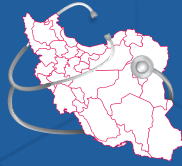




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Sports Medicine Research Center
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Health-Enhancing Physical Activity Monograph in the Islamic Republic of Iran (Comprehensive Report)



Health-Enhancing Physical Activity Monograph in the Islamic Republic of Iran

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Foreword

From ancient times, Iranian culture and science have believed that physical activity and exercise are of great importance in human health. "The basis of health is on nutrition, sleep, and exercise, while the most important of which is exercise," says Avicenna, at the beginning of Al-Qanon, the most famous medical reference book in the global history of medicine. Therefore, he started his book with three chapters on the effects of exercise on the human body. Research performed in Iran in recent years also emphasized this issue. However, studies reported that the physical activity levels of Iranians are decreasing sharply. It seems that many Iranians are not fully aware of the sufficient levels of physical activity and methods of engaging in physical activity in Iran. Valuable activities have been conducted by different ministries, universities, and related organizations to make Iranians more active; however, the effectiveness of these activities is somehow controversial. This report provided a summary of the studies on the physical activity levels of Iranians and its changes in recent years. We hope that it will be useful in planning for physical activity increase in Iranians.

که ورزشی مایه ی زندگی است
که فرجام سستی سرافکنندگی است
که بنیاد گیتی به کوشندگی است

تن زنده والا به ورزشی است
به ورزش گرای و سرافراز باش
ز ورزش میاسای و کوشنده باش

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List of used abbreviations in alphabetical order

Abbreviations

Behavioral Risk Factor Surveillance System	BRFSS
Childhood & Adolescence Surveillance and Prevention of Adult Non-communicable of Diseases	CASPIAN
Disability-Adjusted Life Year	DALY
Global Physical Activity Questionnaire	GPAQ
hour/day	h/d
Health Enhancing Physical Activity Policy Audit Tool	HEPA PAT
Health Promotion Model	HPM
International Physical Activity Questionnaires	IPAQ
Low Physical Activity	LPA
Metabolic Equivalent of Task	MET
Physical Activity	PA
Physical Activity Questionnaire for Adolescents	PAQ-A
Iran Persian Gulf Healthy Heart Study	PGHHS
STEPwise approach to surveillance	STEPS
Trans Theoretical Model	TTM
World Health Organization Global School-based Student Health Survey	WHO-GSHS



Summary

Insufficient physical activity is the main cause of premature mortality through the increased burden of non-communicable diseases. Non-communicable diseases are the cause of 38 million annual deaths globally. Non-communicable diseases cause more than 76% of all the burden of diseases in Iran (1). From 1990 to 2017, the percentage of low physical activity attributable Disability-Adjusted Life Years (DALY) increased by 1.5 times globally and 2 times in Iran, respectively, causing more than 1.2 million deaths worldwide and 18,000 deaths in Iran in 2017. Iran has a high prevalence of physical inactivity as a developing country (2). The most important risk factors in 18-64-year-old Iranians include unhealthy diet, hypertension, high body mass index, inactivity, smoking, and diabetes. Thus, a reduction in the prevalence of these risk factors is a principal strategy for non-communicable disease reduction (3). The goal of the Global Action Plan on Physical Activity (GAPPA) of the World Health Organization (WHO) is reaching a 15% reduction in the global prevalence of inactivity by 2030 (4). According to the studies, the achievement of this goal can be fulfilled through national efforts and measures. Providing information on the prevalence of low physical activity plays

an important role in making policies and decisions in public health. The "National Plan on Physical Activity Promotion of the Islamic Republic of Iran" is being complied with the contribution of all the physical activity-related organizations and aims to manage the physical inactivity epidemic in Iran; however, some progressions have recently been made in the field of physical activity. These statistics indicate a significant gap between the desired and achieved targets of the policies. In 2015, all countries committed to investing in healthcare nationally, aiming at increasing physical activity. Understanding the physical activity barriers can contribute to the planning and modifications to support this move (4). There is a lack of extended and integrated studies investigating the "physical activity barriers" in Iran, so an exact understanding of all the barriers is not possible. However, unfavorable economic conditions, long working hours, cultural issues, lack of self-esteem and motivation, the impact of the disease, injury, and disability, lack of appropriate and available facilities and environments, and air and environmental pollutions are the main physical activity barriers in Iran according to the limited studies conducted.

Introduction

Definition of physical activity

Physical activity includes physical movements by skeletal muscles with energy consumption. It can be performed in different ways, including walking, cycling, housework, exercises, and recreational activities such as football or local games and sports. It can also be done in different places such as at work and at home. Physical activity involves active work such as farming physical works, carrying different equipment in work, and during daily traveling from workplace to home by cycling or walking. It also includes the activities that can be performed around the house such as walking and exercising in the park or gym. All forms of physical activity lead to health benefits if performed regularly and with enough duration and intensity (5).

In 2010, the World Health Organization (WHO) provided recommendations on the type and frequency of physical activity aimed at achieving optimal health for young people, adults, and the elderly (5).

Recommended level of physical activity in different age groups:

Physical activity in infants, toddlers, and children (0-5 years old) (6)

- Babies younger than 1-year-old should have multiple bouts of physical activity per day, especially by playing actively on the floor.
- 1-4-year-old toddlers should have 180 minutes of physical activity with any intensity throughout the day, including motor skills and various activities in different environments and.
- In children up to 5 years of age, the highly active games should increase to 60 minutes per day.
- More physical activity leads to additional health benefits.

Physical activity in grade-schoolers (5 to 12) and adolescents (13 to 17) (5)

- They should have a minimum duration of 60 minutes of moderate to vigorous physical activity daily.
- Physical activity of amounts greater than 60 minutes daily

will provide additional health benefits.

- Most of the daily physical activity should be aerobic.
- Muscle-strengthening and vigorous-intensity physical activities should be done at least 3 times a week.

Physical activity in adults aged 18-64 years old (5)

- They should do at least 150 minutes of moderate-intensity physical activity or at least 75 minutes of vigorous-intensity physical activity in a week, or a combination of both.
- The activity should be performed in bouts of at least 10 minutes duration.
- For additional health benefits, adults should increase their moderate-intensity physical activity to 300 minutes per week, or engage in 150 minutes of vigorous-intensity aerobic physical activity per week
- Muscle-strengthening activities should be done involving major muscles 2 days a week or more.

Elderly aged 65 years and above (5)

- They should do at least 150 minutes of moderate-intensity physical activity or at least 75 minutes of vigorous-intensity physical activity in a week, or a combination of both.
- The activity should be performed in bouts of at least 10 minutes duration.
- For additional health benefits, they should increase their moderate-intensity physical activity to 300 minutes per week, or engage in 150 minutes of vigorous-intensity aerobic physical activity per week
- The elderly with poor mobility should perform balance-enhancing physical activity to prevent falls 3 days per week or more.
- Muscle-strengthening activities should be done involving major muscles 2 days a week or more.
- When the elderly cannot do the recommended amounts of physical activity, they should be as physically active as their abilities and conditions allow.

Importance of physical activity and its effects on health

Regular physical activity contributes to the prevention and treatment of non-communicable diseases including cardiovascular diseases, stroke, diabetes, breast cancer, and colon cancer (5). Moreover, Physical activity is involved in the prevention of other major risk factors of non-communicable diseases including hypertension, overweight, and obesity. It is also associated with mental health improvement (7, 8), delaying the incidence of dementia (9), and improvements in the quality of life and well-being (10). Sedentary behavior includes any type of behavior during awakening times with less energy consumption or equal to 1.5 METs (Metabolic Equivalent of Task) including sitting, leaning, and lying down (11). Recent literature reported that getting the habit of sedentary behavior (such as sitting for long periods) is associated with abnormal glucose metabolism, cardiovascular-metabolic disease development, and general mortality (12). Sedentary behavior reduction by promoting physical activity in daily life (standing, climbing stairs, and short walks) increases the physical activity level and helps to reach the required and desirable threshold of health. In addition to the several benefits of physical activity, more active societies are pioneers in productivity in investments, including fossil fuel consumption reduction and achieving cleaner and less polluted air and safe roads. Physical activity is important in all age groups. Active games and recreation in early childhood are important for healthy growth and development of

children and adolescents. The quality of physical education and the presence of a supportive environment in the school can provide motor skills and health needed for a long-term healthy and active lifestyle. Physical activity and its different forms lead to multiple health, social, and economic benefits. Walking and cycling are the key routes of active transportation, allowing active engagement of people in regular and daily physical activity. However, the role and popularity of these methods are unfortunately decreasing in most countries. Low- and middle-income countries show the most changes. For example, the transportation methods of many people are changing from walking and cycling to private cars (13). Policies that improve the road safety and urban design, prioritize the pedestrians, cyclists, and public transport users in service provision, and focus on the educational issues and creating public green spaces and entertainment and sports facilities ultimately lead to a reduction in the private car use, airborne carbon particle emissions, urban traffic, and health costs (14). Also, they result in the local microeconomics strengthening and the promotion of community health and quality of life at the same time (14, 15). Given the fact that 70% of the global population lives in urban areas, city authorities can take effective steps regarding this issue by improving the urban design and sustainable transportation systems, according to the Shanghai Consensus on healthy cities (16).



Costs imposed on the healthcare system and society by inactivity

Global physical inactivity costs health-care systems \$54 billion throughout the world. In addition to direct costs, physical inactivity contributes to \$14 billion in productivity losses (17). According to the statistics in high-, low-, and middle-income countries, 1%-3% of national healthcare costs are due to the inactivity-related complications (4). These reports are quite conservative because of limited access to the data regarding the costs imposed by mental health issues and musculoskeletal

problems. The costs out of the healthcare system that are imposed on the community, including the potential environmental benefits of increased walking, cycling, and public transportation use and fossil fuel use reduction are not included in this general evaluation. Studies show that physical inactivity-related costs are increasing and are associated with adverse effects on the healthcare system, environment, economic development, community well-being, and quality of life for all.



Physical activity status in Iranian children and adolescents

The National Plan on Childhood & Adolescence Surveillance and Prevention of Adult Non-Communicable Diseases (CASPIAN) studies were first implemented in 2003 and have been performing in 5 steps since then. The project was implemented with the collaboration of associated organizations and ministries, including the Ministry of Education and the Ministry of Health and Medical Education with the support of the World Health Organization (WHO). The study was performed in the provinces of Iran on 6-18 years old students. Both genders and all grades were included in the sampling. A quota sampling of the urban and rural areas was conducted in each county. The sampling was performed considering the different grades, the ratio of the public to private schools under coverage, and the ratio of sample allocation to the schools of the related

cluster. Also, the sampling was based on a simple random method and included the girls' and boys' schools using the school records. A questionnaire was designed for the study which was consisted of 2 parts. Part I included the demographics and the potential environmental factors affecting the physical activity, which were extracted from the other studies. Part II included the evaluation of the levels of physical activity of the students using a classified physical activity questionnaire adapted from validated questionnaires (World Health Organization Global School-based Student Health Survey (WHO-GSHS)).

The CASPIAN study provides comprehensive information on a variety of topics. We only discuss the information regarding physical activity and hours spent on watching TV and using the Personal Computer (PC) by the students.

Table 1: Overall characteristics of the CASPIAN surveillance system studies

Reference	Age Group	Number of Provinces Under Coverage	Sample Size (Students)	Year	CASPIAN Study
(18)	10-18 years old	27	5682	2009-2010	3rd
(19)	6-18 years old	30	14880	2011-2012	4th
(20)	6-18 years old	30	14272	2015	5th

According to the studies based on CASPIAN studies, physical activity is classified into three levels of low, moderate, and high as follows:
A low level of physical activity is defined as less than 2 sessions

of physical activity per week (duration of each session is 30 min). A moderate level of physical activity is defined as 2-4 sessions of physical activity per week, while the high level of physical activity is defined as more than 4 sessions a week.

Table 2: The prevalence of low, moderate, and high levels of physical activity by gender according to the CASPIAN studies

Physical Activity	Girls	Boys	Total
3rd CASPIAN			
Percentage (%)			
Low level of physical activity	53.1	69.1	61.5
Moderate level of physical activity	31.7	19.3	25.1
High level of physical activity	15.3	11.6	13.3
4th CASPIAN			
Percentage (%)			
Low level of physical activity	39.6	28.7	34.1
Moderate level of physical activity	37.9	35.6	36.7
High level of physical activity	22.4	35.6	29.1
5th CASPIAN			
Percentage (%)			
Low level of physical activity	35.0	31.9	33.4
Moderate level of physical activity	33.4	33.0	33.2
High level of physical activity	31.6	35.1	33.3

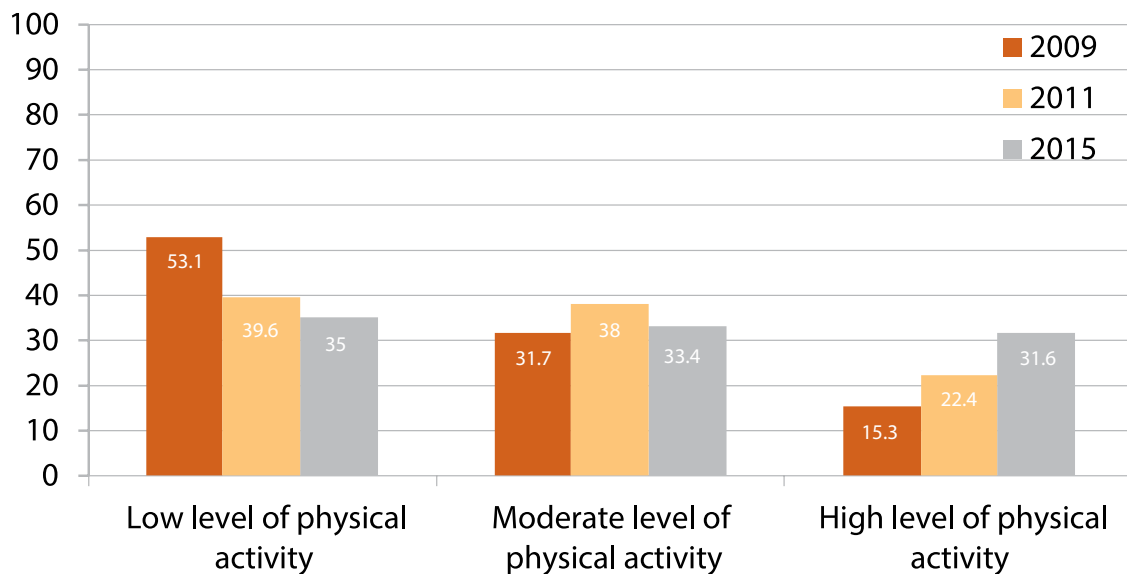


Diagram 1: The trend of changes in the prevalence of low, moderate, and high levels of physical activity in Iranian girls according to the CASPIAN studies in percentage (18-20)

According to Diagram 1, the prevalence of low level of physical activity was decreased by 18.1%, while the prevalence of moderate and high levels of physical activity increased by 1.7% and 16.3%, respectively, in female grade-schoolers and adolescents in the 5th CASPIAN study (2015) compared to the 3rd CASPIAN study (2009).

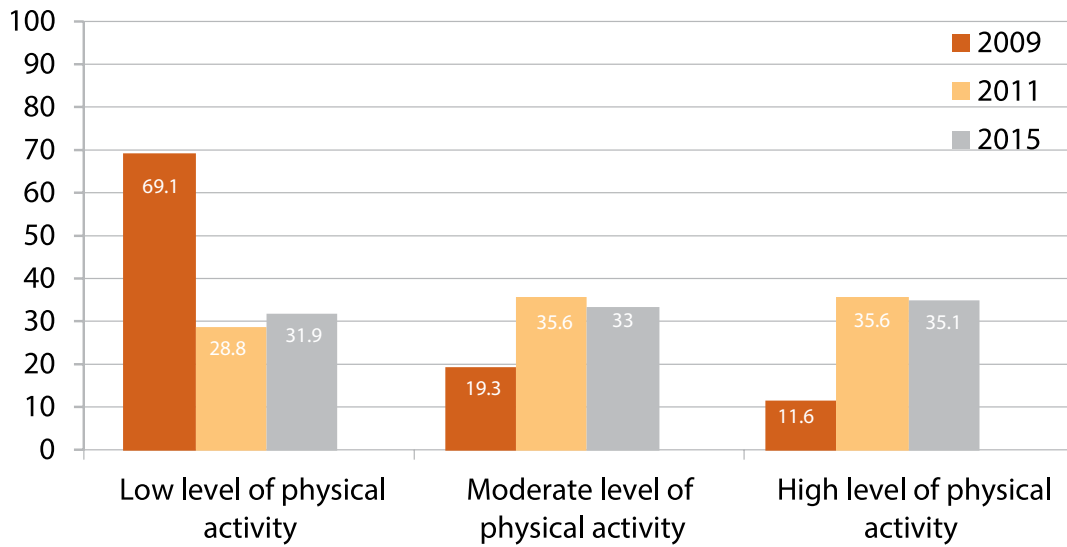


Diagram 2: The trend of changes in the prevalence of low, moderate, and high levels of physical activity in Iranian boys according to the CASPIAN studies in percentage (18-20)

According to Diagram 2, the prevalence of low level of physical activity was decreased by 37.2%, while the prevalence of moderate and high levels of physical activity increased by 13.7% and 23.5%, respectively, in male grade-schoolers and adolescents in the 5th CASPIAN study (2015) compared to the 3rd CASPIAN study (2009).

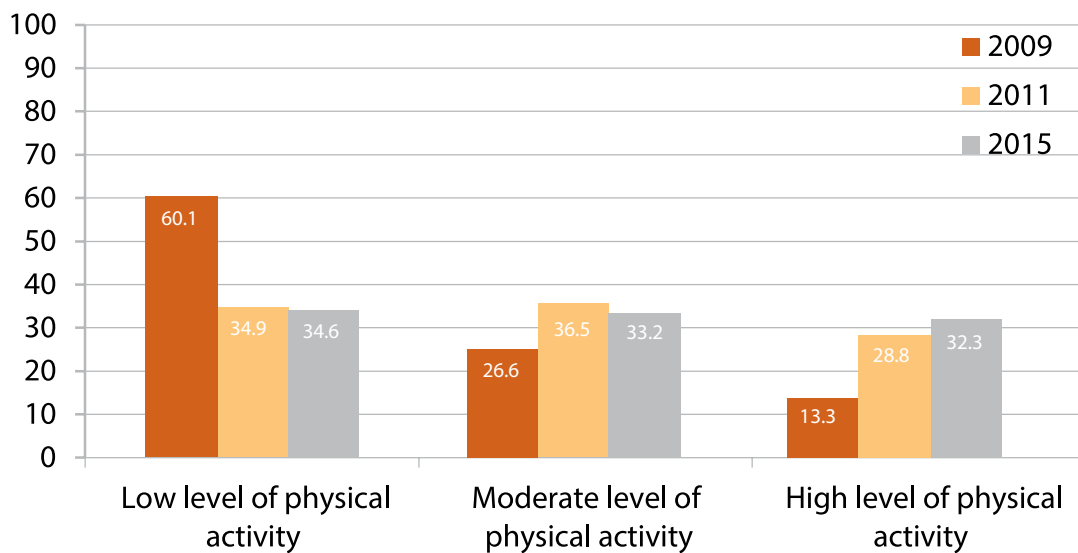


Diagram 3: The trend of changes in the prevalence of low, moderate, and high levels of physical activity in Iranian urban population according to the CASPIAN studies in percentage (18-20)

According to Diagram 3, the prevalence of low level of physical activity was decreased by 25.5%, while the prevalence of moderate and high levels of physical activity increased by 6.6% and 19%, respectively, in the grade-schoolers and adolescents living in the urban areas in the 5th CASPIAN study (2015) compared to the 3rd CASPIAN study (2009). These data indicate an increase in the level of physical activity and a decrease in the level of physical inactivity in this population.

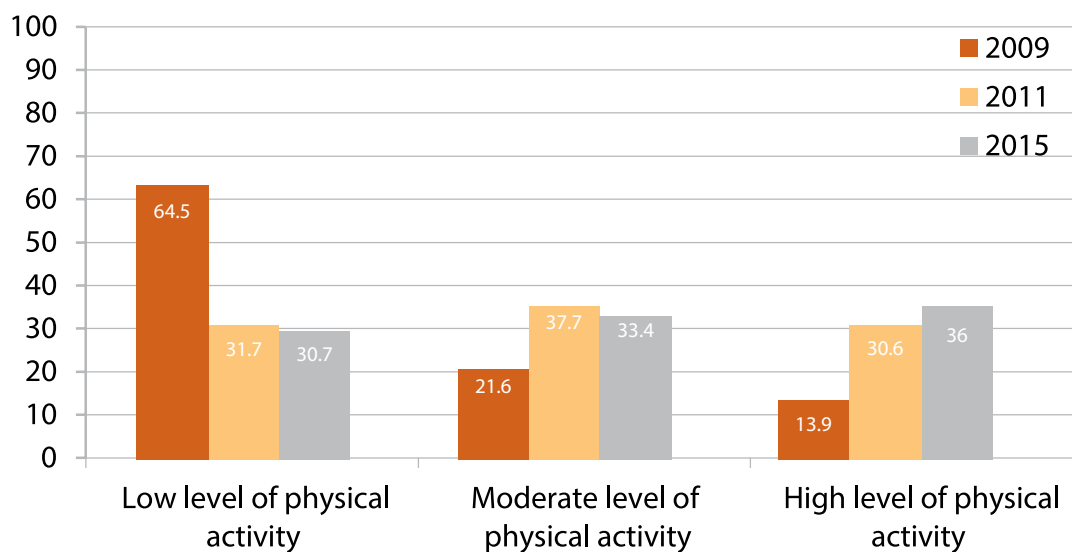


Diagram 4: The trend of changes in the prevalence of low, moderate, and high levels of physical activity in Iranian rural population according to the CASPIAN studies in percentage (18-20)

According to Diagram 4, the prevalence of low level of physical activity was decreased by 33.8%, while the prevalence of moderate and high levels of physical activity increased by 11.8% and 22.1%, respectively, in the grade-schoolers and adolescents living in the rural areas in the 5th CASPIAN study (2015) compared to the 3rd CASPIAN study (2009). These data indicate an increase in the level of physical activity and a decrease in the level of physical inactivity in this population.



Table 3: The distribution of low, moderate, and high levels of physical activity in 6- to 18-year-olds by province according to the 4th CASPIAN study (19)

4th CASPIAN study		(% Level of physical activity)		
		Low	Moderate	High
Provinces	Tehran	49.4	37.3	13.4
	Khuzestan	48.4	30.6	21
	Qom	47.9	28.8	23.3
	Alborz	44.9	38.2	16.9
	Chaharmahal va Bakhtiari	41.7	31.5	26.8
	Kermanshah	40	36.8	23.2
	Ilam	39.4	35	25.6
	Kohgiluyeh and Boyerahmad	39.1	34.7	26.2
	Zanjan	36.2	39	24.8
	Sistan and Baluchestan	35	36.6	28.4
	Ardabil	34.9	38.1	27
	Isfahan	34.9	37.4	27.7
	Mazandaran	34.8	34.5	30.7
	Bushehr	34.1	38.4	27.6
	Qazvin	33.5	23.9	33.5
	Khorasan Razavi	33	43.3	23.7
	East Azerbaijan	32.8	40.5	26.7
	Hormozgan	32.3	40.9	26.8
	Hamedan	32.2	36.1	31.7
	Markazi	30.4	37.1	32.5
	North Khorasan	29.4	33.2	37.4
	Golestan	28.5	38.7	32.8
	Semnan	28.4	40	31.6
	Fars	28.4	38.8	32.8
	Kurdistan	27.9	30.9	41.2
	Lorestan	27.5	46.8	25.7
	Gilan	26	40.4	33.5
	Yazd	25.4	34.6	40
	West Azerbaijan	22.9	36.7	40.4
	Kerman	21.8	43.9	34.3
	Total	34.1	36.8	29.1

Table 4: The distribution of low, moderate, and high levels of physical activity in 6 to 18 years olds by province according to the 5th CASPIAN study (20)

5th CASPIAN study		(% Level of physical activity)		
		Low	Moderate	High
Provinces	Tehran	41.3	28.6	30.1
	Semnan	39.3	32.7	27.9
	Mazandaran	38.9	29.8	31.3
	Alborz	38.7	30.6	30.6
	Ardabil	38.5	29.1	32.4
	Zanjan	38.5	28.8	32.6
	Qazvin	38.5	32.5	29
	Kerman	37.5	32.9	29.6
	Khorasan Razavi	37.1	31.2	31.7
	Bushehr	36.9	33.6	29.6
	Isfahan	36.3	33.4	30.3
	Markazi	34.7	33.6	31.8
	South Khorasan	34.3	32.3	35.4
	North Khorasan	33.9	31.9	34.2
	Hormozgan	33.1	33.1	33.8
	West Azerbaijan	32.9	36.8	30.3
	East Azerbaijan	32.8	35.6	31.6
	Hamedan	32.7	32.9	34.4
	Yazd	31.5	34.6	33.9
	Ilam	31.3	33.8	35.1
	Chaharmahal va Bakhtiari	30.9	31.4	37.7
	Sistan and Baluchestan	30.6	33.7	35.7
	Lorestan	29.9	33.6	36.5
	Gilan	28.9	37.3	33.8
	Kurdistan	28.9	34.9	36.2
	Khuzestan	28.5	36.4	35.1
	Fars	28.1	36.7	35.2
	Golestan	27.3	36.4	36.2
	Hamedan	32.7	32.9	34.4
	Kermanshah	27.2	33.1	39.7
	Total	33.4	33.2	33.3

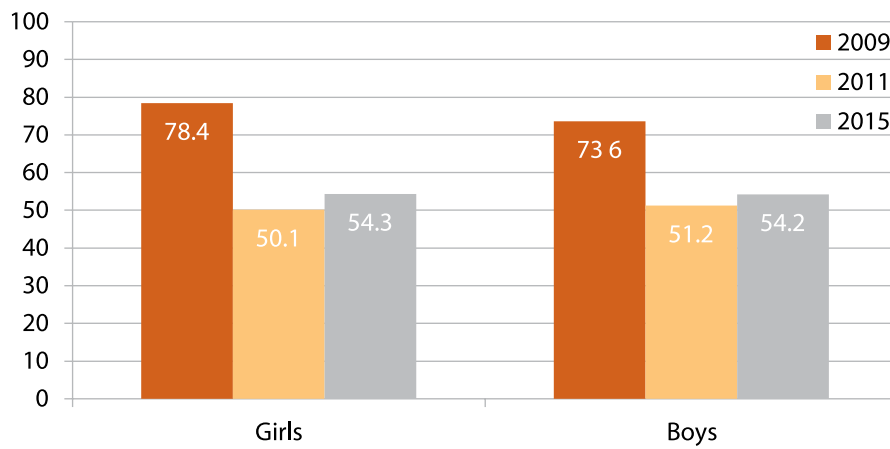


Diagram 5: The trend of changes in watching TV with the duration of longer than 2 hours daily in Iran by gender according to the CASPIAN studies in percentage (18-20)

According to Diagram 5, the prevalence of watching TV with a duration of longer than 2 hours daily was decreased by 24.1% and 19.4% in girls and boys, respectively, in the 5th CASPIAN study (2015) compared to the 3rd CASPIAN study (2009).



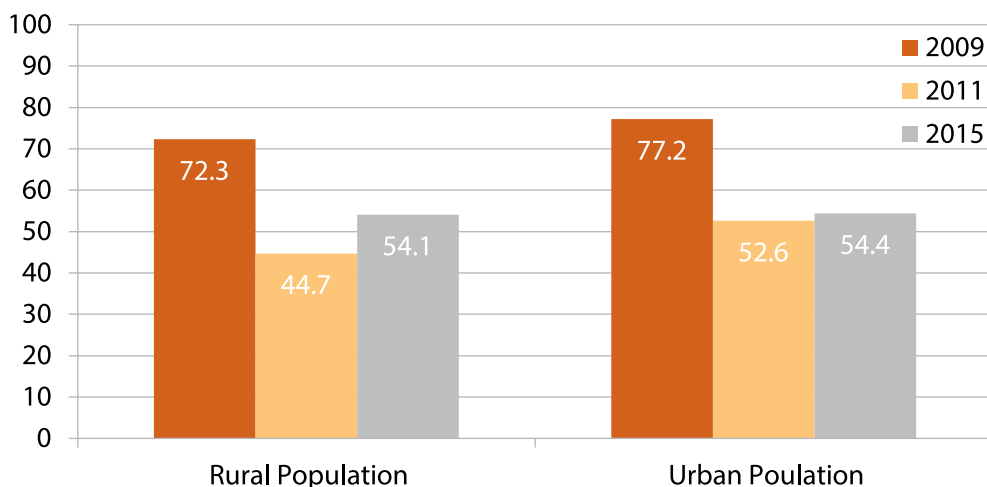


Diagram 6: The trend of changes in watching TV with the duration of longer than 2 hours daily in the urban and rural population in Iran according to the CASPIAN studies in percentage (18-20)

According to Diagram 6, the prevalence of watching TV with the duration of longer than 2 hours daily was decreased by 22.8% and 18.2% in the grade-schoolers and adolescents living in the urban and rural areas, respectively, in the 5th CASPIAN study (2015) compared to the 3rd CASPIAN study (2009). A decrease in the duration of TV watching per day was reported in the CASPIAN studies.

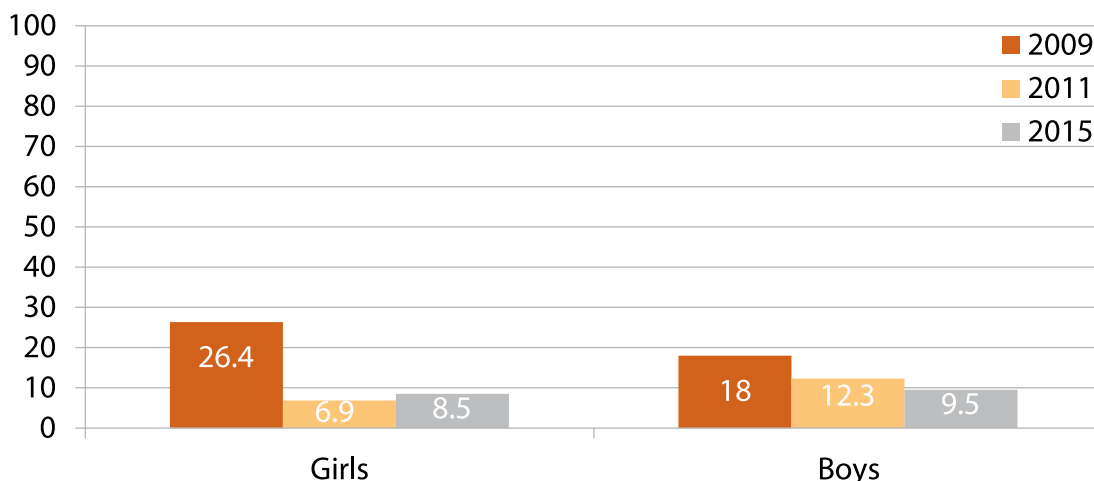


Diagram 7: The trend of changes in using Personal Computer (PC) with the duration of longer than 2 hours daily in Iran according to the CASPIAN studies by gender and in percentage (18-20)

According to Diagram 7, the prevalence of using Personal Computer (PC) with the duration of longer than 2 hours daily was decreased by 17.9% and 8.5% in girls and boys, respectively, in the 5th CASPIAN study (2015) compared to the 3rd CASPIAN study (2009).

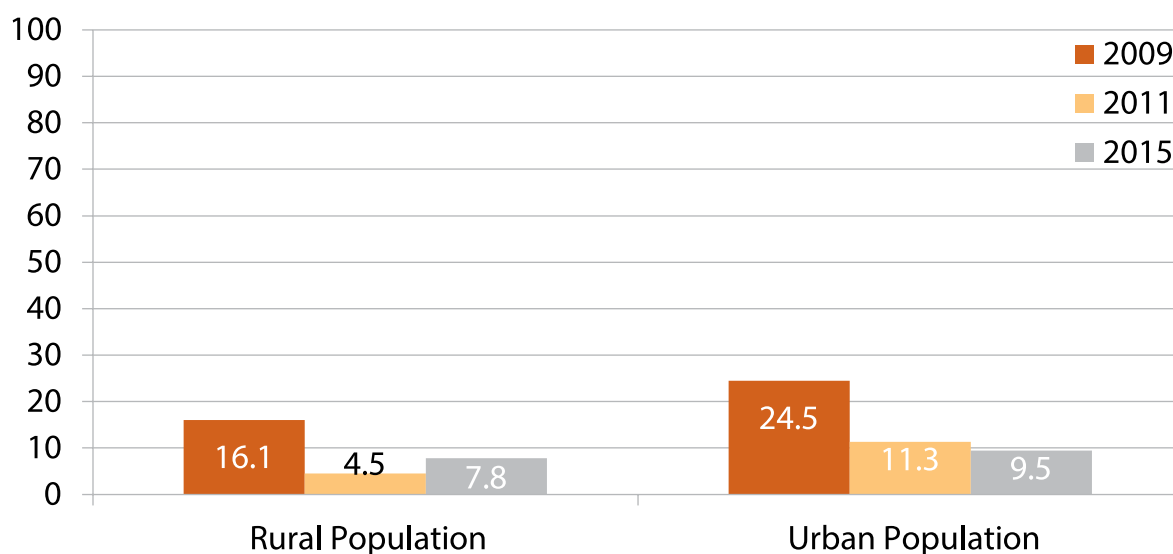


Diagram 8: The trend of changes in using Personal Computer (PC) with the duration of longer than 2 hours daily in the urban and rural population in Iran in CASPIAN studies in percentage (18-20)

According to Diagram 8, the prevalence of using Personal Computer (PC) with the duration of longer than 2 hours daily was decreased by 15% and 8.3% in the grade-schoolers and adolescents living in the urban and rural areas, respectively, in the 5th CASPIAN study (2015) compared to the 3rd CASPIAN study (2009).

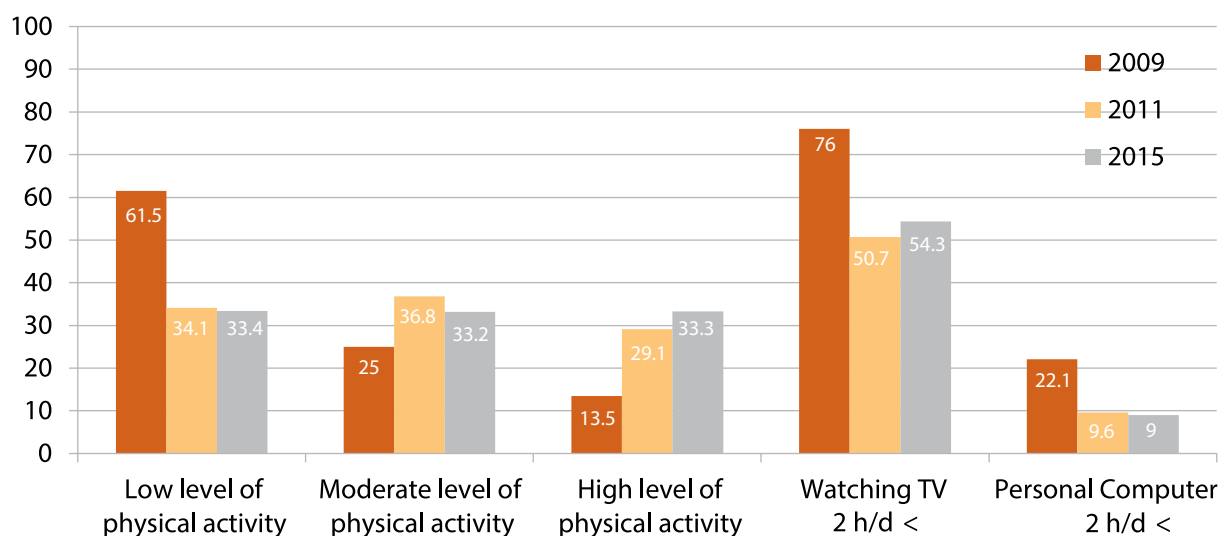


Diagram 9: The trend of changes in physical activity levels, the duration of watching TV, and the duration of using Personal Computer (PC) in Iranian grade-schoolers and adolescents in percentage (18-20)

Physical activity status in Iranian adults

Given the increasing prevalence of non-communicable diseases throughout the world, the World Health Organization (WHO) has taken the STEPwise Approach to Surveillance (STEPS) to provide access to validated and comparable data on the risk factors of non-communicable diseases. The survey goal is the implementation of an appropriate surveillance system for these major risk factors. This survey is being conducted in Iran in this regard. The STEPwise approach to non-communicable disease risk factor surveillance of the World Health Organization has three steps of data collection. These three executive steps include inquiries using questionnaires, physical measurements, and biochemical measurements. The first step, which is conducting an inquiry using a questionnaire, evaluates smoking, diet, physical activity, history of hypertension and diabetes, and other factors including the seat belt use by the front passenger and the healthcare insurance coverage. The prevalence of different levels of physical activity is assessed using the Global Physical Activity Questionnaire (GPAQ2). The study target group includes adults older than 18 years of age. The sampling is performed from all provinces and both genders. The GPAQ questionnaire includes 16 items regarding the different types of physical activity that people perform as a part of their daily lives. Generally, the questionnaire investigates all the types of vigorous and moderate physical activity during the past 7 days in three domains of physical activity during work, during traveling to and from places, and during recreational activities.

According to the GPAQ questionnaire used in the STEPs survey for physical activity assessment (21), vigorous-intensity physical activity includes activities with the minimum duration of 10 min continuously, causing a substantial increase in the respiratory and heart rate (including carrying heavy loads, construction works, and drilling works). Moderate-intensity physical activity includes activities with a minimum duration of 10 min continuously, causing a noticeable increase in the respiratory and heart rate (including carrying light loads,

frequent climbing of short stairs, or long walks). According to the GPAQ questionnaire, the level of physical activity of the individuals is classified into three levels of low, moderate, and high levels.

An individual with the following criteria is classified in the high-level group of physical activity:

High-intensity activity at least 3 days a week with a minimum energy consumption of 1500 METs per min/week

Or

A combination of walking 7 days a week or moderate-intensity physical activity with a minimum energy consumption of 3000 METs per min/week

An individual who does not fulfill the criteria of the high level of physical activity but fulfills any of the following criteria is classified in the moderate-level group of physical activity:

High-intensity activity at least 3 days a week or more with a minimum duration of 20 minutes a day

Or

Moderate-intensity activity at least 5 days a week or more, or walking 7 days a week with a minimum duration of 30 minutes a day

Or

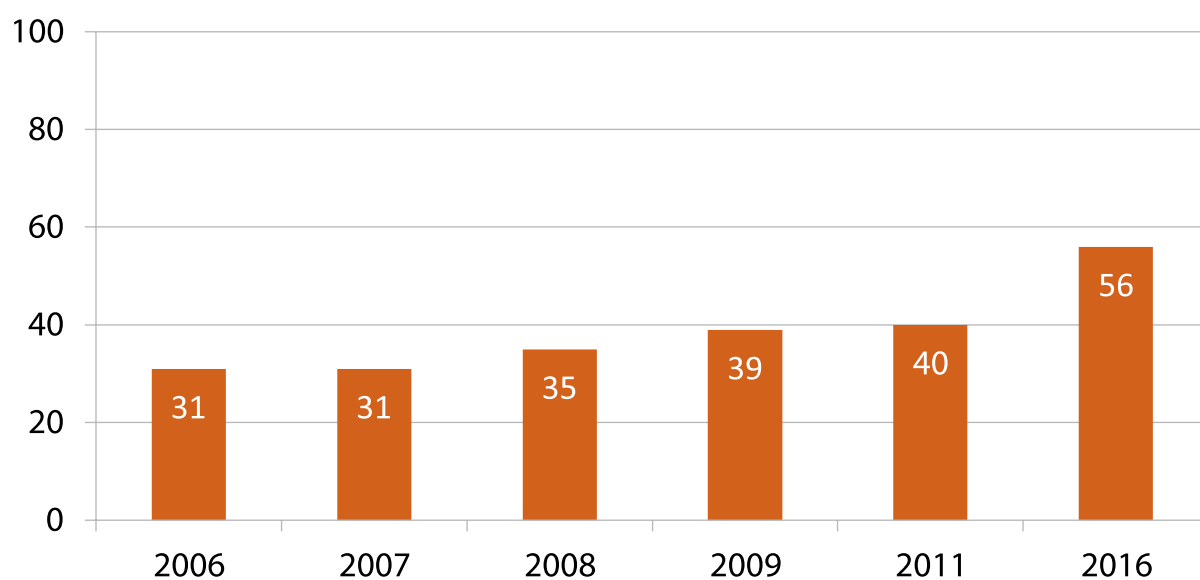
Moderate- or high-intensity activity or walking at least 5 days a week or more with a minimum energy consumption of 600 METs per min/week

An individual who does not fulfill any of the criteria associated with high or moderate levels of physical activity is classified in the low-level group of physical activity.

7 rounds of the STEPwise approach to non-communicable disease risk factor surveillance survey (STEPS) have been performed in Iran in 2005, 2006, 2007, 2008, 2009, 2011, and 2016 (in 2005, the level of physical activity was not studied). The data obtained in the first two steps (inquiry using a questionnaire and physical measurements) was collected in all rounds of the study and the results of insufficient physical activity prevalence are presented in Table 5 and Diagram 10.

Table 5: The prevalence of insufficient physical activity in Iran from 2006 to 2016 according to the STEPs study in percentage

Year	2006	2007	2008	2009	2011	2016
Total population	31	31	35	39	40	56
Men	22	22	24	28	32	46
Women	37	40	46	50	49	63

**Diagram 10: The prevalence of insufficient physical activity in Iran from 2006 to 2016 according to the STEPs study by percentage**

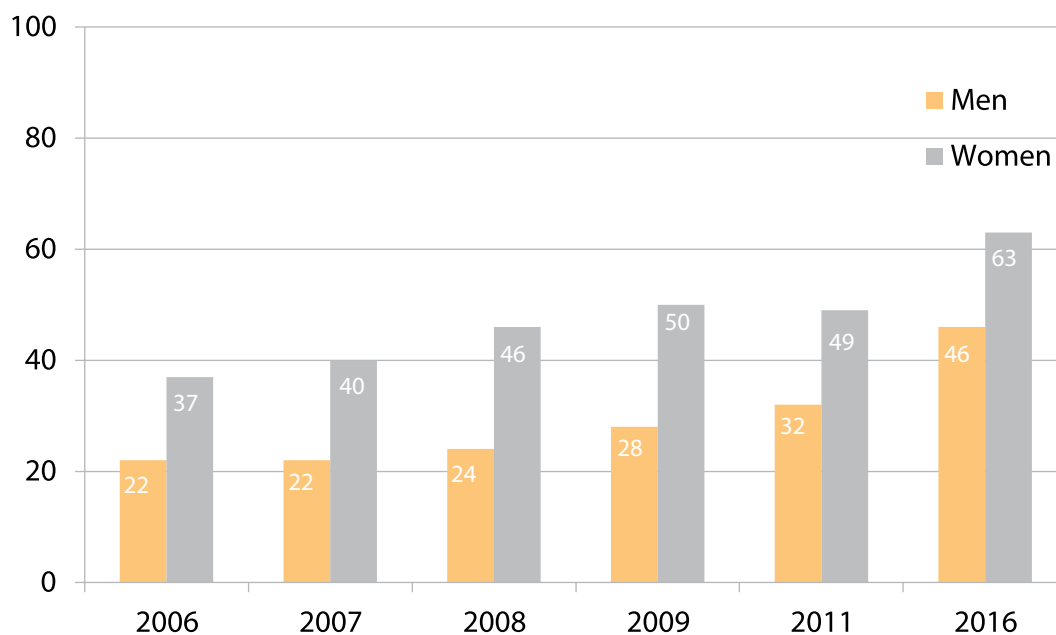


Diagram 11: The trend of changes in the insufficient physical activity prevalence in Iran by gender from 2006 to 2016 according to the STEPs study in percentage

According to these studies, there is a significant decrease in physical activity from 2006 to 2016. In terms of gender, the prevalence of insufficient physical activity was higher in women than men. This difference was also steadily increasing from 2006 to 2016 (Diagram 11).



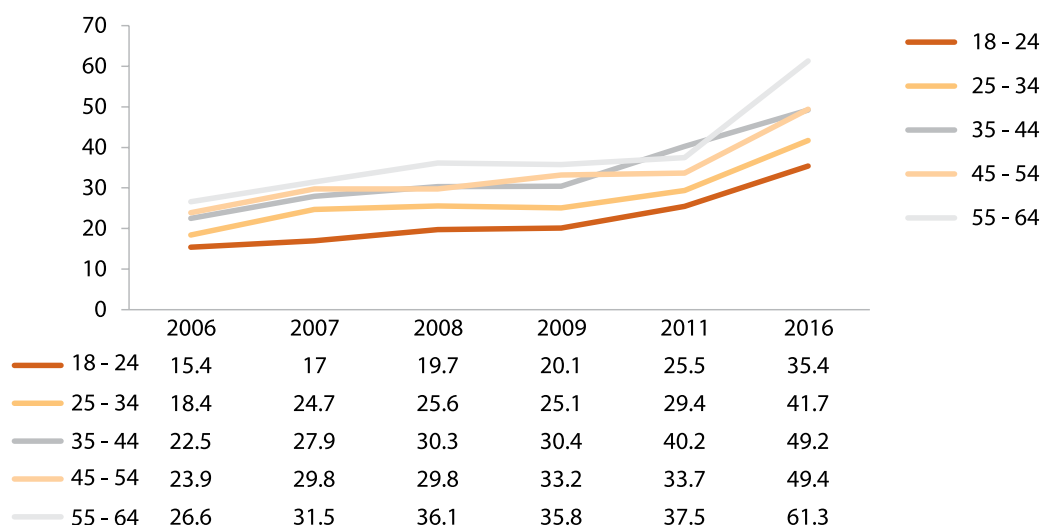


Diagram 12: The trend of changes in the insufficient physical activity prevalence in Iranian men by age group (18-64 years old) from 2006 to 2016 according to the STEPs study in percentage

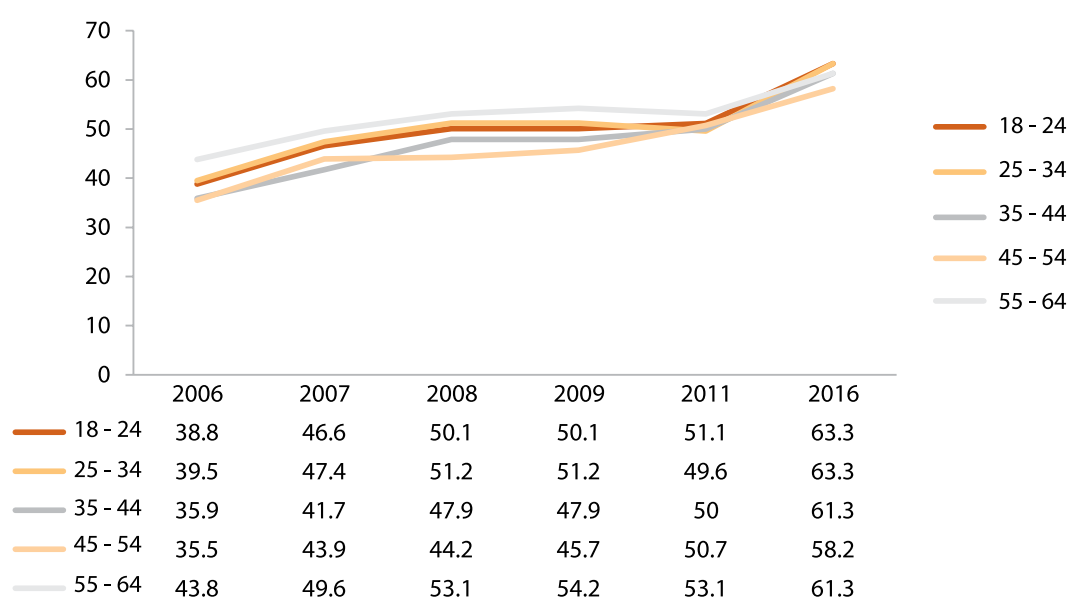


Diagram 13: The trend of changes in the insufficient physical activity prevalence in Iranian women by age group (18-64 years old) from 2006 to 2016 according to the STEPs study in percentage

In terms of different age groups, the highest and lowest rates of insufficient physical activity were reported in the elderly (older than 60 years old) and adults 18-24 years of age, respectively. Moreover, insufficient physical activity has increased significantly in all age groups in recent years (Diagram 13).

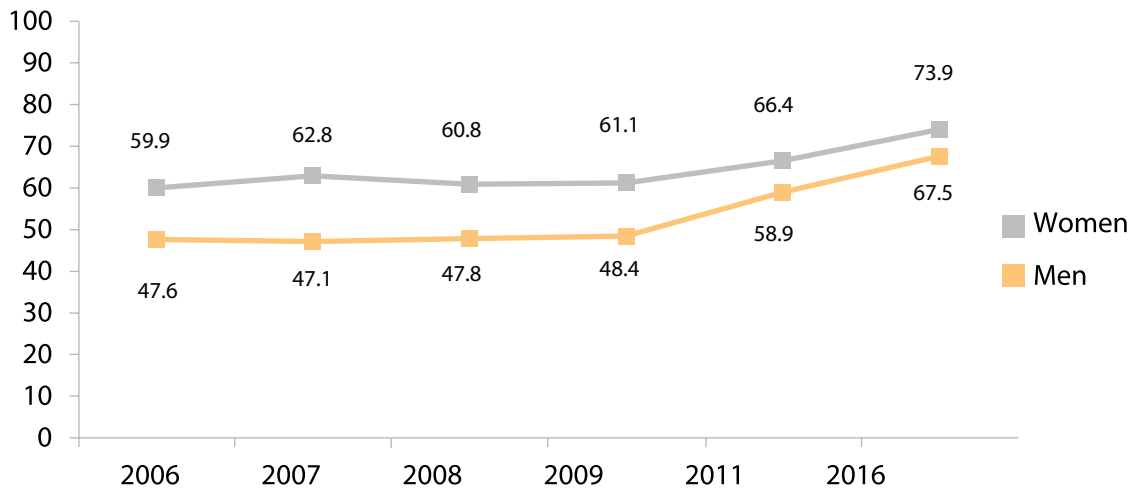


Diagram 14: The trend of changes in the prevalence of insufficient physical activity at work from 2006 to 2016 according to the STEPs study in percentage

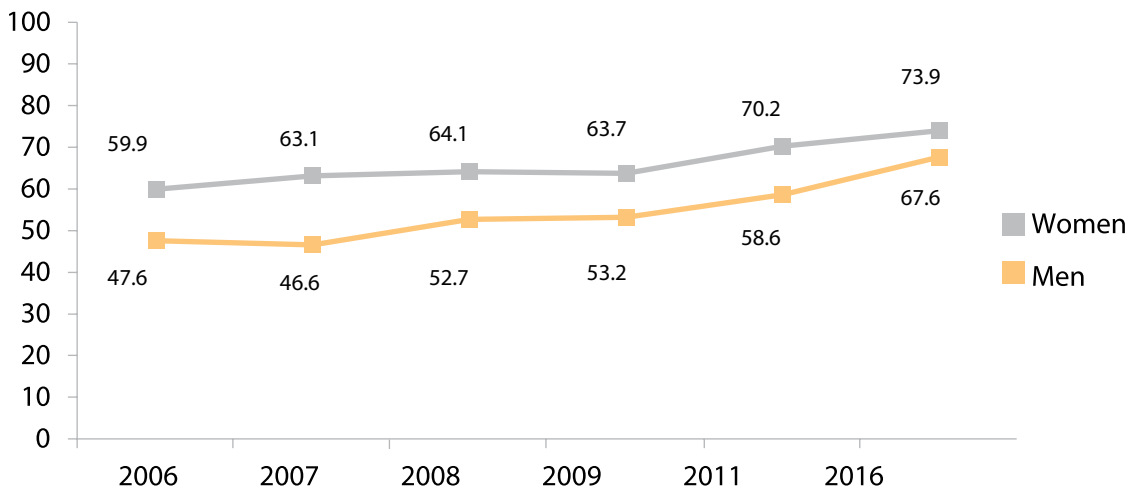


Diagram 15: The trend of changes in the prevalence of insufficient physical activity at times of traveling to and from places from 2006 to 2016 according to the STEPs study in percentage

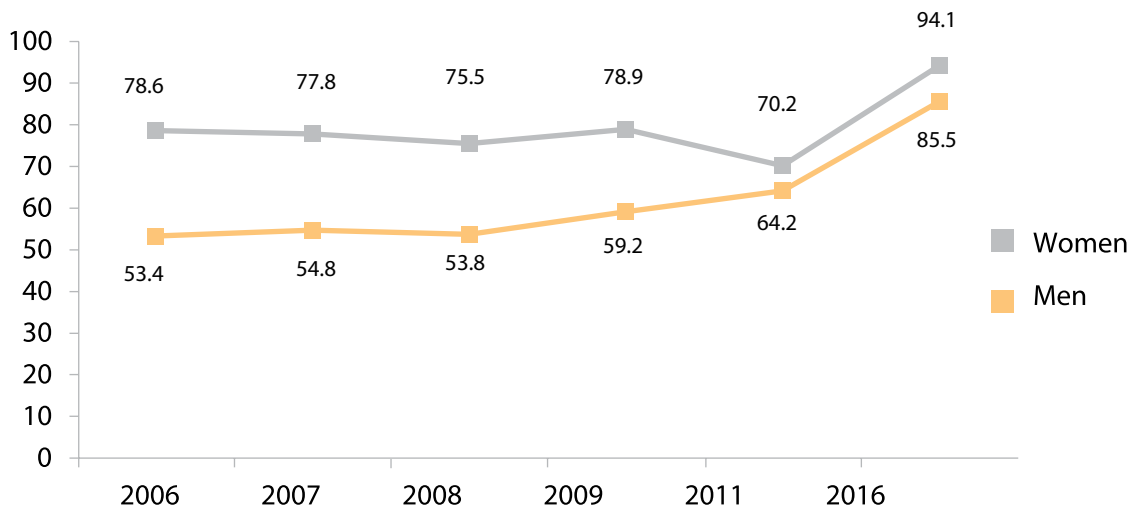


Diagram 16: The trend of changes in the prevalence of insufficient physical activity at times of recreational activities from 2006 to 2016 according to the STEPs study in percentage

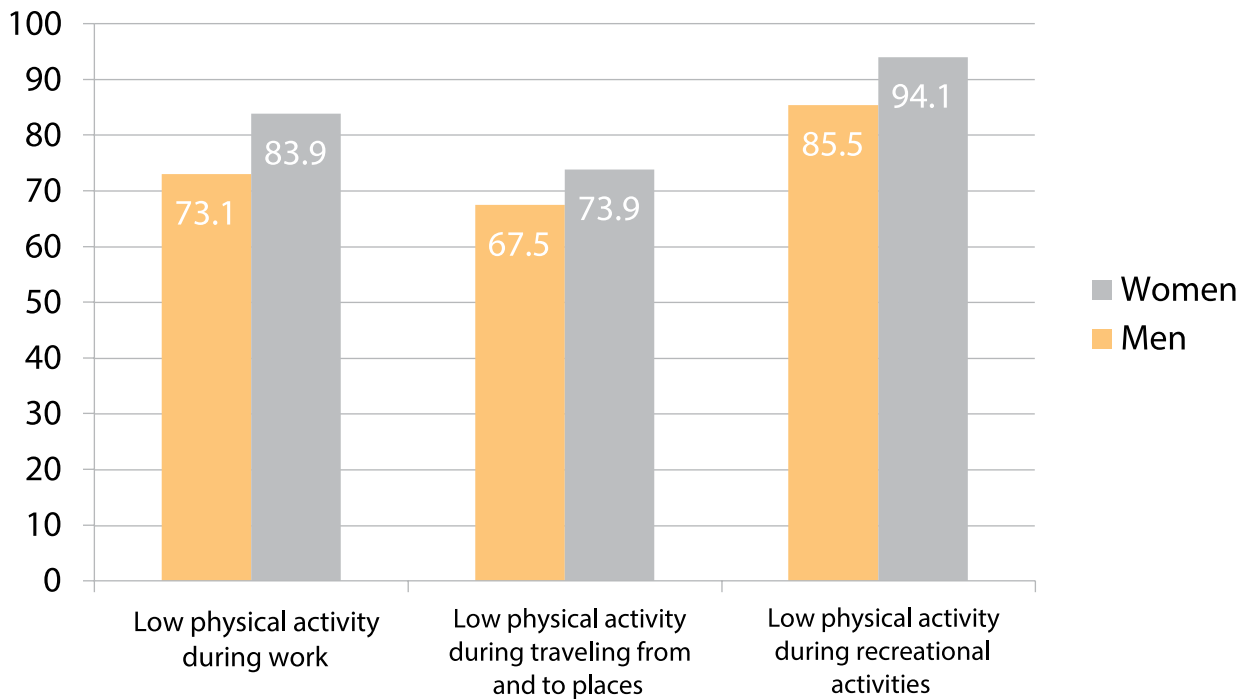


Diagram 17: The trend of changes in the prevalence of insufficient physical activity in different aspects of physical activity by gender in 2016 according to the STEPs study in percentage

In this section, there is a report of the results associated with the prevalence of the low level of physical activity according to the STEPs study in 2016 (22).

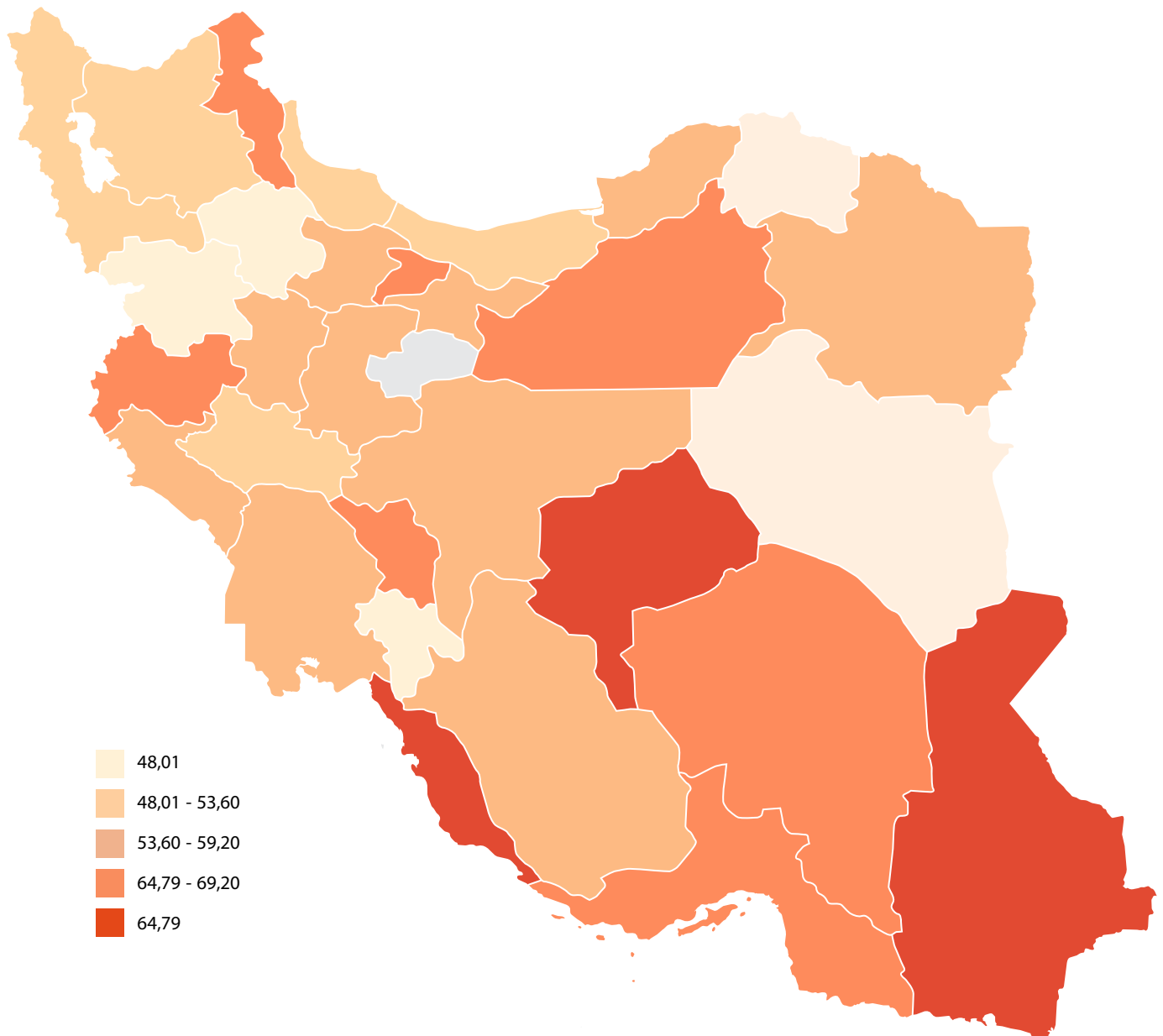


Figure 1: The distribution of low physical activity level in Iran in 2016 by province according to the STEPs study in percentage (22)

Figure 1 presents the prevalence of the low level of physical activity in adults older than 18 years old and involves the urban and rural areas and both genders in 2016 on the map of Iran. The prevalence of low level of physical activity is classified into 5 groups as follows: Lower than 48.01%, 48.01%-53.60%, 53.60%-59.20%, 59.20%-64.79%, higher than 64.79%.

Table 6: The distribution of low physical activity in all age groups by gender and province in 2016 according to the STEPs study in percentage (22)

Table 6 presents the distribution of low physical activity in all age groups by gender and province in 2016 according to the STEPs study in percentage.

By Province	Men	Women	Total
Bushehr	58.8	79.5	70.3
Yazd	59.3	70.6	65.2
Sistan and Baluchestan	57.4	71.1	65.2
Kermanshah	54.1	72.2	64.2
Ardabil	52.1	73.2	64
Alborz	55.8	70.7	64
Chaharmahal va Bakhtiari	52	72.1	63.6
Semnan	56.9	67.4	63
Hormozgan	55.8	67.9	62.8
Kerman	50.4	67.5	60
Golestan	50.7	66	58.8
Khuzestan	47.3	68	58.6
Fars	50.2	63.7	58.2
Isfahan	49.5	63.6	57.4
Tehran	46.9	64.9	56.5
Hamedan	41.4	66	55.6
Ilam	40.2	65.5	55
Markazi	39.8	65.4	54.7
Qazvin	36.3	69.5	64.6
Khorasan Razavi	47.6	59.8	54.3
East Azerbaijan	39.6	60	51.3
Lorestan	38.9	60.1	51.2
Mazandaran	39.3	58.7	50
West Azerbaijan	38.9	57.1	49.3
Gilan	39.9	54.8	48.2
South Khorasan	36	56	47.3
Kurdistan	35.7	55.6	47.3
North Khorasan	38.1	53.4	47.2
Kohgiluyeh and Boyerahmad	39.3	44.5	42.5
Zanjan	37.4	45.8	42.4

Bushehr is the first province in the prevalence of low level of physical activity with a rate of 70.3% and the women in Bushehr have the lowest physical activity among Iranian women with a prevalence of 79.5%. The province with the lowest physical activity in men is Yazd with a prevalence of 59.3%. On the other hand, the lowest prevalence of low physical activity in men and women was 35.7% and 44.5% in Kohgiluyeh and Boyerahmad and Kurdistan, respectively. The best condition in physical activity was reported in Zanjan with a low physical activity rate of 42.4%, where the average condition of physical activity in both genders was better compared to the other provinces. So in general, the prevalence of low physical activity in Iran in 2016 was 56%, considering all age groups and both genders.

Table 7: The distribution of the low physical activity prevalence in Iran by age group index and gender in percentage (22)

Age Group	Mean prevalence of low physical activity in Iran	Mean prevalence of low physical activity in Iranian women	Mean prevalence of low physical activity in Iranian men	Provinces with the highest prevalence of low level of physical activity	Provinces with the lowest prevalence of low level of physical activity
18-24 years old	51.6	63.3	35.4	Yazd, 78.2	South Khorasan, 35.6
25-34 years old	54.9	64.7	41.7	Hormozgan, 71.8	Kohgiluyeh and Boyerahmad, 38.3
35-44 years old	56	61.3	49.2	Bushehr, 76.6	Zanjan, 40.7
45-54 years old	54.4	58.2	49.4	Alborz, 66.3	Zanjan, 52.6
55-64 years old	54.5	61.3	44	Bushehr, 76.3	Kohgiluyeh and Boyerahmad, 24.1
65-69 years old	62.1	72.3	48.5	Sistan and Baluchestan, 82.2	South Khorasan, 15.7
70 years old and older	69.5	81.3	58.5	Semnan, 85.1	Qazvin, 52

According to Table 7, the highest prevalence of low physical activity was reported in 70 years old women or older living in Semnan province, while the lowest rate was in men aged 65- 69 years in South Khorasan province.

According to the table, the mean prevalence of low physical activity was higher than 50% in all age groups. In other words, one in two people of any age group has low physical activity.



Preventable mortality rate by increasing physical activity by province

In case of achieving a 20% relative reduction in the prevalence of insufficient physical activity, which is one of the goals of the National Document on the Prevention and Control of Non-Communicable Diseases of the Islamic Republic of Iran from 2015 to 2025, the mortality rate can be reduced significantly. 10717 deaths can be prevented in Iran annually if the rate of insufficient physical activity is reduced by 20% (Figure 2).



Figure 2: Number of annual preventable deaths in case of a 20% reduction in the prevalence of insufficient physical activity in each province in Iran (22).

Evaluation of the systematic review of "Prevalence of Physical Inactivity in Iran"

In a study by Fakhrzadeh et al. (23), the authors investigated the prevalence of physical inactivity in Iran. They searched the international and national databases including Scopus, PubMed/Medline, ISI, Irandoc, Barakat knowledge network system, and SID to access all the available studies. Finally, 34 studies were extracted. The data of these studies are presented in Table 8 in terms of gender, age, province, and year of publication.

Table 8: Evaluation of the systematic review of "Prevalence of Physical Inactivity in Iran"

The table is adapted from the study by Fakhrzadeh et al. (23) and the studies published from 2016 to 2019 were added.

Number	Author	Study location	Publication year	Sample size	Age group	Measure	Reporting method	Results (physical activity)	Reference
1	Janghorbani	At the national level	2005	89404	15-65	¹ GPAQ	The rate of people with a low level of physical activity who has never been married, who are married, and who were married previously	Never been married = 44.9 Married = 23.6 Previously married (not now) = 16.3 Total = 27.93	24
2	Janghorbani	At the national level	2005	89404	15-65	GPAQ	Percentage of individuals with a low level of physical activity	8/27	25
3	Alikhani	At the national level	2005	70981	25-65	GPAQ	The average time of physical activity at work in minutes per day	5/27	26
							The average time of physical activity during traveling to and from places in minutes per day	8/43	
							The average time of physical activity during recreational activities in minutes per day	6/28	
4	Esteghamati	At the national level	2007	3001	25-65	GPAQ	Percentage of individuals with physical activity	Low level of physical activity = 40.1% Moderate level of physical activity = 24.7% High level of physical activity = 35.2%	27

Number	Author	Study location	Publication year	Sample size	Age group	Measure	Reporting method	Results (physical activity)	Reference
5	Koohpayehzadeh	At the national level	2011	4121	25-65	¹ IPAQ	Percentage of individuals with physical activity	Low level of physical activity = 39.1% Moderate level of physical activity = 17.8% High level of physical activity = 43.1%	21
6	² PGHHS 2003, 2004	Bushehr province	2004	3723	≥ 25	BRFSS ³	Percentage of individuals with physical inactivity	4/70	28
7	Golestan 2005, 2006	Golestan province	2003	5000	20-65	Running, jogging, swimming, cycling or at least 30 minutes of walking at any time of the day	Percentage of individuals with physical inactivity	4/75	23
8	Sadeghi	Isfahan province	2003	1520	> 25	Minnesota	Percentage of individuals with physical inactivity	27	29
9	Saidei	Isfahan province	2001	4178	-	Baecke	Mean ± standard deviation of the low level of physical activity in MET (min/week)	Men 519.4 ± 186.8 Women 460.5 ± 663.3	30
							Mean ± standard deviation of the physical activity associated with work in MET (min/week)	4498.9 ± 2238.9 3621.6 ± 2667	
10	Sadeghi	Isfahan province	2002	12514	> 19	Baecke	Percentage of individuals with regular physical activity	519.4 ± 186.8	31
11	Sarrafzadegan	Isfahan province	2000	4178	-	Baecke	Percentage of individuals with low or moderate physical activity	4498.9 ± 2238.9	3621.6 ± 2667
12	Mousavi	Isfahan province	2005	6331	-	Baecke	Percentage of individuals with physical inactivity	7/75	33
13	Bahonar	Isfahan province	2001	12541	40/38 ± 30 /14	Baecke	Percentage of individuals with low physical activity	5/84	34

1. International Physical Activity Questionnaire

2. Persian Gulf Healthy Heart Study

3. Behavioral Risk Factor Surveillance System

Number	Author	Study location	Publication year	Sample size	Age group	Measure	Reporting method	Results (physical activity)	Reference
14	Hajian-Tilaki	An area in the north of Iran	2007	3600	6/13 ± 38	Not specified	Exercise (h/w)	≥ 2 (h/w) = 79.2% ≥ 3-5 (h/w) = 20.8%	35
							Physical activity at work (low, moderate, high)	Low level = 64.3%	
							Low level of physical activity (very low, low, high, very high)	Low and very low levels of physical activity = 81.8%	
15	Hajian-Tilaki	Babol	2008	1200	12 - 17	Baecke	Percentage of individuals with low physical activity	High, moderate, and low physical activity during recreational activities was 2.9%, 79.4%, and 17.8%, respectively.	36
16	Dastgir	An area in the north of Iran	2005	300	> 18	National Health and Nutrition Examination Survey	Percentage of individuals with the physical activity associated with recreational activities	High = 8.7%	37
								Moderate = 75.9%	
								Low = 9.6%	
17	Ghodousi	Tehran province	2001	1100	20-69	Lipid Research Clinic	Percentage of individuals with low, moderate, and high physical activity	62.8 13 24.2	38
18	Azadbakht	Tehran province	2001	926	40-60	IPAQ	Percentage of individuals with low, moderate, and high physical activity	Low = 45% Moderate = 30% High = 25%	39
19	Mirmiran	Tehran province	2000	840	18-74	Lipid Research Clinic	Percentage of individuals with low, moderate, and high physical activity	Low = 57% Moderate = 30% Vigorous = 13%	40
20	Mirmiran	Tehran province	2000	462	16<	Lipid Research Clinic	Percentage of individuals with low, moderate, and high physical activity	Low = 52.5% Moderate = 31.5% High = 16%	41
21	Sabet	Tehran province	2009	836	20 ≤	Lipid Research Clinic	Percentage of individuals with high physical activity, moderate physical activity, and physical inactivity	High = 17.8% Moderate = 17.5% Physical inactivity = 64.2%	42
22	Hadaegh	Tehran province	2007	3444	20 ≤	Lipid Research Clinic	Percentage of individuals with low, moderate, and high physical activity	Low = 39% High = 61%	43
23	Harati	Tehran province	2005	8212	20<	Modifiable Activity Questionnaire	Percentage of individuals with low, moderate, and high physical activity	Low = 66% Moderate = 12% High = 22%	44
24	MONICA	Bushehr province	2003	1574	25-64	MONICA	Percentage of individuals with physical inactivity	16.8	23

Number	Author	Study location	Publication year	Sample size	Age group	Measure	Reporting method	Results (physical activity)	Reference
25	Motefaker	Yazd province	2007	1500	20<	IPAQ	Percentage of individuals with physical inactivity, sufficient physical activity, and high physical activity	Physical inactivity = 67.3% Sufficient physical activity = 15% High physical activity = 17.7%	45
26	مطالعه CASPIAN III	At the national level	2010	5623	10-18	At least 30 minutes of daily exercise that leads to heavy sweating or increased respiratory or heart rate.	Percentage of individuals with physical activity	Low = 84.9% High = 15.1%	19
27	مطالعه CASPIAN IV	At the national level	2012	14683	6-18	At least 30 minutes of daily exercise that leads to heavy sweating or increased respiratory or heart rate.	Percentage of individuals with physical activity	Inactive = 34.11% Active = 65.89%	20
28	مطالعه CASPIAN IV مطالعه عوامل تعیین کننده اختلالات وزن	At the national level	2012	22841	6-18	At least 30 minutes of daily exercise that leads to heavy sweating or increased respiratory or heart rate.	Percentage of individuals with physical activity	Inactive = 23.48% Active = 76.52%	46
29	Emdadi	Hamedan province	2015	866	40-64	Questionnaire of physical activity self-efficacy	Percentage of individuals with physical inactivity or insufficient physical activity	57	47
30	Moradi	Kurdistan province	2005	2494	08/39 ± 37/14	Physical inactivity is defined as a low level of activity. It means no or little physical activity at home, work, or during recreation or outdoor activities and traveling.	Percentage of individuals with physical inactivity	16.9	48
31	Moradi	Kurdistan province	2009	997	77/39 ± 24/14	Physical inactivity is defined as a low level of activity. It means a minimum duration of 150 min of normal physical activity or 60 min of vigorous physical activity per week at home, work, during recreation, or in outdoor activities and traveling.	Percentage of individuals with physical inactivity	26.8	48

Number	Author	Study location	Publication year	Sample size	Age group	Measure	Reporting method	Results (physical activity)	Reference
32	Sanaeinasab	Khorramabad	2013	1551	12-14	The amount of time allocated to physical activity in the past week	Percentage of individuals with physical inactivity	87.1	49
33	Soltanian	Bushehr province	2005	2579	15-19	IPAQ	Percentage of individuals with physical activity	Physical inactivity = 58.3% Minimum activity = 23.8% Health-enhancing physical activity = 17.8%	50
34	Pazoki	Bushehr province	2007	335	25-64	BRFSS	Percentage of individuals with physical activity	Moderate = 26.59% High = 3.61%	51
35	Emdadi	Hamedan province	2016	866	40-64	IPAQ-S	Percentage of individuals with physical activity	Low physical activity = 57% Vigorous physical activity = 19.3%	52
36	Ramezankhani	Shahr-e Kord	2016	308	15-18	Researcher-made and based on the Health Belief Model	Percentage of individuals with physical activity	Low physical activity = 70.1% Moderate level of physical activity = 27.3% Vigorous physical activity = 2.6%	53
37	Moradi	Sanandaj	2016	2506	10-12	MAQ	Percentage of individuals with physical activity	Insufficient physical activity = 40.90% Sufficient physical activity = 59.09%	3
38	Noormohammadpour	At the national level	2017	7889	30-70	GPAQ	Percentage of individuals with physical activity	Low physical activity = 40% Moderate physical activity = 27.2% Vigorous physical activity = 21.8%	54
39	Mohebi	At the national level	2019	30541	18-64	GPAQ	Percentage of individuals with insufficient physical activity	54.7	2

Summary of the results of some cohort studies evaluating the physical activity levels in different people

Table 9: Summary of the results of some cohort studies evaluating the physical activity levels in different people

Number	Author	Study type	Publication year	Sample size	Age group	Measure	Results (physical activity)	Reference
1	Eslami	Tehran Lipid Study	2018	1490	≥ 60	-	The prevalence of low physical activity decreased from 40% to 26% in men from 2002 to 2014, while it has been about 50% in women with no significant difference.	55
2	Khosravi-Boroujeni	Iran Cohort	2017	6500	≥ 35	-	The mean amount of physical activity was 863.4, 766.3, and 775.1 METs/hr in 2001, 2007, and 2013, respectively.	56



Overview of some Persian studies in physical activity in recent years in Iran

Apart from the national STEPs studies in Iran, many studies have investigated the level of physical activity in different groups in the past 10 years. Given various ages, genders, jobs, and study designs, they reported different rates of low physical activity. We selected some of these studies and summarized the results in Table 10.

Given the different definitions for low, moderate, and high levels of physical activity in the studies, it is not possible to compare the results with each other.

Table 10: Summary of the results of some Persian studies evaluating the physical activity levels in different people in recent years in Iran

Target group	Sample size	Level of inactivity	Publication year	Title	Reference
Students of the University of Tabriz and the Tabriz University of Medical Sciences	768	39.8% of the students of the Tabriz University of Medical Sciences are at a dangerous level of physical activity	2007-2008	Comparison of physical activity of Tabriz University of Medical Sciences students with Tabriz University	(57)
Residents in Babol by multi-stage sampling method	2500	The average duration of vigorous, moderate, and light physical activities were 7.3, 8.5, and 2.4 h/w, while the average duration of sedentary activity was 17.4 h/w.	2008-2009	Study on physical activities in Babol city	(58)
Female students of high schools in Isfahan	240	The rate of physical inactivity was 26.5% in adolescents	2008-2009	Patterns of physical activity in female adolescents in Isfahan and its affecting factors	(59)
Elderly in Isfahan using cluster and multi-stage sampling method	350	The appropriate level of physical activity was 13.7%	2010-2011	Assessment of the physical activity of the elderly population of Isfahan, Iran	(60)
Tehran residents	7285	The prevalence of physical inactivity was 69.8% in the target population	2010-2011	Physical inactivity and related factors in an adult Tehranian population: Tehran Lipid and Glucose Study	(61)
Adolescents in district 5 of Tehran	543	The mean frequencies of exercise were 3.2 and 4.2 days a week in female and male adolescents, respectively	2010-2011	Evaluation of some diet habit and physical activity in adolescents in Tehran	(62)
Children affected by autism in the elementary schools of Tehran	68	91% of these children (90% of the boys and 94% of the girls) had low levels of physical activity.	2012-2013	Investigating the level of daily physical activity in children with high functioning autism and its relation with age and autism severity	(63)
Workers of the Sanat Khodro	133	19.2% of the workers exercised regularly 53.3% of the workers exercised occasionally 26.7% of the workers never exercised	2013-2014	Examining the association between musculoskeletal disorders, physical activity and quality of life for workers in an auto parts manufacturing industry	(64)

Target group	Sample size	Level of inactivity	Publication year	Title	Reference
Female students of 6 high schools	615	Light physical activity = 46.2% Moderate physical activity = 28% Vigorous physical activity = 25.8%	2013-2014	Application of BASNEF ¹ model in regular physical activity evaluation of high school girls in Hamadan	(65)
the female staff of Kermanshah University of Medical Sciences	101	Low physical activity = 39.6% Moderate physical activity = 55.4% Vigorous physical activity = 5%	2014-2015	Effect of physical activity on body composition and quality of life among women staff of Kermanshah University of Medical Sciences in 2013	(66)
Elderly hospitalized in the CCU and post-CCU wards in the Hospitals in Ilam city	240	Regular and moderate physical activity = 8.3% Regular and light physical activity = 28.3% Low physical activity = 32.5% Physical inactivity = 25.8%	2014-2015	Physical activity among elderly people with heart disease	(67)
Female high school students using a random multi-stage sampling method	230	Active = 32% Inactive = 68% Results of the IPAQ questionnaire showed that 68%, 28%, and 2% of the active individuals had light, moderate, and vigorous physical activity, respectively.	2014-2015	Level of physical activity among girl high school students in Tarom county and relevant factors	(68)
Nurses working in 27 hospitals in Tehran	553	Excellent physical activity = 18.8% Good physical activity = 25.9% Moderate physical activity = 34.2% Poor physical activity = 20.3%	2015-2016	Factors associated with nurses lifestyle in nurses of Tehran hospitals in 2012	(69)
Male students living in residential halls of the Tabriz University of Medical Sciences	260	Mild physical activity = 23.5% Moderate physical activity = 48.5% Vigorous physical activity = 28.1%	2016-2017	The status of physical activity based on the health belief model in dormitory students of Tabriz University of Medical Sciences	(70)
Female and male students from 7 faculties of the Gilan University	400	Low physical activity = 62.5%	2016-2017	Evaluation of the level of physical activity, physical fitness, obesity, and musculoskeletal abnormalities in university students	(71)
Workers of the Basij Organization of the Medical Society of Gilan Province	101	60% were inactive with the mean age of 40.7 years old	2017-2018	Factors associated with physical activity in ringleaders of righteous of Gilan medical society Basij organization: Applying the transtheoretical model	(72)
Hormoz residents using the double stage sampling method	400	Regular physical activity = 37%	2017-2018	Lifestyle of Hormoz island residents: A cross-sectional study	(73)
Overweight pregnant women in Urmia county	120	The mean physical activity was 1.14 + 2.65 MET/min	2018-2019	Evaluation of nutritional status and physical activity level in overweight pregnant women	(74)

Overview of interventions for physical activity promotion in Iran

Given the available studies, the studies on "the effect of various interventions on physical activity in Iran" are limited. However, some studies have investigated the issue in different groups, including children, adolescents, young people, women, pregnant women, and the elderly.

Children

In a study by Kordi et al. (2012), the authors indicated that a physical activity development program by trained physical education teachers in nursery schools is an effective and applied intervention to increase the level of basic motor skills in preschool children in Iran (75).

Adolescents and young people

A study by Ahmadi et al. (2018) reported in the age group of adolescents and young people, the motivation for physical activity and social-cognitive patterns are important in physical activity levels. They reported that personal knowledge, social support by family and friends, enjoyment from physical activity, and self-efficacy are positively correlated with the level of physical activity (76).

A study by Solhi et al. (2012) evaluated the effectiveness of implementing educational programs in schools. The result showed the effectiveness of the theory of planned behavior on physical activity promotion in school students. They concluded that educational planning based on active learning in the educational system of Iran can change the personal attitudes toward physical activity by making a positive attitude toward physical activity and increasing personal knowledge (77).

A study by Estesbari et al. (2010) suggested the interventions including lectures, free discussions, pamphlets, educational booklets, essay writing and wall newspaper competitions, sports competitions, and film presentation in order to increase the level of physical activity in adolescents and young people (78).

A study by Kelishadi et al. (2010) studied the physical activity promotion in female school students and their mothers as part of the national CASPIAN study. The authors could improve the generalized and abdominal obesity indices by educational courses and increasing personal knowledge (79).

A study by Tamimi et al. (2015) suggested social support by family as an effective factor in the interventions based on the health promotion model. They reported that motivating families to support adolescents can be an effective step in physical activity promotion in this group (80).

A study by Asefi et al. (2015) suggested that music can be effective in increasing the physical activity duration in

addition to increasing pleasure. Also, music can be used to manage the intensity of physical activity (81).

A study by Najafabadi et al. (2017) investigated the effect of mental training on the promotion of physical activity-related behaviors in adolescent girls. They reported that one of the most effective ways of physical activity-related behavioral reinforcement is making positive attitudes and mental training (82).

A study by Ahmadi et al. (2018) suggested that web-based interventions using Telegram application can be useful in improving the psychological variables associated with physical activity in inactive adolescents (76).

Women and pregnant women

A study by Qaderpanah et al. (2015) investigated the effect of face-to-face education based on the 5A self-management model on physical activity. The results indicated a positive association of motivating and attitude change with the physical activity-related behavior in individuals who had received face-to-face education based on the 5A self-management model (83).

In a study by Shakeri et al. (2012), the researchers encouraged the participants to increase their physical activity levels by holding group-based educational courses. They reported that the group-based educational program increased the physical activity levels during pregnancy and recommended the use of these programs in the associated clinics (84).

In a study by Eskandari et al. (2015), the participants were encouraged to increase their physical activity levels using stimulating measures including video CDs, booklets, free discussion classes, and lectures depending on the stage of behavior change. Finally, it was reported that the implementation of interventional programs based on the behavior change pattern can improve physical activity behavior (85).

A study by Amini et al. (2014) reported that web-based and multimedia-based educational interventions including virtual teaching via SMS, E-mail, online messages, or educational videos can increase the physical activity levels and prevent inactivity-related diseases (86).

In a study by Rassafiani et al. (2015), an intervention program with the ability to record the number of daily steps using electronic smart devices was introduced. They reported that the intervention not only increased the physical activity but also reduced the sitting hours (87).

The approach of two studies by Ayati (2014) and Saberi (2018) was to investigate the effect of self-efficacy on the

improvement of health behavior such as regular physical activity. The participants reported that yoga and Pilates courses helped in their mental health and happiness in addition to improving their physical activity (88, 89).

The elderly

A study by Karimi et al. (2015) reported that 6 structures of the trans-theoretical model (self-awareness enhancement, dramatic relief, social self-liberation, environmental re-evaluation, helping relationships, and social liberation) and interventions including group discussion, brainstorming, reminiscence, and questioning can help identify the facilitators of physical activity and promote physical activity in the elderly (90).

A study by Mokhlesi et al. (2019) intended to develop a social marketing model to promote physical activity in a middle-aged population. In this study, standard, methodological, pleasant, and feasible physical activities with the costs as low as possible and best access conditions could encourage middle-aged individuals to physical activity (91).

A study by Amirzadeh et al. (2016) investigated the effect of educational intervention based on the health belief model on the physical activity levels of the elderly. They reported that the health belief model, which is a cost-effective model analyzing the nature of preventive health behavior, can be a behavioral predictor in the physical activity of the elderly. The study suggested that the health belief model is effective as

an educational intervention in elderly women, and physical activity education using this model promotes the behavior of the elderly women (92).

Healthcare Personnel

Studies on health volunteers by Emami (2011) (93) and on the staff of health centers by Tabatabaei (2012) (94) indicated that interventions based on planned education in the form of educational courses were effective in improving the awareness and attitude toward physical activity. Therefore, educating the healthcare personnel on this issue is recommended.

Patients

Given the effect of education on the physical activity levels in patients, two studies evaluated the effect of education on diabetic patients. A study by Lari (2018) investigated the effect of education based on the Health Promotion Model (HPM) using a multimedia-based approach on physical activity in diabetic patients. In this study, each patient and one of his/her visitors were instructed on physical activity using an educational CD. The method was reported to increase the physical activity levels in the patients (95). Moreover, a study by Mahdizadeh et al. (2013) investigated the effect of education on the promotion of physical activity in diabetic women using the social cognitive therapy model. They reported that the intervention resulted in increasing the physical activity of the patients (96).



Situation analysis of current policies in physical activity

Situation analysis of the current policies in physical activity provides plenty of information that is useful in planning (97). Current situation analysis will contribute to the exchange of information and experiences. This situation analysis indicates which policy can be used in the current situation, thereby providing a foundation for designing and implementing a national strategic program with the collaboration of all organizations (97). To achieve these goals, it is recommended to analyze the physical activity status using a Health Enhancing Physical Activity Policy Audit Tool (HEPA PAT) (97). This tool provides the requirements for the surveillance of the physical activity-enhancing policies and includes a method of appropriate collection and distribution of the national policies. This audit tool involves the background information of the country, present and previous documents and rules and their developments, the scope and content of the associated policies and target groups, experiences in policy implementations, progressions and challenges of the policies, and reports evaluating the present plans (97).

Evaluation of the policies using a policy audit tool provides a comprehensive overview of the current policies on health-enhancing physical activity and can identify the consistencies or inconsistencies of the policies as well as potential shortcomings (84). The application of this tool for evaluation allows the collaboration of the governmental agencies with the organizations associated with health-enhancing (97). Moreover, it can facilitate further communications, help in the implementation of strategic plans and joint actions, improves the collaboration of agencies in the development and implementation of future policies, and ultimately, introduces the priorities of policy-making and planning (97).

The following results are obtained from the situation analysis

of the physical activity status in Iran using Health Enhancing Physical Activity Policy Audit Tool (HEPA PAT):

- In the management and mutual co-operation of the organizations at the national and provincial levels, we need a revision and planning on physical activity.
- In the evaluation of the macroplanning and main documents, the problem is the little work done in the fields of active environment, active society, and active system.
- Physical activity development programs have been neglected in some groups including children younger than 6 years old, the elderly, and the disabled.
- There is no connection and integrity between the present organizations and documents in physical activity.
- Provincial plans should receive more support.
- The counseling and participation of the authorities associated with physical activity need to improve by focusing on the public sector, universities, executives, front-line staff, people affected by the policies, and the private sector.
- In the evaluation of the national macroplanning and documents for physical activity development, the reports are limited and more work should be done. Investment in physical activity in various fields is limited and needs to be supported.
- Capacity building in physical activity by the national TV channels should be supported.

Given the prevalence of low physical activity in the majority of Iran population and the analysis of the current status of physical activity, there is a need for a national program to increase the physical activity levels with the collaboration of different organizations.

Physical activity barriers in Iran

The important point in the prevalence of low physical activity is the evaluation of the physical activity barriers. Finding these barriers is necessary to provide efficient solutions.

There are limited studies on the physical activity barriers

in Iran in different populations and age groups. However, a summary of the barriers suggested in the studies is presented in Table 11.

Table 11: Physical activity barriers according to the suggestions by studies conducted in Iran

1	Socioeconomic barriers	<ul style="list-style-type: none"> ❑ Unfavorable economic condition (98) ❑ High costs of exercising (98-102) ❑ Work-related problems and long working hours (103)
2	Cultural barriers	<ul style="list-style-type: none"> ❑ Social beliefs and cultural issues (4) ❑ Lack of safe environments for physical activity (4,100) ❑ Cultural physical activity barriers for women (101)
3	Personal barriers	<ul style="list-style-type: none"> ❑ Lack of enough time (98-02) ❑ Lack of self-esteem (104) ❑ Lack of motivation, and laziness (104,105) ❑ Illnesses, pain, injury, disability, fatigue (99,102)
4	Environmental barriers	<ul style="list-style-type: none"> ❑ Lack of appropriate and available facilities and environment (98) ❑ Air and environmental pollution (99,105)





Reference

1. Peykari N, Hashemi H, Dinarvand R, Haji-Aghajani M, Malekzadeh R, Sadrolsadat A, et al. National action plan for non-communicable diseases prevention and control in Iran; a response to emerging epidemic. *Journal of Diabetes & Metabolic Disorders*. 2017;16(1):3.
2. Mohebi F, Mohajer B, Yoosefi M, Sheidaei A, Zokaei H, Damerchilu B, et al. Physical activity profile of the Iranian population: STEPS survey, 2016. *BMC public health*. 2019;19(1):1266.
3. Moradi G, Mostafavi F, Azadi N, Esmailnasab N, Nouri B. Evaluation of screen time activities and their relationship with physical activity, overweight and socioeconomic status in children 10-12 years of age in Sanandaj, Iran: A cross-sectional study in 2015. *Medical journal of the Islamic Republic of Iran*. 2016;30:448.
4. Global action plan on physical activity 2018-2030: more active people for a healthier world: World Health Organization; 2019.
5. WHO Global recommendations on physical activity for health. Geneva: World Health Organization; 2011.
6. Tremblay MS, LeBlanc AG, Carson V, Choquette L, Connor Gorber S, Dillman C, et al. Canadian physical activity guidelines for the early years (aged 0-4 years). *Applied Physiology, Nutrition, and Metabolism*. 2012;37(2):345-56.
7. Schuch FB, Vancampfort D, Richards J, Rosenbaum S, Ward PB, Stubbs B. Exercise as a treatment for depression: a meta-analysis adjusting for publication bias. *Journal of psychiatric research*. 2016;77:42-51.
8. Mammen G, Faulkner G. Physical activity and the prevention of depression: a systematic review of prospective studies. *American journal of preventive medicine*. 2013;45(5):649-57.
9. Livingston G, Sommerlad A, Orgeta V, Costafreda SG, Huntley J, Ames D, et al. Dementia prevention, intervention, and care. *The Lancet*. 2017;390(10113):2673-734.
10. Das P, Horton R. Rethinking our approach to physical activity. *Lancet (London, England)*. 2012;380(9838):189.
11. Tremblay MS, Aubert S, Barnes JD, Saunders TJ, Carson V, Latimer-Cheung AE, et al. Sedentary behavior research network (SBRN)-terminology consensus project process and outcome. *International Journal of Behavioral Nutrition and Physical Activity*. 2017;14(1):75.
12. Owen N, Healy GN, Matthews CE, Dunstan DW. Too much sitting: the population-health science of sedentary behavior. *Exercise and sport sciences reviews*. 2010;38(3):105.
13. Li Z, Wang W, Yang C, Ding H. Bicycle mode share in China: a city-level analysis of long term trends. *Transportation*. 2017;44(4):773-88.
14. Woodward A, Lindsay G. Changing modes of travel in New Zealand cities. Sizing up the city-Urban form and transport in New Zealand Wellington: New Zealand Centre for Sustainable Cities centred at University of Otago. 2010.
15. Sallis JF, Cerin E, Conway TL, Adams MA, Frank LD, Pratt M, et al. Physical activity in relation to urban environments in 14 cities worldwide: a cross-sectional study. *The Lancet*. 2016;387(10034):2207-17.
16. Organization WH. Shanghai declaration on promoting health in the 2030 Agenda for Sustainable Development. *Health promotion international*. 2017;32(1):7.
17. Ding D, Lawson KD, Kolbe-Alexander TL, Finkelstein EA, Katzmarzyk PT, Van Mechelen W, et al. The economic burden of physical inactivity: a global analysis of major non-communicable diseases. *The Lancet*. 2016;388(10051):1311-24.
18. Baygi F, Heshmat R, Kelishadi R, Mohammadi F, Motlagh ME, Ardalan G, et al. Regional disparities in sedentary behaviors and meal frequency in Iranian adolescents: the CASPIAN-III study. *Iranian journal of pediatrics*. 2015;25(2).
19. Kelishadi R, Qorbani M, Motlagh ME, Ardalan G, Heshmat R, Hovsepian S. Socioeconomic disparities in dietary and physical activity habits of Iranian children and adolescents: The CASPIAN-IV study. *archives of iranian medicine journal*. 2016; 19(8): 530-537

20. Angoorani P, Heshmat R, Ejtahed HS, Mottlagh ME, Ziaodini H, Taheri M, et al. The association of parental obesity with physical activity and sedentary behaviors of their children: the CASPIAN-V study. *Jornal de Pediatria (Versão em Português)*. 2018;94(4):410-8.
21. Koohpayehzadeh J, Etemad K, Abbasi M, Meysamie A, Sheikhbahaei S, Asgari F, et al. Gender-specific changes in physical activity pattern in Iran: national surveillance of risk factors of non-communicable diseases (2007–2011). *International journal of public health*. 2014;59(2):231-41.
22. Non-Communicable Diseases Research Center, Endocrinology and Metabolic Diseases Research Institute, Tehran University of Medical Sciences. surveillance (STEPS). Access Date: October 2019. Available at : <https://vizit.report>.
23. Fakhrazadeh H, Djalalinia S, Mirarefin M, Arefirad T, Asayesh H, Safiri S, et al. Prevalence of physical inactivity in Iran: a systematic review. *Journal of cardiovascular and thoracic research*. 2016;8(3):92.
24. Janghorbani M, Amini M, Rezvanian H, Gouya MM, Delavari AR, Alikhani S, et al. Association of body mass index and abdominal obesity with marital status in adults. *archives of iranian medicine journal*. 2008; 11(3): 274-281.
25. Janghorbani M, Amini M, Willett WC, Gouya MM, Delavari A, Alikhani S, et al. First nationwide survey of prevalence of overweight, underweight, and abdominal obesity in Iranian adults. *journal of Obesity*. 2007;15(11): 2797-808.
26. Alikhani S, Delavari A, Alaedini F, Kelishadi R, Rohbani S, Safaei A. A province-based surveillance system for the risk factors of non-communicable diseases: A prototype for integration of risk factor surveillance into primary healthcare systems of developing countries. *Public Health*. 2009;123(5):358-64.
27. Esteghamati A, Khalilzadeh O, Ashraf H, Zandieh A, Morteza A, Rashidi A, et al. Physical activity is correlated with serum leptin independent of obesity: results of the national surveillance of risk factors of noncommunicable diseases in Iran (SuRFNCD-2007). *Metabolism*. 2010;59(12):1730-5.
28. Nabipour I, Amiri M, Imami S, Jahfari S, Nosrati A, Iranpour D, et al. Unhealthy lifestyles and ischaemic electrocardiographic abnormalities: the Persian Gulf Healthy Heart Study. *EMHJ-Eastern Mediterranean Health Journal*, 2008;14 (4):858-868.
29. Sarraf-Zadegan N, Sadri G, Malek-Afzali H, Baghaei M, Mohammadi-Fard N, Shahrokhi S, et al. Isfahan Healthy Heart Programme: a comprehensive integrated community-based programme for cardiovascular disease prevention and control. Design, methods and initial experience. *Acta cardiologica*. 2003;58(4):309-20.
30. Komal W, Jaipanesh K, Seemal M. Association of leisure time physical activity, watching television, obesity & lipid profile among sedentary low-income south Indian population. *East African journal of public health*. 2010;7(3).
31. Sadeghi M, Roohafza H, Shirani S, Poormoghadas M, Kelishadi R, Baghaei A, et al. Diabetes and associated cardiovascular risk factors in Iran: the isfahan healthy heart programme. *annals-academy of medicine singapore*. 2007;36(3):175.
32. Sarrafzadegan N, Kelishadi R, Esmailzadeh A, Mohammadifard N, Rabiei K, Roohafza H, et al. Do lifestyle interventions work in developing countries? Findings from the Isfahan Healthy Heart Program in the Islamic Republic of Iran. *Bulletin of the World Health Organization*. 2009;87:39-50.
33. Mousavi E, Gharipour M, Tavassoli A, Sadri GH, Sarrafzadegan N. Multiparity and risk of metabolic syndrome: Isfahan Healthy Heart Program. *Metabolic syndrome and related disorders*. 2009;7(6):519-24.
34. Blanco-Montenegro I, De Ritis R, Chiappini M. Imaging and modelling the subsurface structure of volcanic calderas with high-resolution aeromagnetic data at Vulcano (Aeolian Islands, Italy). *Bulletin of Volcanology*. 2007;69(6):643-59.
35. Hajian-Tilaki K, Heidari B. Prevalence of obesity, central obesity and the associated factors in urban population aged 20–70 years, in the north of Iran: a population-based study and regression approach. *Obesity reviews*. 2007;8(1):3-10.
36. Hajian-Tilaki K, Heidari B. Prevalences of overweight and obesity and their association with physical activity pattern among Iranian adolescents aged 12–17 years. *Public health nutrition*. 2012;15(12):2246-52.
37. Dastgiri S, Mahdavi R, TuTunchi H, Faramarzi E. Prevalence of obesity, food choices and socio-economic status: a cross-sectional study in the north-west of Iran. *Public health nutrition*. 2006;9(8):996-1000.
38. Ghodousi K, Azizi F, Ameli J. Physical activity level and its role on the level of lipid profile in adults. *Medical Journal of Kowsar* 2005;10(1):59-64.
39. Azadbakht L, Esmailzadeh A. Dietary and non-dietary determinants of central adiposity among Tehrani women. *Public health nutrition*. 2008;11(5):528-34.

40. Mirmiran P, Noori N, Zavareh M, Azizi F. Fruit and vegetable consumption and risk factors for cardiovascular disease. *Metabolism* 2009;58(4):460-8.
41. Mirmiran P, Esmailzadeh A, Azizi F. Dairy consumption and body mass index: an inverse relationship. *International Journal of Obesity*. 2005;29(1):115-21.
42. Sabet Z, Amouzegar A, Hedayati M, Azizi F. Predicting the metabolic syndrome according to serum total testosterone, free testosterone index and SHBG in males aged over 20 years: Tehran lipid and glucose (TLGS). *Iranian Journal of Endocrinology and Metabolism*. 2009;11(4).
43. Hadaegh F, Zabetian A, Harati H, Azizi F. Metabolic syndrome in normal-weight Iranian adults. *Annals of Saudi medicine*. 2007;27(1):18-24.
44. Harati H, Hadaegh F, Momenan AA, Ghanei L, Bozorgmanesh MR, Ghanbarian A, et al. Reduction in incidence of type 2 diabetes by lifestyle intervention in a middle eastern community. *American journal of preventive medicine*. 2010;38(6):628-36.
45. Motefaker M, Sadrbafighi S, Rafiee M, Bahadorzadeh L, Namayandeh S, Karimi M, et al. SuicEpidemiology of physical activity: a population based study in Yazd cityide attempt and its relation to stressors and supportive systems: a study in Karaj city. *Tehran University Medical Journal TUMS Publications*. 2007;65(4):77-81.
46. Kelishadi R, Qorbani M, Djalalinia S, Sheidaei A, Rezaei F, Arefirad T, et al. Physical inactivity and associated factors in Iranian children and adolescents: the Weight Disorders Survey of the CASPIAN-IV study. *Journal of cardiovascular and thoracic research*. 2017;9(1):41.
47. Emdadi S, Hazavehie SMM, Soltanian A, Bashirian S, Heidari Moghadam R. Predictive factors of regular physical activity among middle-aged women in the West of Iran, Hamadan: application of PRECEDE model. *Journal of research in health sciences*. 2015;15(4):244-9.
48. Moradi G, Mohammad K, Majdzadeh R, Ardakani HM, Naieni KH. Socioeconomic inequality of non-communicable risk factors among people living in Kurdistan Province, Islamic Republic of Iran. *International journal of preventive medicine*. 2013;4(6):671.
49. Sanaeinasab H, Saffari M, Nazeri M, Karimi Zarchi A, Cardinal BJ. Descriptive analysis of Iranian adolescents' stages of change for physical activity behavior. *Nursing & health sciences*. 2013;15(3):280-5.
50. Soltanian AR, Nabipour I, Akhondzadeh S, Moeini B, Bahreini F, Barati M, et al. Association between physical activity and mental health among high-school adolescents in Boushehr province: A population based study. *Iranian journal of psychiatry*. 2011;6(3):112.
51. Pazoki R, Nabipour I, Seyednezami N, Imami SR. Effects of a community-based healthy heart program on increasing healthy women's physical activity: a randomized controlled trial guided by Community-based Participatory Research (CBPR). *BMC public health*. 2007;7(1):216.
52. Emdadi S, Hazavehei SMM, Soltanian A, Bashirian S, Moghadam RH. Physical activity status and related factors among middle-aged women in west of Iran, Hamadan: A cross-sectional study. *Global journal of health science*. 2016;8(10):151-9.
53. Ramezankhani A, Tavassoli E, Ghafari M, Alidosti M, Daniali SS, Gharlipour Z. Physical activity in adolescent girls and their perceptions of obesity prevention in Shahr-e Kord, Iran. *International Journal of Pediatrics*. 2016;4(8):3249-62.
54. Noormohammadpour P, Mansournia MA, Koohpayehzadeh J, Asgari F, Rostami M, Rafei A, et al. Prevalence of chronic neck pain, low back pain, and knee pain and their related factors in community-dwelling adults in Iran. *The Clinical journal of pain*. 2017;33(2):181-7.
55. Eslami A, Lotfaliany M, Akbarpour S, Azizi F, Hadaegh F. Trend of cardiovascular risk factors in the older Iranian population: 2002–2014. *Geriatrics & gerontology international*. 2018;18(1):130-7.
56. Khosravi-Boroujeni H, Sarrafzadegan N, Sadeghi M, Roohafza H, Talaei M, Ng S-K, et al. Secular trend of metabolic syndrome and its components in a cohort of Iranian adults from 2001 to 2013. *Metabolic syndrome and related disorders*. 2017;15(3):137-44.
57. Baradaran Rezaei M, Shirvani M, Fathi Azar E. Comparison of physical activity of Tabriz University of Medical Sciences students with Tabriz University. *Journal of Faculty of Nursing and Midwifery, Iran University of Medical Sciences*. 2008;21(55):77-87
58. zabihi E, Jafarian S, Farokhifar M, Babaei F, salehi OM, Bijani A. Study on physical activities in Babol city. *journal of babol university of medical sciences (JBUMS)*. 2010;11(6):71-76.
59. Kazemi A, Eftekhar Ardebili H, Sadat Nekouki Zahraee N. Patterns of Physical Activity in Female Adolescents in Isfahan and its Affecting Factors, *Journal of Qazvin University of Medical Sciences*. 2011;1(1).
60. Damirchi A, Mehrabani J, Mohebibi H, Sharifi H. Physical Activity, Obesity, Dietary Patterns, and General Health among Males in Arak, Iran. *Tabari*

- Biomedical Student Research Journal. 2016;2(2):9-18.
61. Momenan A, Delshad M, Mirmiran P, Ghanbarian A, Safarkhani M, Azizi F. Physical inactivity and related factors in an adult Tehranian population (Tehran Lipid and Glucose Study). *Iranian Journal of Endocrinology and Metabolism*. 2012;13(5).
 62. Hossein Rashidi B, Malek Afzali H, Haghollahi F, Ardalan G, Motlagh M, Kazemi Jaliseh H. Evaluation of some diet habit and physical activity in adolescents in Tehran (2011). *The Journal of Qazvin University of Medical Sciences*. 2018;22(1):13-23.
 63. Ghaheri B, Sheikh M, Memari AH, Hemayat Talab R. Investigating level of daily physical activity in children with high functioning autism and its relation with age and autism severity. *Journal of Arak University of Medical Sciences*. 2013;16(8):66-77.
 64. Malekpour F, Mohamadian Y, Moharampour A, Malekour A. Examining the Association between Musculoskeletal Disorders, Physical Activity and Quality of Life for Workers in an Auto Parts Manufacturing Industry. *Journal of ergonomics*. 2014;2(1):19-26
 65. Masoumeh Rostami Moaz et al, Application of BASNEF Model in Regular Physical Activity Evaluation of High School Girls in Hamadan *Journal of Zanjan University of Medical Sciences*, 2014;22(92):96-107.
 66. Pasdar Y, Niazi P, Darbandi M, Khalvandi F, Izadi N. Effect of physical activity on body composition and quality of life among women staff of Kermanshah University of Medical Sciences in 2013. *Journal of Rafsanjan University of Medical Sciences*. 2015;14(2):99-110.
 67. Borji M, Bastami MR, Bastami Y, Azami M, Tavan H. Physical activity among elderly people with heart disease. *Journal of Iranian Journal of Cardiovascular Nursing*. 2015;4(2):54-61.
 68. BashiriMoosavi F, Farmanbar R, Taghdisi M, AtrkarRoshan Z. Level of physical activity among girl high school students in Tarom county and relevant factors. *Iranian Journal of Health Education and Health Promotion*. 2015;3(2):133-40.
 69. Hasanpour L, Zohari AS, Safaril M, Naderiravesh N, KhodakarimS. Factors associated with nurses lifestyle in nurses of Tehran hospitalsin 2012. *Journal of advances in nursing and midwifery (faculty of nursing of midwifery quarterly)*. 2016;25(91):65-73.
 70. Mir Ghafarvand E, Rahy P, Ahmadpour P, Motti M, Sadeghi Gh. The Status of Physical Activity Based on Health Belief Model in Dormitory Students of Tabriz University of Medical Sciences. *Generations of breeze. Faculty of Medical Sciences, Azad University, Sari Branch*. 2013;3(2):36-43.
 71. Mehrabani F, Mehrabani J. Evaluation of the level of physical activity, physical fitness, obesity, and musculoskeletal abnormalities in university students. *Tabari Biomedical Student Research Journal*. 2016;2(3):33-43.
 72. Akhoondi M, Afkar A, Bakhshi F. Factors associated with physical activity in ringleaders of righteous of guilan medical society basij organization: Applying the transtheoretical model. *Journal of Military Medicine*. 2017;19(1):422-9.
 73. Aghamolaei T, Davoodi SH, Madani A, Dadipoor S. Lifestyle of Hormoz Island Residents: A Cross-Sectional Study. *Journal of Education and Community Health*. 2018;4(4):39-48
 74. Ghaderpanah N, Khalkhali H, Vahabzadeh D, Mohaddesi H. evaluation of nutritional status and physical activity level in overweight pregnant women. *The J Urmia Nurs Midwifery Fac*. 2018;16(9):686-93.
 75. Kordi R, Nourian R, Ghayour M, Kordi M, Younesian A. Development and evaluation of a basic physical and sports activity program for preschool children in nursery schools in Iran: an interventional study. *Iranian journal of pediatrics*. 2012;22(3):357.
 76. Ahmadi, A., Aghdasi, M. T., & Ahmadi, M. Effects of Physical Activity Interventions through Telegram App according to Self-Determination Approach on Psychological Variables and Physical Activity in Adolescents with Low Physical Activity. *Journal of Sport Psychology Studies*. 2018;7(23):99-114.
 77. Solhi m, Zinatmotlagh F, Karimzadeh SK, Taghdilil MH, Jalilian F. Designing and implementing educational program to promote physical activity among students: An application of the theory of planned behavior. *Journal of ofogh-e-danesh*. 2012;18(1):45-52.
 78. Estebsari F, Shojaeizadeh D, Mostafaei D, Farahbakhsh M. Planning and evaluation of an educational program based on PRECEDE model to improve physical activity in female students. *Hayat*. 2010;16(1).
 79. Kelishadi R, Ziaee V, Ardalan G, Namazi A, Noormohammadpour P, Ghayour-Mobarhan M, et al. A national experience on physical activity initiatives for adolescent girls and their mothers: CASPIAN study. *Iranian journal of pediatrics*. 2010;20(4):420.
 80. Tamimi H, Noroozi A. Determinants of physical activity in high school girl students: Study Based on Health Promotion Model (HPM). *Journal of health*.

- 2016;6(5):527-37.
81. Asefi Y. Movement with the Beat of Music: Strategy to Control the Intensity and Increase Participation in Physical Activity. *journal HONAR-HA-YE-ZIBA*. 2015;20(1):49-56.
82. Najafabadi MG, Memari A-H, Kordi R, Shayestehfar M, Eshghi M-A. Mental training can improve physical activity behavior in adolescent girls. *Journal of sport and health science*. 2017;6(3):327-32.
83. Qaderpaneh N, Hadithi H, Wahhabzadeh D, Khalkhali H.R. The effect of Model 5A on physical activity behavior change in overweight pregnant women. *IJOGL*. 2017;20(9):101-114.
84. Shakeri M, Fekri S, Shahnavaz A, Shakibazadeh E. Effectiveness of a group-based educational program on physical activity among pregnant women. *Journal of hayat*. 2012;18(3):1-9.
85. Eskandari N, Araban M, Saki Malehi A. Promoting physical activity in women referred to health centers applying the trans-theoretical model. *Iranian Journal of Health Education and Health Promotion*. 2015;3(1):14-22.
86. Amini N, Shojaezadeh D, Saffari M. The study of the effect of e-education on physical activity and body mass index of female employees. *Journal of School of Public Health and Institute of Public Health Research*. 2014;11(3):95-106.
87. Rassafiani M, Shamsipour dehkordi P, Ghorat F, Sahaf R. The effect of pedometer using in increasing physical activity in workplace. *Bimonthly journal of sabzevar university of medical sciences*. 2015;22(5).
88. Ayati NK, Esmaeil ZMR, Sang SS. The Effects of aerobic and yoga exercise on efficacy of female staff in Sabzevar University of Medical Sciences in 1392. *journal of sabzevar university of medical sciences*. 2014; 20(5); 590-596.
89. Saberi Y, Ghorbanian B, Ghorbanzadeh B, Iranpour A. Effects of Pilates and Aerobic Exercises on Happiness and Desire for Physical Activities in Inactive Women. *Scientific Journal of Nursing, Midwifery and Paramedical Faculty*. 2018;4(1):52-61.
90. Karimi Z, Tal A, Sahaf R, Rahimi Foroshani A. The Effect of Educational Intervention on Promoting Physical Activity in Elderly Men in Qom: Application of Transtheoretical Model. *Iranian Journal of Ageing*. 2015;10(3):182-191.
91. Mokhlesi S, Akbari Yazdi H, Elahi A, Khabiri M. Developing a Social Marketing Model to Promote Well-Informed and Low-Income Middle-Aged Participation in Regular Physical Activity, a Qualitative Study. *Iranian Journal of Health Education and Health Promotion*. 2019;7(1):93-108.
92. Amirzadeh Iranagh J, Motallebi S. The effect of health belief model based on education intervention on physical activity of elderly women. *The Journal of Urmia Nursing and Midwifery Faculty*. 2016;13(12):1050-8.
93. Seyed Emami R, Eftekhari Ardebili H, Golestan B. Effect of a health education intervention on physical activity knowledge, attitude and behavior in health volunteers. *Journal of hayat*. 2011;16(3):48-55.
94. Ahmadi Tabatabaei SV, Taghdisi MH, Sadeghi A, Nakhaei N. The effect of education in physical activities on knowledge, attitude and behavior of Kerman health center's staff. *Journal of Research and Health*. 2012;2(1):55-62.
95. Lari H, Tahmasebi R, Noroozi A. Effect of electronic education based on health promotion model on physical activity in diabetic patients. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*. 2018;12(1):45-50.
96. Mahdizadeh M, Peymam N, Taghipour A, Esmaily H, Mahdizadeh SM. Effect of Health Education Program on Promoting Physical Activity among Diabetic Women in Mashhad, Iran: Applying Social Cognitive Theory. *J Res Health Sci*. 2013;13(1):90-97.
97. Bull FC, Milton K, Kahlmeier S. National policy on physical activity: the development of a policy audit tool. *Journal of Physical Activity and Health*. 2014;11(2):233-40.
98. Vafaee-Najar A, Ebrahimipour H, Behzad F, Tehrani H. Relationship of perceived benefits and perceived barriers with regular physical activity among employees of Mashhad University of Medical Sciences. *Iranian Journal of Health Education and Health Promotion*. 2017;5(1):58-64.
99. Shoa'i F, Kordi R, Nejat V. Factors Affecting Physical Activity in Elderly Area 17 of Tehran. *Iranian Journal of Aging*. 2009;1(1):52-58.
100. Peykari N, Eftekhari MB, Tehrani FR, Afzali HM, Hejazi F, Atoofi MK, et al. Promoting physical activity participation among adolescents: The barriers and the suggestions. *International journal of preventive medicine*. 2015;6(12).

101. Motameni A, Hemmati A. Identifying and prioritizing the barriers for women's sports activities. *Journal of Sport Management Review*. 2014;6(24):111-30.
102. Hassani L, Sadat Tawafian S, AghamalaieIranian T. Self-efficacy, Perceived Benefits and Obstacles to Regular Physical Activity among Students of Hormozgan University of Medical Sciences. *Journal of Epidemiology*. 2008; 4(3-4):9-15.
103. Sharifi N, Mahdavi R, Ebrahimi-Mameghani M. Perceived barriers to weight loss programs for overweight or obese women. *Health promotion perspectives*. 2013;3(1):11.
104. Kelishadi R, Ghatrehsamani S, Hosseini M, Mirmoghtadaee P, Mansouri S, Poursafa P. Barriers to physical activity in a population-based sample of children and adolescents in Isfahan, Iran. *International journal of preventive medicine*. 2010;1(2):131.
105. Salehi L, Eftekhar H, Mohammad K, Taghdisi MH, Shojaeizadeh D. Physical activity among a sample of Iranians aged over 60 years: an application of the transtheoretical model. *journal of archives of iranian medicine*. 2010;13(6):528-536.



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The Sports Medicine Research Center is the first and only academic sports medicine center in Iran, which commenced its activities in 1998 as an office for studying and teaching issues of sports medicine in the Tehran University of Medical Sciences.

The center has three main parts: education and research, clinics, and laboratories. The units of the Sports Medicine Research Center include the spine research group, the motor neuroscience research group, the physical activity research group, the sports nutrition research group, and the professional sports research group. The Physical Activity Research Group of the Sports Medicine Research Center has commenced its activities at the national and international levels to improve the physical activity levels in Iran. The goals of this research group include providing a proper strategy to increase the levels of physical activity to achieve the global standards and suitable planning considering the needs and facilities of Iran.

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Tehran University of Medical Sciences



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