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Original Article

The Relationship Between Socioeconomic Status and Mean Physical Activity in Older Adults in Selseleh County, Iran, in 2021

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Abstract

Background: The global population aged 60 years and above is projected to increase from 1.1 billion in 2023 to 1.4 billion by 2030. Regular physical activity is a crucial health-promoting behavior for older adults, playing a significant role in preventing and delaying various chronic diseases and premature mortality. This study investigated the relationship between socioeconomic status and physical activity among older adults residing in Selseleh County, Lorestan Province. Iran.

Materials and Methods: This descriptive-analytical cross-sectional study was conducted on a sample of 500 older adults from Selseleh County, Lorestan Province, Iran, selected through multi-stage random sampling. In the first stage, proportional quota sampling based on health centers was used to allocate a sample size commensurate with the older adult population of each center. In the second stage, all health houses and health sites under the coverage of each center were alphabetically ordered, the number of older adults in each house or health sites was specified, and then sample numbers were randomly selected. Finally, the participants in the study were identified through the SIB system and enrolled in the study.

Resulte: Overall, the mean physical activity score was 124.11 ± 30.28 minutes per week (males: 155.12 ± 51.93 minutes; females: 88.71 ± 24.42 minutes). Moreover, 43.0% of the participants reported low physical activity, 22.0% reported moderate activity, and 35.0% reported high activity. Data showed a significant inverse relationship between education level, socioeconomic status, age, and physical activity ($P<0.001$). A significant relationship was found between marital status and physical activity ($P<0.001$), with married individuals exhibiting higher mean physical activity compared to other groups (single, divorced, and widowed individuals). Furthermore, a significant relationship was observed between gender, place of residence, and mean physical activity ($P<0.001$), with higher means noted in rural areas and among males.

Conclusion: The findings from this study indicated that the majority of older adults surveyed engaged in low to moderate physical activity. Given that the World Health Organization identifies the level of physical activity and mobility as the primary health indicator for a community, implementing effective programs and creating the necessary infrastructure for promoting physical activity among older adults appears essential.

Keywords: Aging, Physical activity, Socioeconomic status

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Introduction

Declining birth and death rates have led to increased life expectancy and a global aging population (1). This demographic shift is rapidly becoming a worldwide concern, representing one of the most fundamental challenges of our time (2-4). In 2019, the number of individuals aged 60 and over reached one billion, projected to increase to 1.4 billion by 2030 and 2.1 billion by 2050 (5). Based on fertility indicators, individuals aged 60 and above are expected to constitute 31% (approximately 29 million people) of Iran's population by 2050. Data on the speed of population aging indicate that Iran is the second fastest aging country globally in terms of the percentage increase in its population aged 60 and over between 2015 and 2050 (6). It is anticipated that by 2050, more than 26 million people in Iran will be over 60 years old (7).

Physical inactivity is a significant public health issue in the 21st century, contributing to most chronic diseases (8). Globally, 7.2% of all-cause mortality and 7.6% of cardiovascular disease mortality are attributed to physical inactivity. The proportion of non-communicable diseases resulting from physical inactivity ranges from 1.6% for hypertension to 8.1% for dementia (9). Physical inactivity is a primary cause of major chronic diseases, substantially contributing to the global burden of disease, mortality, and disability (8). Regardless of age, regular physical activity improves physiological function. At any age, lifestyle changes, such as physical activity and exercise, delay mortality factors and increase longevity (10). Regular physical activity is a crucial health-promoting behavior for older adults and is recognized as a significant factor in preventing and delaying various chronic diseases, improving sleep quality, reducing osteoporosis, post-menopausal fractures, and the risk of falls and injuries, and preventing premature mortality (11, 12). Physical activity enables older adults to live independently, and its importance as a tool for maintaining independence has been highlighted in many studies. Accordingly, a decrease in physical activity can lead to various consequences, including increased dependency and reduced well-being (13-15).

Individuals' levels of physical activity typically decline with age, with a more pronounced decrease upon entering older adulthood (16). According to the latest national survey on non-communicable disease risk factors in 2021, the prevalence of physical inactivity was 57.98% among individuals aged 65-74 and 68.07% among those aged 75 and older. These data suggest that the prevalence of physical inactivity increases with age across all age groups, being considerably higher in older adults than in younger cohorts (17).

The inconsistent findings regarding activity and inactivity status among different groups of older adults suggest that various factors influence physical activity in this population (18). One such factor is socioeconomic status (SES). Previous studies have indicated that poor and inadequate SES is a strong predictor of insufficient physical activity, as well as mental health issues and depression in older adults (19). Most studies examining the impact of SES on health measure it based on objective indicators and available resources such as income, employment status, education level, and so on (20-22).

Factors associated with low physical activity in Iran differ from those in Western populations. The primary factors linked to low physical activity in Iran are female gender, urban residence, low socioeconomic status, obesity, diabetes, and older age. Public health policies should specifically target groups at the highest risk of physical inactivity (23).

Aging brings about various physiological, psychological, and other changes in the human body. While some age-related changes are uncontrollable, many can be managed in various bodily systems through exercise. With increased mobility and lifestyle changes in older adults, exercise has beneficial effects on health and longevity. Thus, addressing the issue of exercise for older adults is crucial (24).

The World Health Organization (WHO) identifies the level of physical activity and mobility as the primary health indicator for a community (25). Cumulatively, these issues underscore the necessity of focusing on physical activity in older adults. Accordingly, the present study investigated the relationship between socioeconomic status and physical activity among older adults residing in Selseleh County, Lorestan Province, Iran.

Materials and Methods

This descriptive-analytical, cross-sectional study was conducted among older adults residing in Selseleh County (Aleshtar), Lorestan Province, Iran, in 2021. The research population consisted of all older adults identified and registered in the SIB system. Considering a 95% confidence level, a prevalence of physical inactivity among older adults of 63% (based on the 2016 survey of non-communicable disease risk factors), and an acceptable error of 0.063, a sample size of 226 was initially calculated. Given that each selected health center represented a cluster, a design effect of 2 was applied to achieve a representative sample and increase power, resulting in a final sample size of 452. Moreover, approximately 10% of the calculated sample size was added to compensate for potential dropout and incomplete questionnaires, leading to a total of 500 completed questionnaires. Participants were selected using multi-stage sampling from all older adults in the county. In the first stage, a stratified quota sampling method, based on health centers, allocated a sample size proportional to the older adult population of each center. In the second stage, all health houses and health sites covered by each center were alphabetically ordered, the number of older adults in each house or health sites was identified, and then sample numbers were randomly selected. Finally, participants were identified through the SIB system and enrolled in the study. The inclusion criteria for the study were older adults registered in the SIB system residing in Selseleh County, aged 60 years or older, willingness to participate in the study, and ability to complete or respond to questionnaire items. The exclusion criteria were individuals unable to move (due to a disability preventing physical activity), hospitalization during the study period, and clear cognitive impairment (based on the participants' medical records).

The data in this study were collected using a three-part questionnaire. The first part gathered demographic characteristics, including age, gender, duration of residence in the area, insurance coverage, and the name of the health center from which they received services.

The second part of the questionnaire focused on

assessing physical activity using the translated version of the Physical Activity Scale for the Elderly (PASE). The validity and reliability of this questionnaire were confirmed by Keikavoosi-Arani et al at the Shahid Beheshti School of Nursing and Midwifery in Rasht, achieving a CVI of 92.4% and demonstrating internal consistency and stability through Cronbach's alpha coefficient and a two-week test-retest (26, 27). This section comprised three sub-sections: Part A covered leisure-time activities, including six items on sedentary activities, walking, light or recreational physical activity, moderate physical activity, vigorous physical activity, and strength-endurance activities. Part B covered household activities, consisting of five items. Part C addressed work-related activities, with one item. A "yes" response was scored as 1, and a "no" response as 0. If "yes," the participant selected the best description of the physical activity level required for voluntary or paid work, which was then calculated using PASE weights. Finally, all PASE scores from the three parts were summed, with the PASE score range for older adults potentially varying from 0 to over 400 (27). Based on the total score obtained from this scale, older adults were categorized into three groups: low activity (score 0-66), moderate activity (67-124), and high activity (greater than 124) (28).

The third part of the questionnaire focused on assessing socioeconomic status (SES), encompassing factors such as marital status, education level, occupation, family type, household expenses, assets, number of family members, and housing ownership. In this study, principal components analysis (PCA) was run on these variables to create an SES index for each household (29). Based on the PCA results, households were categorized into three groups: low, moderate, and high socioeconomic status.

The collected data were analyzed using SPSS-16 software. Descriptive statistics were employed, and inferential analyses included the independent samples t-test, ANOVA, and the chi-square test. Furthermore, a linear regression analysis was conducted to identify multivariate predictors influencing physical activity in older adults. A significance level of 95% ($P<0.05$) was set for all statistical tests.

Ethical Considerations

Before data collection, the objectives of the study were explained to all participants, and written informed consent was obtained. All collected data were kept confidential, with no personal identifiers recorded. This research project was approved by the Ethics Committee of Hamadan University of Medical Sciences, with the ethics code IR.UMSHA.REC.1400.192.

Results

The findings from this study revealed that 53.6% of participants were male, 63.6% resided in rural areas, 59.0% were illiterate, and 31.8% belonged to the 60-64 age group. An analysis of the participants' socioeconomic status indicated that 33.2% of individuals had low socioeconomic status, 33.6% had moderate status, and 33.2% had good status (Table 1).

The mean physical activity score was 124.30 ± 111.28 minutes per week. A significant relationship was observed between the mean physical activity score and gender, place of residence, occupation, type of social network, and marital status. Specifically, mean physical activity was higher in men than in women ($P<0.001$), in rural residents than in urban dwellers ($P<0.001$), in self-employed individuals than in other occupations ($P<0.001$), and in married individuals than in unmarried individuals ($P=0.031$). Moreover, a significant inverse relationship was found between the mean physical activity score and education level, socioeconomic status, and age ($P<0.001$). A significant relationship was also observed for insurance status based on the independent samples t-test ($P<0.006$) (Table 1).

Overall, of a total of 232 (46.4%) female participants, 121 (52.2%), 71 (30.6%), and 40 (17.2%) had low, moderate, and high physical activity, respectively. Among the 268 (53.6%) male participants, 94 (35.1%), 39 (14.6%), and 135 (50.4%) had low, moderate, and high physical activity, respectively. The difference between the men and women in the percentage of individuals with high physical activity was significant ($P<0.001$). Among individuals with low socioeconomic status, 52 (31.3%), 43 (25.9%), and 71 (42.8%) had low, moderate, and high physical activity, respectively. For those with moderate socioeconomic status, 65 (38.7%), 38 (22.6%), and 65 (38.7%) had low, moderate, and high physical activity, respectively. Among individuals with high socioeconomic status, 98 (59.0%), 29 (17.5%), and 39 (23.5%) had low, moderate, and high physical activity, respectively. This difference was statistically significant ($P=0.044$). In general, the percentage of individuals with high physical activity was significantly different across gender, place of residence, education level, occupation, insurance status, socioeconomic status, and marital status ($P<0.05$) (Table 2).

The data from multivariate analysis showed a significant negative correlation between the mean physical activity score and the variables of place of residence ($\beta=-0.310$), age ($\beta=-0.470$), years of education ($\beta=-0.291$), and socioeconomic status ($\beta=-0.134$). Conversely, a significant positive correlation was found between the mean physical activity score and gender ($\beta=0.384$). The coefficient of determination (R^2) indicated that approximately 54.0% of the variance in physical activity among older adults was attributable to the variables included in the regression model (Table 3).

Discussion

The overall mean physical activity score for the older

Table 1. The participants' demographic characteristics and physical activity by demographic variables

Variable	Categories	N (%)	Physical activity (minutes per week)	*P* value
	Total	500 (100)	124.11 ± 30.28	-
Gender	Male	268 (53.6)	155.12 ± 51.93	0.001
	Female	232 (46.4)	88.71 ± 24.42	
Place of Residence	Urban	182 (36.4)	80.29 ± 79.66	0.001
	Rural	318 (63.6)	149.48 ± 118.84	
Education	Illiterate	295 (59.0)	109.10 ± 17.62	0.001
	Primary school	86 (17.2)	173.12 ± 15.80	
	Middle School	53 (10.6)	125.11 ± 81.88	
	High School	31 (6.2)	143.13 ± 37.16	
	Diploma	22 (4.4)	142.12 ± 08.77	
	University	13 (2.6)	50.41 ± 29.85	
Age Groups	60-64	159 (31.8)	156.11 ± 07.66	0.001
	65-69	131 (26.2)	145.11 ± 97.78	
	70-74	88 (17.6)	108.10 ± 93.83	
	75-79	42 (8.4)	135.93 ± 28.91	
	80 and above	80 (16.0)	36.54 ± 78.40	
Occupation	Self-employed	160 (32.0)	231.99 ± 91.34	0.001
	Employee	3 (0.6)	167.11 ± 30.05	
	Retired	80 (16.0)	50.70 ± 61.80	
	Homemaker	210 (42.0)	93.73 ± 62.94	
	Unemployed	8 (1.6)	30.39 ± 54.07	
	Disabled	39 (7.8)	15.14 ± 03.02	
Type of Social Network	Nuclear	211 (42.2)	110.84 ± 98.76	0.050
	Extended	250 (50.0)	135.91 ± 121.39	
	Dispersed	8 (1.6)	110.84 ± 98.76	
	Alone	31 (6.2)	130.10 ± 21.52	
Insurance coverage	Yes	31 (96.2)	126.14 ± 112.35	0.006
	No	19 (3.8)	77.63 ± 65.60	
Socioeconomic Status	Low	166 (33.2)	141.11 ± 25.67	0.044
	Medium	168 (33.6)	139.11 ± 51.05	
	High	166 (33.2)	91.94 ± 95.15	
Marital Status	Married	388 (77.6)	135.11 ± 20.56	0.031
	Non-Married	112 (22.4)	86.54 ± 89.78	

adults in this study was 124.30 ± 111.28 minutes per week. The participants were categorized into three groups based on their physical activity levels: 43% exhibited low activity, 22% had moderate activity, and 35% reported having high activity. A significant association was observed between physical activity and several variables, including education level, socioeconomic status, marital status, gender, place of residence, and age.

The latest national survey on non-communicable disease risk factors in Iran (2021) found that the prevalence of physical inactivity was 57.98% in individuals aged 65-74 years and 68.07% in those aged 75 years and older (17). Eshaghi et al in their study on the physical activity status of older adults in Isfahan, reported that 13.7% of older adults had adequate physical activity (30). A study by Motefaker et al on the epidemiology of physical activity in the urban population of Yazd Province indicated that the prevalence of physical inactivity among individuals over 60 years old was 68.4% (31). In a study by Zabihi et al in Babol, the mean duration of vigorous physical activity was 3.22 hours/week, moderate activity was 5.7 hours/week, and light activity was 1.7 hours/week (32).

Papi et al's study on physical activity and related factors among older adults in Khorramabad reported a mean physical activity score of 251.02 ± 184.81 minutes per week. Specifically, 7.77% performed no physical activity, 27.33% had low physical activity, 54% had moderate physical activity, and 11% had vigorous physical activity (33). A study by Peralta et al on sociodemographic associations of physical activity among European older adults from 28 countries generally found that 59.7% of participants met recommended physical activity levels (34).

Comparing the varied statistics from different studies reveals differing figures, which can be attributed to cultural and lifestyle differences across regions. Furthermore, the timing of different studies should be considered, as mean physical activity can vary significantly over time due to differing work and economic conditions, industrialized and mechanized lifestyles, and other factors. The variability in data collection instruments and the weighting methods for different activities can also account for conflicting findings.

The independent samples in this study revealed a significant difference in mean physical activity between genders, with men exhibiting higher mean physical activity than women. This finding was further supported by the chi-square test. Besides, other studies, including Eshaghi et al in Isfahan (30), Nejati et al in Tehran (35), Zabihi et al's study on physical activity levels in the urban population of Babol (32), Alizadeh et al's study on physical health status and influential socioeconomic factors among older adults in Tehran (19), a study on physical activity among a sample of Iranians over 60 years old conducted by Salehi et al (8), a systematic review by Lehne et al on the impact of equity-focused interventions to promote physical activity in older adults (36), a study by bin Mohamed Roshdin Murad et al in Malaysia on the knowledge, attitude, and practices of individuals exercising in sports and recreational parks (37), and a study by Santos et al on physical activity and other lifestyle behaviors in Portugal (38) reported consistent findings. However, the findings from the present study contradict the results reported by Motefaker et al in Yazd (31), indicating that physical activity was higher in women than in men. This discrepancy might be because men in that study had less physical activity due to their occupations (e.g., desk jobs or shopkeeping) compared to women, or it could indicate

Table 2. Relationship between physical activity and research variables

Variable	Categories	Physical activity level (Frequency/%)			X^2	*P* value
		Low	Moderate	High		
	Total	215 (43.0)	110 (22.0)	175 (35.0)	-	-
Gender	Male	94 (35.1)	39 (14.5)	135 (50.4)	62	0.001
	Female	121 (52.2)	71 (30.6)	40 (17.2)		
Place of residence	Urban	97 (53.3)	61 (33.5)	24 (13.2)	63.21	0.001
	Rural	118 (37.1)	49 (15.4)	151 (47.5)		
Education	Illiterate	147 (49.8)	62 (21.0)	86 (29.2)	40.97	0.001
	Primary school	21 (24.4)	18 (20.9)	47 (54.7)		
	Middle school	16 (30.2)	19 (35.8)	18 (34.0)		
	High school	13 (41.9)	4 (12.9)	14 (45.2)		
	Diploma	10 (45.4)	2 (9.1)	10 (45.5)		
	University	8 (61.5)	5 (38.5)	0 (0.0)		
Age groups	60-64	46 (28.9)	39 (24.5)	74 (46.5)	92.76	0.001
	65-69	44 (33.6)	32 (24.4)	55 (42.0)		
	70-74	42 (47.7)	20 (22.7)	26 (29.5)		
	75-79	12 (28.6)	13 (31.0)	17 (40.5)		
	80 and above	71 (88.8)	6 (7.5)	3 (3.8)		
Occupation	Self-employed	7 (4.4)	28 (17.5)	125 (78.1)	252.78	0.001
	Employee	3 (100.0)	0 (0.0)	0 (0.0)		
	Retired	58 (72.5)	13 (16.3)	9 (11.3)		
	Homemaker	105 (50.0)	65 (31.0)	40 (19.0)		
	Unemployed	6 (54.5)	4 (36.4)	1 (9.1)		
	Disabled	7 (4.4)	28 (17.5)	125 (78.1)		
Type of social network	Nuclear	91 (43.1)	60 (28.4)	60 (28.4)	12.26	0.050
	Extended	105 (42.0)	43 (17.2)	102 (40.8)		
	Other (dispersed/alone)	19 (48.7)	7 (17.9)	13 (33.3)		
Insurance coverage	Yes	206 (42.8)	103 (21.4)	172 (35.8)	4.14	0.006
	No	9 (47.4)	7 (36.8)	3 (15.8)		
Socioeconomic status	Low	52 (31.3)	43 (25.9)	71 (42.8)	28.43	0.044
	Medium	65 (38.7)	38 (22.6)	65 (38.7)		
	High	98 (59.0)	29 (17.5)	39 (23.5)		
Marital status	Married	145 (37.4)	91 (23.5)	152 (39.2)	23.05	0.031
	Non-married	70 (62.5)	19 (17.0)	23 (20.5)		

that women in that region prioritize their health more and incorporate physical activity into their routines.

The data in the present study showed an inverse relationship between mean physical activity and age, consistent with findings reported by Eshaghi et al in Isfahan (30) and Santos et al in Portugal (38). Specifically, as age increased, mean physical activity decreased significantly. The present study also found a significant inverse difference between mean physical activity and education level, as reported in studies by Santos et al in Portugal (38), Motefaker et al in Yazd (31), and Zabihi et al in Babol (32). In contrast, studies by Papi et al in Khorramabad (33), Sharifirad et al in Isfahan (39), and Peralta et al among older European populations (34) reported a significant direct relationship between mean physical activity and education level. Furthermore, Eshaghi et al in Isfahan (30) and Hoseini et al in Ahvaz (40) found no relationship between physical activity and education level, which contradicts the findings from the present study. These discrepancies might be attributed to varying levels of awareness and educational attainment within different communities, where some individuals have higher education while others possess minimal literacy or are illiterate. Occupational factors might also contribute to these differences.

The data from the present study indicated a significant inverse relationship between mean physical activity and socioeconomic status. This finding is consistent with

Table 3. Regression analysis of the factors affecting physical activity in older adults

Predictor variable	B	S.E.	β*	T	*P*
Place of residence (urban/rural)	-71.74	8.99	-0.31	-7.97	<0.001
Age (years)	-6.33	0.59	-0.47	-10.56	<0.001
Gender (male/female)	85.62	9.75	0.38	8.77	<0.001
Insurance coverage (yes/no)	7.92	21.73	0.01	0.36	0.716
Family type (nuclear/extended/dispersed/alone)	4.38	7.84	0.02	0.56	0.576
Education level (years of education)	-7.31	1.25	-0.29	-5.85	<0.001
Socioeconomic status (low/medium/high)	-18.29	9.07	-0.13	-2.01	0.044
Marital status (married/non-married)	-28.42	13.15	-0.10	-2.16	0.031

*Standardized Coefficient Regression Constant
$F = 64.85$, $R^2 = 0.54$, $P < 0.001$

studies by Santos et al in Portugal (38), Motefaker et al in Yazd (31), and Ethisan et al in Thailand (41), which showed lower physical activity among men and women with sufficient income in rural Thai communities. Conversely, studies by Papi et al in Khorramabad (33), Alizadeh et al in Tehran (19), a systematic review by Lehne et al (36), and Fu et al in China (42) demonstrated a significant direct relationship between mean physical activity and socioeconomic status. Moreover, a study by Hoseini et al in Ahvaz found no association between sports participation and socioeconomic status (40), which differs from the findings in the present study. These inconsistencies likely stem from cultural differences and varying lifestyles across different societies.

The present study found a significant difference in mean physical activity across different occupations. This finding was consistent with the results reported by Eshaghi et al in Isfahan (30), Papi et al in Khorramabad (33), and Zabihi et al in Babol (32).

The mean physical activity of married individuals in the present study was statistically significantly higher than that of non-married individuals. Accordingly, studies by Eshaghi et al in Isfahan (30) and Peralta et al's study on sociodemographic associations of physical activity among older Europeans (data collected from 28 countries) indicated that women living with a partner were more likely to meet physical activity recommendations (34). However, a study by Bin Mohamed Roshdin et al in Malaysia revealed a significant association between marital status and exercise regularity, with single individuals exercising more regularly than married individuals (37), which contradicts previous findings. This discrepancy might be related to lifestyle differences in various societies or greater leisure time availability for single individuals.

The findings from the present study indicated a significant difference in mean physical activity based on place of residence, with individuals residing in rural areas exhibiting higher mean physical activity than those in urban areas, as reported by Peralta et al. (34).

The present study found that mean physical activity was significantly higher among individuals living in extended families compared to other groups, consistent with the findings of Papi et al in Khorramabad (33).

The independent samples t-test in the present study revealed a significant difference in mean physical activity based on insurance status, with individuals possessing health insurance demonstrating higher mean physical activity than those without any health insurance. However, the chi-square test did not show a significant difference between these two groups. It is important to note that less than 4% of participants lacked insurance. If the sample size in this group had been larger, a significant difference might have been observed with the chi-square test as well.

One of the limitations faced in the present study was the time-consuming process of sample selection, questionnaire completion, and interviews, largely due to the specific conditions of older adults. Attention must also be paid to potential under- or over-reporting of costs and recall bias. Finally, due to the cross-sectional nature of the data, the possibility of reverse causality between socioeconomic status and physical activity should be considered.

Conclusion

The findings from the present study revealed that approximately 65% of older adults exhibited low to moderate physical activity levels. Several variables, including education level, socioeconomic status, occupation, marital status, and place of residence, were significantly associated with physical activity. Identifying these variables and implementing necessary interventions can enable all individuals, particularly older adults who were the primary focus of this study, to engage in appropriate physical activity tailored to their age and physical condition. Consequently, this can lead to a healthier life experience. Given that the World Health Organization considers physical activity and mobility as key indicators of a community's health, prioritizing education and enhancing health literacy within society, alongside encouraging individuals to adopt healthy behaviors such as engaging in sports and ensuring sufficient physical activity, represents one of the

most crucial and cost-effective interventions. Ultimately, policymaking and planning must ensure that all members of the community, regardless of their occupation, place of residence, or educational background, particularly older adults, have access to the necessary facilities and appropriate incentives to participate in sports and physical activities.

Authors' Contribution

Conceptualization and design: Abbas Najafpour, Babak Moeini.
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Competing Interests

The authors declare no competing interests.

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