Original Article

Sociodemographic Pattern of Physical Activity in the Northwest of Iran: Results of the Pilot Phase of the Azar Cohort Study

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Abstract

Background: Sedentary lifestyle plays a key role in the emergence of many noncommunicable diseases. Given the importance of physical activity (PA) in population-based studies, the present study was conducted to investigate the pattern of PA and its correlates in the pilot phase of Azar cohort study. **Methods:** In the pilot phase of Azar cohort study, 1236 individuals aged 35–70 years in Khameneh, a city in East Azarbaijan, Iran, were invited to participate in the study. A total of 952 individuals completed the overall and the PA questionnaire, a response rate of 82%. The PA level was evaluated using the classified PA questionnaire based on the equivalent metabolic activities. The general linear model was used to determine the factors affecting PA. **Results:** The overall mean score of PA was 36.54 (standard deviation = 5.3). In multivariate analysis, after adjustment for sociodemographic variables, total PA score was associated with gender (adjusted β = 0.014, confidence interval [CI] 95% = [0.01–0.82]), occupation (adjusted βs ranged over 0.015–0.059, (CI 95% = 0.01–0.079), level of education (adjusted βs ranged over 0.010–0.018, CI 95% = 0.001–0.026). In other word, sex (mean ranged over 35.49–36.81), educational level (mean ranged over 35.01–36.73) and occupation status (mean ranged over 34.62–39.62) were predictors of PA (all $P < 0.05$). This variable could also predict 20% of the variance of the PA. **Conclusions:** The current study identifies that gender, occupation and level of education could be factors that influence on PA level in the study population.

Keywords: *Cohort study, Iran, physical activity*

Introduction

Epidemiological studies have shown a positive and consistent relationship between sedentary lifestyle and health problems (such as cardiovascular diseases, diabetes, osteoporosis, psychological disorders, and even some cancers).[1-5] The World Health Organization has classified physical inactivity as the fourth leading risk factor for global mortality.[6] About 6% of the global causes of death are associated with diseases caused by physical inactivity, which accounts for approximately 3.2 million deaths a year across the world.[6] Despite the growing acceleration of epidemiological transition and the role played by proper physical activity (PA) in reducing the risk of different chronic diseases and mortality, a large percentage of the population (approximately 50%–60%) in many countries do not have proper levels of PA and sedentary lifestyles abound almost all over the world.[1-8] In the field of public health, researchers have always considered PA as a major risk factor and made efforts to assess its status in the society using the validate techniques.[1-8]

The pattern of PA is multifactorial, and the time spent for PAs in a different population depends on different factors. Proper interventions can be proposed to control and prevent chronic diseases via identifying the factors associated with the duration and type of PAs.[4,9] In population-based studies, PA is considered as a major health-promoting behavior that prevents and delays premature mortality and various chronic diseases at the global level.[1-5] Given the importance of this issue, the present research was conducted to investigate the level of PA and its correlates in the adult population participating in the pilot phase of the Azar cohort study in the Northwest of Iran.

Methods

Subjects and physical activity assessment methods

The Azar cohort study was a part of the nationwide cohort study

How to cite this article: Mirzaei M, Dastgiri S, Aminisani N, Asghari-Jafarabadi M, Vaziri S. Sociodemographic pattern of physical activity in the Northwest of Iran: Results of the pilot phase of the Azar cohort study. Int J Prev Med 2019;10:154.

Access this article online

Website: www.ijpvmjournal.net/www.ijpvm.ir

DOI: 10.4103/ijpvm.IJPVM_472_17

Quick Response Code:

(a prospective epidemiological study in the adult Iranian population [PERSIAN] to determine the risk factors in common noncommunicable diseases in Iran) and PA evaluation is considered a major aim of this study.[10] The present cross-sectional study was carried out on adult (age range of 35–70 years) living in Khameneh, a city in Northwest of Iran, were sent an invitation to taking part in this study (whole counting of the eligible populations, n = 1236) from October 2014 to January 2015. To obtain the participants' consent, they were interviewed, and 952 individuals completed the self-reported PA questionnaire. This 23-item questionnaire includes nine levels of PA defined by metabolic equivalent (MET) activities, dividing in descending order from sleep/rest (METs = 0.9) to high-intensity PAs (METs >6).[11,12] In the current study, the PA level was grouped into inactive (METs <3), moderately active (3< METs <6), and active (METs >6). For each activity, the MET scores were first calculated and multiplied by the duration of the PA in hour/minute, then the sum of the values was ultimately calculated.

This questionnaire was used as a part of the main questionnaire in the Azar cohort study to evaluate PA; and during the first questionnaire survey, we have previously validated it, among population study.[13] Overall, the intra-class correlation coefficient and Cronbach's alpha coefficient were above 0.7. The concurrent validity of this questionnaire was also calculated as 0.6 against the International PA Questionnaire. Furthermore, the construct validity of this questionnaire was confirmed for the study population in four factors.[13]

Statistical analysis

Given that the hypothesis of normal distribution was not confirmed for the overall score of PA using the Kolmogorov–Smirnov test (P < 0.05), a logarithmic transformation was used to transform the data distribution to normal. The method of general linear modeling was used to determine the relationship of sociodemographic variables, including gender, level of education, marital status, occupation, and body mass index (BMI) with the overall score of PA. Quantitative variables were defined as categorical and included in the model as indicators. Each variable was first included in the univariate general linear model as an unadjusted variable. For multivariate analysis, significant variables in the univariate model were used. The data collected were analyzed in SPSS version 17 (SPSS Inc. Chicago, II. the USA). P < 0.05 was considered as the level of statistical significance.

Results

The present study recruited 952 individuals of 35–70 years old with a mean age of 49.84 (standard deviation [SD] = 8.83) years. The response rate of the participants was about 82%. A total of 385 individuals (40.4%) with an age of 45–55 years comprised the majority of the study samples. A total of 504 (52.9%) individuals were female, 873 (91.7%) were married, 484 (40.2%) were homemakers, 280 (29.4%) had primary school levels of education, and 407 (42.7%) were overweight. Other descriptive characteristics of the participants are presented in Table 1.

The overall mean score of PA was 36.54 (SD = 5.3) in the present study. Table 2 presents the mean time spent for activities with different intensities in all the individuals by gender. The mean duration of time spent for light activities was the longest in the study population. The mean time duration spent for light and moderate PAs was, respectively, 21.31 and 2.60 h/day in active individuals; however, the

Table 1: Characteristics of the study participants (n=952)

Variables	Summary statistics, n (%)
Gender	
Male	448 (47.1)
Female	504 (52.9)
Age (years)	
35-45	312 (32.8)
45-55	385 (40.4)
55-65	209 (22)
≥65	46 (4.8)
Marital status	
Unmarried	24 (2.5)
Married	837 (91.7)
Divorce/widow	55 (5.8)
Educational Level	
No formal education	114 (11.9)
Elementary	280 (29.54)
Middle school	177 (18.6)
High school	201 (21.2)
College/university and above	180 (18.9)
Occupation status	
Employee	151 (15.9)
Worker	70 (7.4)
Free job	212 (22.3)
Retired	86 (9)
Housewife (unemployed)	383 (40.2)
Agriculture	50 (5.3)
BMI (kg/m^2)	
Underweight (BMI <18.5)	10 (1.1)
Normal weight (18.5-25)	240 (25.3)
Overweight (25-30)	407 (42.8)
Obese (BMI ≥30)	295 (31)

BMI=Body mass index

Table 2: Time spent on physical activities of different intensities by gender

MET	Mean (SD)		
	Total (n=952)	Male (n=439)	Female (n=513)
Sedentary (<3 METs)	21.31 (2.18)	21.38 (2.72)	21.25 (1.56)
Moderate (3-6 METs)	2.60 (2.14)	2.49 (2.67)	2.71 (1.53)
Vigorous (>6 METs)	0.08 (0.38)	0.13 (0.52)	0.03 (0.19)

MET=Metabolic equivalence, SD=Standard deviation

mean time assigned to intense activities was found to be 0.08 h.

Table 3 shows the relationship between the overall score of PA and demographic factors. The univariate analysis revealed a significant relationship between the overall score of PA and variables of gender, marital status, level of education and occupation ($P < 0.05$). The effects of these variables were adjusted in the multivariate analysis, which also revealed the significant relationship of the overall score of PA with gender (adjusted β = 0.014, confidence interval [CI] 95% = [0.01–0.82]), level of education (adjusted βs ranged over 0.010–0.018, CI 95% = 0.001–0.026) and occupation (adjusted βs ranged over 0.015–0.059, (CI 95% = 0.01–0.079) ($P < 0.05$ for all the relationships). These relationships could predict 20% of the variance of the PA score in adults in Khameneh.

Discussion

The overall mean score of PA was found to be moderate and equal to 36.54 in the present study. Regarding the type and duration of PA in the study participants, the mean duration of light PA in a sitting position was found to be 21.31 h, moderate 2.61 h, and intense 0.8 h. The present study population devoted 21.31 h a day to light sitting activities, approximately half (12.58 h) of which was assigned to watching TV and working with computers, and the remaining time to sleep. The longest mean duration was therefore found to be associated with sitting PAs in the study population living in Khameneh, which is consistent with the results of some other studies. A survey of PA patterns in Babol, North of Iran found the mean duration of the activities to be 36.1 h a week among people aged 20–56 years old.[14] Moreover, in Japan, Yang *et al*. found the longest duration of PAs to be, respectively, associated with moderate, light, and intense activities followed by sitting activities.[15] Although the evaluation method of PA levels in the studies cited is different from that used in the present research, the level of PAs in the present study population can be compared with that in other studies. As mentioned, some of these differences can be explained by social, economic and demographic differences.

The results associated with determining the relationship between the PA pattern and some sociodemographic factors showed that the overall mean score of PA differs in different groups depending on the level of education, gender and occupation.

Gender is a common sociodemographic variable addressed in most studies on PA. Moreover, men have been shown to present higher levels of PA compared to women. The present research found significant relationships between

Table 3: Results of general linear model for relationship between the score of physical activity with participant characteristics (*n*=952)

Variables	Physical activity score mean (SD)	Un-adjusted β (CI 95%)	*P*	Adjusted β (CI 95%)	*P*
Gender	35.49 (4.22)	Reference (female)			
Male	36.81 (7.91)	0.016 (0.008-0.024)	<0.001	0.014 (0.005-0.231)	0.002
Age (years)	35.25 (5.19)	Reference (≥65)			
35-45	36.47 (6.48)	0.015 (−0.005-0.035)	0.149	-	-
45-55	36.20 (6.24)	0.011 (−0.008-0.031)	0.255	-	-
55-65	35.55 (6.32)	0.004 (−0.017-0.024)	0.730	-	-
Marital status	34.52 (4.62)	Reference (divorce/widow)			
Unmarried	34.77 (4.82)	0.001 (−0.028-0.034)	0.842	0.008 (0.23-0.038)	0.619
Married	36.24 (6.41)	0.021 (0.003-0.039)	0.019	0.017 (0.001-0.035)	0.061
Educational level	35.01 (4.57)	Reference (college/university)			
No formal education	36.58 (8.25)	0.019 (0.004-0.034)	0.014	0.017 (0.001-0.033)	0.034
Elementary	36.73 (6.18)	0.021 (0.009-0.033)	0.001	0.018 (0.005-0.031)	0.006
Middle school	35.80 (5.51)	0.010 (−0.004-0.023)	0.154	0.005 (0.009-0.019)	0.474
High school	36.19 (6.99)	0.014 (0.001-0.027)	0.029	0.013 (0.001-0.026)	0.064
Occupation status	34.62 (8.94)	Reference (retired)			
Worker	39.62 (8.94)	0.062 (0.042-0.082)	<0.001	0.059 (0.39-0.079)	<0.001
Employee	35.14 (4.30)	0.010 (0.007-0.027)	0.240	0.015 (0.003-0.032)	0.046
Free job	36.45 (6.85)	0.026 (0.010-0.042)	<0.001	0.022 (0.007-0.038)	0.006
Agriculture	37.54 (9.21)	0.039 (0.017-0.061)	<0.001	0.033 (0.011-0.055)	0.003
Housewife (unemployed)	35.89 (5.10)	0.019 (0.004-0.034)	0.11	0.022 (0.006-0.037)	0.005
BMI (kg/m^2)	35.76 (5.96)	Reference (obese (BMI ≥30))			
Underweight (BMI <18.5)	36.77 (4.21)	0.012 (−0.029-0.053)	0.546	-	-
Normal weight (18.5-25)	36.57 (6.37)	0.010 (−0.001-0.021)	0.087	-	-
Overweight (25-30)	36.05 (6.53)	0.004 (−0.006-0.013)	0.476	-	-

Adjusted R^2=0.20. CI=Confidence interval, BMI=Body mass index, SD=Standard deviation

gender and PA and the results showed a significant increase in the score of PA in men compared to in women. In other words, men had higher levels of PA than women, which is consistent with the literature.[14-17] In contrast, the study by Motefaker *et al*. in Yazd province, Iran showed higher levels of physical inactivity in men compared to in women.[18] Similarly, some other studies revealed that women are more active than men, whereas some others obtained similarly to present results. These discrepancies in results can be explained by the cultural differences in different study populations.[15-19]

Employed individuals in the present study were found to spend more time doing PAs, which is consistent with some studies.[14,18] A study conducted in Yazd, Iran found the highest level of physical inactivity to be respectively associated with official employees, self-employed individuals, retired group, and homemakers.[18] This consistency in results can be justified by the fact that employed people normally have higher activity levels owing to their job requirements.

Significant relationships were also observed between PA and level of education, whereas other studies suggested negative correlations.[20-22] This discrepancy in the results can be explained by the fact that the scale used to evaluate PA in the present study encompasses a wide range of PAs, from household tasks to sports activities. The other reason is that the lack of difference between different groups regarding education level is associated with the difference in the type of activity rather than the level of activity.

In contrast to some previously conducted studies, the present study found no significant differences among the participants regarding the level of PA and BMI. Some other studies found negative correlations between PA and obesity,[22,23] which is inconsistent with the insignificant difference found in the present research in the score of PA in overweight, obese, and normal-weight groups. In line with the present study, Motefaker *et al*. found the difference between obese and overweight individuals with normal-weight individuals to be insignificant regarding PA.[18]

The present study found no relationships between age and PA, whereas other studies found negative correlations between age and PA, i.e., older people had lower levels of PA.[14,18,22,24,25] This discrepancy in results can be attributed to the low age variation in the present study, which is the potential cause of making this relationship insignificant.

Marital status and level of PA were found to have no significant relationships in the present study, which is consistent with the results of some previously conducted studies reporting the lack of relationships between marital status and level of PA.[18,26] In contrast, some researchers found significant differences between marital status and level of PA.[16,22]

Previously conducted studies have demonstrated the effect of different demographic factors on the level of PA, which in turn explains the differences or similarities of results between the present research and other studies. The difference in the pattern of PAs in the present study compared to other studies may be due to the difference in lifestyle and socioeconomic and cultural status, report bias and the cross-sectional nature of the present study.

Limitations and recommendations

The present study was limited to a small geographic area, and the data were collected in a cross-sectional fashion. Hence, the results can be different, and the generalizability of the results can also be limited. The strengths of the present research include its large sample size and the use of a valid and reliable questionnaire, which was separately validated by other authors. Further research is recommended to be performed in proper time intervals to identify all the effective factors in PA in the study population and determine both the variations in PA and the effects of clinical variables on the level of PA.

Conclusions

The results of the present study identified that gender, occupation, and level of education affect PA in the study population. On this base, it is necessary to emphasize on supportive programs to enhance level of PA in high-risk groups.

Acknowledgments

The present article is a part of the Master's dissertations written by the first author. The authors would like to express their gratitude to the authorities of Tabriz University of Medical Sciences and all the personnel and participants of the Azar cohort study.

Financial support and sponsorship

This study was conducted with financial support from the Tabriz University of Medical Sciences.

Conflicts of interest

There are no conflicts of interest.

Received: 30 Oct 17 **Accepted:** 22 Jan 18
Published: 25 Sep 19

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