2546.2	
	Worker and employee	2278.9±3324.1	
	Self-employed	2353.6±3220.6	
	Student and soldier and unpaid work	2024.1±2720.3	

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Discussion

This study aimed to determine PA levels and related sociodemographic factors among Iranian adults. In this study, the prevalence of vigorous, moderate, and low-level PA was 36.3% (95% CI: 35.1-37.5), 29.2% (95% CI: 28-30.3), and 34.5% (95% CI: 33.3-35.7), respectively. Most previous studies in Iran revealed that PA level among Iranian adults is low and reported a higher prevalence of low-level PA (6, 8, 11, 23, 24). Some studies in other countries also showed a high prevalence of low-level PA (15, 16, 25), whereas in some other studies, most of the studied participants metWHO PA recommendations (18,26-28)

In this study, transport-related PA and severe PA at work had large and small contributions to overall PA, respectively. However, in some studies, the main contributions to overall PA were from work followed by transport-related PA (25, 26, 29, 30).This difference lies in the nature of the work and style of transportation and traffic in each community, which should be considered in the planning of PA promotion interventions.

In this study, the mean duration of PA and total MET-min/week were higher in men than in women and homemakers had the highest low-level PA than others. Women are generally more inactive than men. Most studies confirmed a significant association between being a woman and having insufficient PA and established that PA levels are generally lower in women than in men (5, 6, 11, 18, 23, 26, 28, 30-32). Women in most countries such as Iran have lower PA rate due to gender-norm, social and cultural constraints, and maternal responsibilities (33). Therefore, to promote PA level in women, it is essential to consider these limitations and their origin and take the necessary actions to change the social and cultural barriers of promoting PA among women.

Regarding residency, low-level PA was more prevalent among urban residents than the rural and vice versa. Vigorous level PA was more prevalent among rural residents and the total MET-min/week was higher among rural residents. Urbanization had a significant association with low PA in most previous studies in Iran and other countries (15, 34, 35); even in some studies, the levels of PA in rural areas were twice as high as in urban areas (30). Living in urban areas can lead to reduced levels of PA. Several factors, including overcrowding, high-volume traffic, heavy use of motorized transportation, poor air quality, and lack of safe public spaces and recreation/sports facilities make it difficult to participate in PA in urban areas (36).

Remarkable results were found on age. The highest low-level PA was found among participants aged 25-34 years, whereas the highest vigorous level PA was seen among 55-64 year-old participants. On the other hand, total MET-min was higher among participants aged 18-24 years than in others. Age as sex is a determinant factor for PA. In general, PA decreases with age and this finding is confirmed in most studies (3, 5, 6, 10, 11, 32). However, in some studies similar to the present study, some age groups may have less PA level than others even when compared to old people (34). This finding can be justified, as older people due to retirement and having more free time can spend more time on PA than young and middle-aged people. Meanwhile, old people pay more attention to their health and are more likely to be involved in health behaviors such as PA (34).

Strengths and limitations of the study

This study was important because it determined the levels of PA in terms of intensity and duration according to demographic characteristics. Such studies can provide national trends in PA to identify successful strategies to promote PA level among target populations. Sociodemographic characteristics of individuals in each community are one of the most important factors influencing the effectiveness of community-based public health programs.

The limitation of the present study was related to the cross sectional nature of the studies used in this article, which could not explore the causes of the trend, associated demographic factors, and logical causality of these associations. Hence, conducting further studies to explore these causalities is highly recommended.

Conclusion

This study determined PA levels and related sociodemographic factors as risk factors for NCDs among Iranian adults and revealed significant prevalence of low-PA among the target population. Also, urbanization, sex, age, family size, and occupation status were factors associated with PA. Although lack of sufficient PA is recognized as a major modifiable risk factor of NCDs, identifying factors influencing PA behaviors, such as sociodemographic characteistics of community members, can be an introduction to design and implement effective interventions to promote PA levels.

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Conflict of Interests

The authors declare that they have no competing interests.

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