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Original Article

Predictors of Physical Activity in Older Adults in Northwest of Iran

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Introduction: There are strong evidences to support the relation between Physical Activity (PA) and improved health in older adults. So this study aimed to determine the predictors of PA among a group of older adults in northwest of Iran.

Methods: In 2016, a randomly sample size of 340 older people in urban regions of Maku, West Azerbaijan, Iran, was recruited to complete Physical Activity Scale for the Elderly (PASE) and individual factors questionnaires.

Results: The mean score of PA was 94.02 ± 3.41. Logistic regression analysis showed that age was the strongest predictor of PA; among younger elderly with higher level education, who had less comorbidity were significantly more active than their counterparts. (β = -2.72, SE = 0.47, P- value = 0.001)

Conclusion: In this study the level of PA among the older adults was low and interventions to promote PA in this population is recommended.

Keywords: Physical Activity, Aged, Individual Factors

Introduction

Aging is a complex process of physiological and social change that results in diseases, disabilities, reduced levels of happiness (1), gradual decline in performance, and individual changes (2). One of the key strategies in the healthy ageing process is a physical activity (PA) (1), which results in the lack of dependence, physical ability, and the improvement of the quality of life and the reduction of the risk of disease (2, 3). Regular PA has unexpected changes in physiological factors and increases life expectancy by limiting the growth and progression of chronic diseases, disability in the elderly (4). Despite such health benefits (1, 5-7), insufficient PA is very common in older adults ranging from 50 % to 88 % (5, 8-11). Studies showed that different factors are associated with participating in PA in older adults including social, cultural and climatic conditions (2), and individual and social factors such as age, gender, marital status, education level, income and health status (10).

Iran's population is ageing, according to 2011 census, 8.2 % of the total population was made up by the elderly (12), which increased to 10 % by 2025 and 21-25 % by 2050 because of the advancements in health care and social factors toward medical and therapeutic care (1).

Iranian studies have also shown a high degree of insufficient PA varied between 30 % and up to 85 % (8, 13-15). Findings from studies, the means Physical Activity Scale for the Elderly (PASE) score in the older people were 124.79 in Tehran (15), 222 in Illam (16), and the elderly living in the Canadian Senior Health Center 112.6 (10, 17). Level of PA based on PASE score in the northwest of Iran, with special culture, no study has done on PA level of the elderly. Therefore assessment of PA in this age group can helpful to design healthy programs.

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Maku is located in the northwest of Iran with a population about 49500, it has shared a border with Turkey, and people in this area have Azari-Turkish background with sociocultural differences that affect their lifestyle, based on SIB (an abbreviation for the Persian equivalent of 'integrated health system') the percentage of people aged 65 and older is about 7 % in this city (12). Obesity, diabetes, hypertension which are strongly related to the lifestyle factors such as insufficient PA are common in this city and the number of studies targeting the health of older people is scarce. Therefore, this study aimed to assess the level of the PA, and its correlates among older adults in this area to introduce proper health promotion for older adults (18, 19).

Methods

Study design

This cross-sectional study was conducted in 2016 in Maku located in the north-west of Iran. Subject selection: A total of 340 randomly selected individuals aged 60 years and older were included in this study. Inclusion criteria were: aged 60 and above, standing and walking ability, no severe mental history, limiting musculoskeletal disorders, neurological defects, Parkinson's disease, acute heart failure, severe hearing impairment and visual impairment and congenital physical defects.

Data collection

Eligible individuals received a phone call informing the study aim and procedure, and if they provided a verbal consent, then the interviewer invited them to attend the health center for conduction an interview. In some circumstances where the study participants were not able to visit the health center, a home visit was arranged.

Instrumentation

Study information was collected through a questionnaire which consisted of two parts. 1 socio-demographic data (age, sex, level of education, occupation, monthly income, marital status), smoking, weight, height, the presence of the chronic disease (diabetes, hypertension, heart disease, cancer, depression, arthritis, cholesterol, prostate, asthma, thyroid and co-morbidity) (2). We applied the PA Scale for the Elderly (PASE) to measure the level of PA among the participants. The PASE, as a brief and specific instrument was designed for the elderly to measure the PA recalled over a period of one week (20). In this scale, participants are asked to report how often (i.e, never, seldom, 1–2 days; sometimes, 3–4 days; or often, 5–7days) they were engaged in a variety of activities during the previous week. The activities included light (e.g., stretching), moderate (e.g., pairs tennis), or strenuous intensity activities (e.g., jogging) as well as muscle-conditioning activities. Time spent on these activities was categorized into four classes of less than 1 hour, 1–2 hrs, 2–4 hrs, or more than 4 hrs/day. Moreover, time spent in paid or volunteer work involving at least some standing or walking was recorded in total hours per week. Furthermore, household activities such as light house-work, yard work, and caring for others were also recorded and was categorized as yes or no. To generate the final PASE score for the week, various activities were multiplied by established item weights (20). PA levels were categorized based on PASE score to 4 levels. level 1 including PASE $\leq$ 93, level 2: PASE = 94-146, level 3: PASE = 147-206 and level 4: PASE $\geq$ 206(21).

The validity and reliability of PASE have been used to measure the PA of the elderly in various studies (20, 22). The content validity and reliability of the questionnaire in Iran were also evaluated by Ishani et al. And the Cronbach's alpha coefficient was 0.97 (23).

Ethical considerations

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Ethical approval was provided by a research committee in an Iranian medical university with number IR.TBZMED.REC.1395.767.

Data analysis

Data were summarized using means (± SD) for continuous variables and counts and percentages for categorical variables. Distribution of PA as PASE score across different variables was also described as means (± SD). Kruskal Wallis test was used to assess the bivariate differences of PA level across different variables, respectively because the PASE score was not distributed normally. Multiple linear regression was used to identify the association between PASE score and selected variables in this study such as age, sex, BMI, education, job, number of comorbidities, and smoking. The β coefficient, the standard error and the p-value were reported with the multiple regression models. All statistical assumptions were checked and fulfilled before using the regression running the model. The analysis was performed using the STATA software.

Results

A total of 340 people aged 60 years and above were included in this study. The average age of participants was 69.2 ± 7.3, 193 (56.8 %) were women, 176 (51.8 %) were illiterate/reading and writing ability, the majority were married and currently lived with their spouses and 28.2 % were smokers. (Table 1)

Mean scores for PA were low (94.2) and 54 % of participants were inactive. (Table2)

A linear regression was conducted to test a predictive model for PA (PASE score) with predictor variables (age, gender, education,

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smoking, job, number of comorbidities, and BMI). The overall model was significant (R^2 = 0.28, F (12, 327) = 12.21, p < 0.001. Age strongly predicted PA (β = -2.72, p < 0.001), implies that PASE score was lower among older participants. PASE score was higher among with highest level of education (β = 31.49, p = 0.01). Being currently working predicted the PA level among study population (β = 63.75, p = 0.001). A number of comorbidities was also the strong predictor of the PASE score, (β = -22.15, p < 0.001), implies those with more comorbidities had a lower score of PASE. (Table 3)

There was a sex difference between the score of PA that was higher among women than men (104.0 vs 65.7, p = 0.0002). PA scores was significantly higher among those younger (p < 0.001) and had high level of education (p = 0.006) in both men and women (p < 0.001). Also PA scores was significantly lower among those had one or two chronic diseases. (Table 4)

Table 1. Demographic characteristics among older people

Variable		N	%
Age group	**60-69**	201	59.1
	70-79	103	30.3
	80+	36	10.6
Sex	**Women**	193	56.8
	Men	147	43.2
Education	**Illiterate**	176	51.8
	Primary/Literacy	79	23.2
	Diplomat+	85	25.0
Job status	**Housewife**	156	45.9
	Retired	140	41.2
	In-paid work	27	7.9
	Workless	17	5
Income	**No-income**	162	47.6
	Retired	149	43.8
	Working	29	8.5
Smoking	**Non-smoking**	244	71.8
	Smoker	96	28.2
BMI	**Less than 25**	97	28.5
	25-29.9	153	45.0
	30+	90	26.5
Marital status	**Married**	245	72.1
	Single/divorce/widow	95	27.9

Table2. Frequency, percentage, mean, SD and Confidence Interval PA among older people

Level of PASE	N	%
Level 1 PASE ≤ 93	184	54
Level 2 PASE 93.1-146	99	29
Level 3 PASE 146.1-206	38	11
Level 4 PASE ≥ 206	19	5
Mean PASE	SD	95 % (CI)
94.02	3.41	87.30-100.73

Table 3. Predictors of the PA among older people

Variables	β	SE	P- value
Age	-2.72	0.47	0.001
Sex	22.54	11.00	0.04
Education level	30.49	4.16	0.01
Smoking	-4.33	9.19	0.63
Job status	63.75	5.23	0.001
Comorbidity	-22.15	3.88	0.001
BMI	-1.44	0.76	0.85

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Table 4. The mean score of PASE according to different factors by sex in elderly

Age group	Overall	Men	Women
60-69	123.65 (72.70)	120.42 (95.90)	125.49 (55.66)
70-79	81.37 (72.13)	84.48 (94.37)	78.19 (38.85)
80	44.77 (48.03)	36.99 (48.01)	57.01 (47.15)
P-value	0.0001	0.0001	0.0001
Education			
Illiterate	93.29 (66.28)	77.51 (96.62)	98.39 (52.41)
Primary/intermediate	98.91 (83.15)	89.78 (92.02)	117.53 (58.50)
Diploma& higher	124.85 (81.48)	115.80 (91.95)	138.43 (61.42)
P-value	0.006	0.016	0.0003
Occupation			
Housewife	97.58 (48.13)	-	97.58 (48.13)
Retired	95.09 (84.11)	82.44 (85.71)	138.68 (61.62)
Working	174.13 (106.77)	164.12 (108.45)	231.70 (85.74)
P-value	0.0006	0.0007	0.0001
BMI			
Normal	92.33 (78.70)	97.81 (93.75)	83.45 (44.49).
Overweight	104.98 (76.55)	94.33 (94.37)	112.8 (59.49)
Obese	109.20 (69. 02)	90.76 (98.15)	115.17 (56.22)
P-value	0.076	0.922	0.006
Smoking*			
Yes	94.96 (91.33)	90.28 (72.01)	202.73 (109.78)
No	105.45 (68.02)	103.48 (103.45)	106.02 (53.89)
P-value	0.009	0.536	0.073
Comorbidity number			
0	144.98 (91.31)	147.02 (103.34)	142.13 (72.20)
1	93.22 (59.02)	64.87 (61.91)	114.21 (47.28)
2	78.89 (58.65)	56.83 (73.95)	89.81 (46.03)
P-value	0.0001	0.0001	0.0001

*only four women were smokers

Discussion

The results showed that the PA of the elderly was 94.02 ± 3.41 indicating low level of activity. Several studies have shown that elderly people have sufficient PA to achieve health benefits (24, 25). In this study 54 % of older people had sedentary lifestyle which is consistent with the findings of those studies that reported more than half of the elderly do not do PA of moderate to vigorous (10, 24). Many studies have reported that PA in the elderly is low (2, 10, 11, 13, 14, 24, 26, 27). In this study among demographic factors, age was the most predictive for PA, so that with the increase in age, PA decreased in individuals. The results were consistent with other studies (3, 10, 11, 13, 14, 24, 25, 27-30). But it did not match the results of studies conducted by Sadrollahi in Kashan and Muni in New York (2, 31) in older people, The reason for this contradiction could be attributed to differences in cultural background, In west Azerbaijan, older people are generally sitting and others respect him/her and do his/her jobs.

Multivariate analysis showed that female elderly were more active than men in our study, which was consistent with the results of some studies (10, 15). Research conducted in rural Thailand population showed that women were 3.64 times more active than men, while in Thai families, most men were family leaders who were less likely to be active in their families, but women were doing housework, gardening, and agriculture, so the lifestyle can explain sex difference in Thailand population study (10). Therefore in the present study women were high active than men, which is inconsistent with the findings of those studies that reported reverse results inside (2, 13, 24) and outside the country (2, 3, 11, 13, 24, 25, 30, 32, 33). Several studies in Ireland have shown that gender is more important than age and employment, which has a stronger effect on the PA of the elderly (32, 33). The reasons for these differences may be explained by cultural, social, economic and living arrangement (2, 10, 24). A surprising finding was that people with a BMI over 25 were more active than those with normal BMI. While in some studies it was found no significant correlation between BMI and PA (24, 34) some researchers have proven that high body mass index reduces PA in the elderly (11, 15, 35, 36), which did not match our study outcomes. In this study, some chronic diseases reduced PA. Most studies have shown the negative impact of chronic illnesses or poor health on reducing PA (15, 24, 25, 31, 32, 34, 37). Due to the fact that having serious illnesses such as joint pain, hypertension and diabetes, it is difficult for a person to have mobility (24). Sadrollahi and co-authors showed that in Kashan older people with chronic diseases had a higher level of PA that contradicted our study results (2), They believed that diseases altered individuals' attitudes toward health issues, and when people were diagnosed with illness, sufferers tend to change their lifestyle which may increase the level of PA in the elderly (2). Also, in this study, people with higher education had more PA, which was in line with other studies that reported the high level of PA among educated people (2, 11, 24, 25, 31), the level of

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education can have a positive impact on PA as well as personal hobbies (2). However some studies reported the opposite results; people with higher education had less activity than those with lower education levels (14, 29, 34), this indicates that the problem is not lack of knowledge but lack of the motivation is more impressive (14). In some studies, there was no significant relationship between the level of education and PA (13, 15, 32), that may be due to the difference in type and level of activity (13, 15). Additionally, public awareness of the effect of PA seems more important than education level (15), another reason for this controversy in the results of studies might be because of sampling which allowed to recruit less educated individuals (13).

Overall, it seems that PA in the elderly has a multi-factorial nature, and a range of socio-demographic factors is involved in determining the level of individual activities (24). Studies in different parts of the world identified several factors as significant determinants and from a global perspective of behaviors of elderly individuals is relatively unpredictable (24).

Conclusion

PA level in the present study was very low and the majority of participants were sedentary. The predictors of PA among urban older people in the present study were age, sex, and education level and comorbid diseases. Compared with all the variables investigated in the present study, age was more influential in predicting the PA. Therefore, interventions to increase physical activity in the elderly are necessary.

Study limitations

This study had strengths as well as certain restrictions. As strengths, the samples were recruited from the SIB so, the sample may be considered as a representative of the older people in the city, also a right level of coverage for all the elder from the high- and medium-class groups in Maku was ensured. As a limitation of the study, monthly income as a significant indicator for the economic status of the participants was not investigated.

Conflict of interest

The authors declare that they have no conflict of interest.

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Author's contributions

FB (corresponding author) was involved in the conception of the study, interpreted the results from the analyses. BA and NA performed data collection and the analyses and drafted the manuscript. FB was involved in the conception of the study, interpreted the results from the analyses, performed significant revisions, assisted in the revision of the manuscript and approved the final version of the manuscript. FB assisted in statistical analysis and interpretation and revision of the article.

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