

THE ASSOCIATION OF LEISURE TIME PHYSICAL ACTIVITY, WATCHING TELEVISION, OBESITY & LIPID PROFILE IN AN IRANIAN POPULATION

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ABSTRACT:

Objective: Physical activity has good effects on cardiovascular disease(CVD) risk-factors while inactivity is an important CVD risk factor and watching TV as an inactivity predictor can influence on CVD risk factors. The present study shows the association of leisure time physical activity (LTPA) and watching TV with lipid profile & obesity in an Iranian adult population.

Methods: This cross-sectional study was performed on 2171 women and 2016 men in Isfahan-the second large city of Iran-in the first phase of Isfahan Healthy Heart Program(IHHP). The subjects were selected by random cluster sampling method. A standardized Beacke physical activity questionnaire was filled and height, weight, blood pressure, blood glucose and blood lipids of the participants were measured. Data were analyzed by SAS using the Student t, multiple regression, and logistic regression tests at P<0.05.

Results: Mean TV watching time among women living in urban and rural areas was not significantly different (954.59±647.84 vs. 949.22±665.34 minutes per week, respectively). Women in urban and rural areas had 262.89±475.86 and 200.08±451.30 MET-minutes per week of physical activity in their leisure time, respectively. Men in urban and rural areas had 519.46±681.82 and 460.51±663.32 MET-minutes per week of leisure time physical activity, respectively. Mean TV watching time among men in rural and urban areas was 900.58±564.26 and 892±547.72 minutes per week, respectively. Leisure time physical activity had a significant negative relation with waist circumference ($\beta=-0.002$), Body Mass Index ($\beta=-0.008$), cholesterol ($\beta=-0.01$), LDL-cholesterol(LDL-C) ($\beta=-0.07$) & diastolic blood pressure($\beta=-0.001$) in rural men. In women, leisure time physical activity had no significant relation with any of these variables. Neither in men, nor in women watching television was related to any of the variables. Odds ratio of obesity didn't relate to leisure time physical activity and watching TV neither in women nor in men.

Conclusion: Leisure time physical activity leads to improvement of lipid profile and reduction of obesity as a major atherosclerosis risk factor. It is therefore recommended to implement community-based interventions for promoting women's leisure time physical activity.

KEYWORDS: Physical activity, Leisure time, Watching television, Lipid profile, obesity.

Pak J Med Sci October-December 2005 Vol. 21 No. 4 476-481

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* Received for publication: January 10, 2005

Accepted: June 15, 2005

INTRODUCTION

Considering the higher mortality rates from cardiovascular diseases (CVD) in the developing countries compared to the developed world, preventing non-communicable diseases, including CVD constitutes a major health priority in such countries.¹ Earlier studies have estimated the prevalence of CVD in Isfahan 19.4%.² More than 75% of people in Isfahan have at least one CVD risk factor.³ Physical inactivity constitutes an important controllable CVD risk factor.⁴ Studies have shown the effectiveness of physical activity in reducing obe-

sity and improving the metabolism of glucose and lipids, lowering blood pressure (BP), and reducing overall mortality from CVD.⁵⁻¹³ Watching television is the most important indicators of inactivity and is related to obesity and other CVD risk factors.¹⁴⁻¹⁷ Studies have demonstrated that the prevalence of CVD risk factors and obesity can be reduced by preventing inactivity.¹⁸⁻²⁴ The present study was undertaken to assess the association of physical activity and watching TV risk factors in an Iranian adult population.

SUBJECTS AND METHODS

This study was based on data obtained from the first phase of Isfahan Healthy Heart Program, a 3-phase interventional study aiming to control CVD risk factors and reduce CVD-related morbidity and mortality which was conducted in 2000-2001 in Iran.²⁵

Sampling: The population under study (Isfahan) was divided into two groups, namely inhabitants of urban and rural areas. Each of the two groups was divided into clusters, which in turn were comprised of households. One person from every household was selected with men and women being placed in groups of roughly equal volumes. A total of 2171 women and 2016 men were studied. Becke questionnaire was used to evaluate the subjects' physical activity, after being modified and standardized for Iranian people and approved in respect of validity and reliability by the Center for Development and Medical Education of Isfahan University of Medical Sciences.²⁶ This questionnaire consisted of three parts: the first part included 15 questions assessing the responder's awareness of physical activity; the second part consisted of 12 questions which address the responder's attitude; and the third part comprises 27 questions evaluating the extent of the responder's physical activity. The 3rd part is used for this study. Individuals on anti-hypertensive and lipid-lowering medications and pregnant women were excluded.

Leisure time physical activity (LTPA) was measured, as MET^{*}-min/week.⁴ One MET is

the equivalent of 3.5 ml oxygen consumed by every kilogram of body weight per minute. For normal weight individuals, 1 MET is roughly equivalent to 1 kcal/kg per hour. The use of MET-min is preferred to kcal/min for measuring physical activity, because it is more or less independent of body weight, it reflects the intensity of physical activity and makes results easier to interpret.²⁷ TV watching time was recorded as minutes per week. The subjects were asked about cigarette smoking in questionnaires. The subjects' BP was measured in the sitting position. Height of subjects was measured in stocking feet to the nearest centimeter using a secured metal ruler while weight was measured in light clothing using calibrated portable Seca scales (made in Germany) and body mass index (BMI) was calculated as weight (kg) divided by height squared (m²). The waist-to-hip ratio was calculated for every individual, and values higher than 0.9 and 0.8 were considered as abnormal for women and men, respectively.

Total cholesterol (Chol), HDL-cholesterol (HDL-C), and triglyceride (TG) levels were measured using an Elan 2000 autoanalyzer. LDL cholesterol (LDL-C) was measured with Friedewald formula.²⁸

Blood glucose was measured using the enzymatic method. All laboratory analysis were performed at Isfahan Cardiovascular Research Center laboratory which has the criteria of the National reference laboratory and is under quality control of the University of St Rafael, Belgium. The 85th percentile of BMI (BMI >31.6 for women and >28.7 for men) was used to classify subjects as obese.²⁹

Statistical analysis: Data were analyzed with SAS software at $p < 0.05$. Chi square test was used to compare categorical variables (between inhabitants of urban and rural areas), and other variables were compared using t-test.

The relation between LTPA, watching TV, and risk factors was assessed with multiple regression analysis after excluding the effect of underlying variables such as smoking, age, education, and work-related physical activity, as well as the relationship between these vari-

ables. Logistic regression test was used to evaluate the effect of physical activity and TV watching on obesity.

RESULTS

We studied 2171 women with mean age of 38.11 ± 14.32 & 2016 men with mean age 38.11 ± 15.05 and their demographic characteristics are shown in Table-I (in a regression model we adjusted for age, sex, education level, smoking status & work related physical activity). The mean of LPTA was similar in rural & urban women (rural: 200.08 ± 451.30 , urban: 262.89 ± 475.86) as well as in rural & urban men (rural: 460.51 ± 663.32 , urban: 519.46 ± 681.82) (Table- II).

LPTA was not related to any variable in women but had a significant inverse relationship to BMI ($\beta = -0.0008$, $P = 0.007$), cholesterol ($\beta = -0.01$, $P = 0.003$), waist circumference ($\beta = -0.002$, $P = 0.008$), LDL-C ($\beta = -0.007$, $P = 0.01$) & diastolic blood pressure ($\beta = -0.001$, $P = 0.045$) inversely. The time spent for watching TV in urban & rural women was 954.59 ± 647.84 & 949.22 ± 665.34 minute/week respectively for urban & rural men. Watching TV was not related to any of variables neither in men nor in women significant (Table-III). The Odd's Ratio of obesity ($BMI \geq 31.6$ for women & $BMI \geq 28.7$ for men) was not significant neither in men nor in women (Table- IV). We did not found any

significant association of LPTA & watching TV with blood glucose, HDL-C and systolic blood pressure neither in men nor in women.

DISCUSSION

Leisure-time physical activity according to duration and intensity among Isfahanian people is lower than what is prescribed by WHO (moderate physical activity about 6 METs, 30 minutes/day) or 1260 MET-minute/week).³⁰ In this study maximum percentile of LPTA was 360MET-minute/week for women and 900 for men. The mean of TV watching time was about 2-2.5 hours/day in this study for men and women.

In this study after adjusting for work related physical activity, age, smoking, sex and education level, we analyzed the relationship between LPTA and watching TV with some of CVD risk factors, independently. Finding no association between LPTA and studied variables in women comparing to men could be discussed from two points of view: first because overall the sex male is a risk factor itself and the second because of lower level of LPTA in women comparing to men. In National Heart Lung Blood Institute(NHLBI), LPTA was related to anthropometric measures.⁴ In Framingham study also physical activity was significantly related to anthropometric measures, in that study HDL-C, BMI, BP, TG, Cho-

Table-I: Demographic characteristics of the study population

Variables	Women (n=2171)mean±SD	Men (n=2016)mean±SD
Age (years)	38.69±14.68	39.03±15.56
Cholesterol (mg/dl)	207.75±54.51	202.74±59.90
Triglyceride (mg/dl)	164.41±101.97	185.17±128.23
LDL-Cholesterol (mg/dl)	125.51±41.81	120.29±42.80
HDL-Cholesterol (mg/dl)	49.33±12.84	46.53±13.85
Waist Circumference (cm)	96.44±13.37	91.50±11.57
Waist/hip ratio	0.92±0.09	0.91±0.07
Body Mass Index (kg/m ²)	27.14±6.41	25.07±0.07
FBS (mg/dl)	86.09±42.85	84.68±28.45
SBP (mmHg)	113.38±20.65	115.82±18.40
DBP (mmHg)	72.94±12.53	73.95±11.25
Menopause (%)	23.5%	-
Current smoking (%)	2%	28.4%
*Education level(%)	8.3%	16.7%

* Diploma and more

Table-II: Leisure-time physical activity and TV watching in the study population

Variables	Women		Men	
	urban mean±SD	rural mean±SD	urban mean±SD	rural mean±SD
Leisure time physical activity (Met-Min. Week)	262.89±475.86 (0 0 360)*	200.08±451.30 (0 0 0)	519.46±681.82 (0 0 900)	460.51±663.32 (0 0 900)
Work physical activity (Met-Min. Week)	179.59±746.59 (0 0 0)	312.65±824.66 (0 0 0)	3621.68±2667.07 (0 4140 5400)	4498.91±2238.99 (3150 4500 5880)
TV watching (Min. Week)	954.59±647.84 (420 840 1260)	949.22±665.34 (420 840 1260)	900.58±564.26 (420 840 1260)	892.21±547.72 (420 840 1260)

*Quartiles & percentiles

Table-III: Influence of leisure-time physical activity and TV watching on atherosclerosis risk factors (multiple regression analysis)

Variables	Leisure time physical activity						TV watching			
	Women			Men			Women		Men	
	R ²	p	estimate	p	estimate	R ²	p	estimate	p	estimate
Body Mass Index(kg/m ²)	0.33	0.22	0.002	0.58	-0.0009	0.02	0.007	-0.0008	0.18	-0.005
Waist/hip ratio	0.11	0.11	0.0003	0.75	-0.000008	0.05	0.08	-0.000008	0.33	-0.000005
Waist circumference(cm)	0.15	0.13	0.005	0.94	0.0003	0.03	0.008	-0.002	0.15	-0.001
Cholesterol (mg/dl)	0.31	0.30	0.01	0.10	0.03	0.02	0.003	-0.01	0.46	-0.008
HDL-Cholesterol(mg/dl)	0.10	0.76	-0.0009	0.61	-0.002	0.008	0.15	0.001	0.61	-0.0004
LDL-Cholesterol(mg/dl)	0.33	0.10	0.02	0.10	0.02	0.01	0.01	-0.007	-0.40	-0.003
Triglyceride (mg/dl)	0.08	0.75	-0.01	0.97	0.002	0.01	0.10	-0.01	0.73	-0.003
FBS (mg/dl) ¹	0.07	0.55	0.02	0.24	0.06	0.01	0.23	-0.002	0.97	-0.00007
SBP (mmHg) ²	0.39	0.17	0.004	0.72	-0.001	0.05	0.11	-0.002	0.23	-0.001
DBP (mmHg) ³	0.15	0.96	-0.0002	0.62	0.002	0.02	0.045	-0.001	0.28	-0.0009

1-Fasting blood sugar 2- Systolic blood pressure 3- Diastolic blood pressure

Table-IV: Effects of Leisure-time physical activity(LPTA) & TV watching on obesity

Variables	Women						Men					
	Urban		Rural		Total		Urban		Rural		Total	
	P	B	P	B	P	B	P	B	P	B	P	B
TV watching (Minutes/ Week)	0.73	0.0003	0.96	0.005	0.67	-0.0004	0.72	0.00008	0.78	0.0001	0.78	0.00005
LTPA (Met-minute)	0.51	0.0005	0.95	0.01	0.49	0.0005	0.05	-0.0004	0.95	-0.00003	0.07	-0.0003

(logistic regression)

lesterol was assessed and after 16 years of follow up, they observed that association of risk factors with increasing weight was 37% and 20% in women and men respectively while with decreasing weight, it was 40% and 48% respectively that showed the importance of weight reduction in related to risk factors.³¹

In this study, watching TV was not related to any variable neither in men nor in women.

In America also several cross-sectional studies which evaluated effect of watching TV on obesity in children and young adults found significant associations in this regard.³¹⁻³⁵ Tucker showed that the probability of obesity in men that watched TV more than 3 hours/day and women watched TV more than 4 hours/day is twice compared to people who watched TV less than one hour/day.³⁶⁻³⁷ Watching TV more

than 4 hours/day was accompanied with Odd's Ratio over 4 in employees.³⁸ A prospective study showed that association of watching TV and weight was no more observed after 3 years follow up in comparing one year follow up.³⁹⁻⁴⁰ In CARDIA study also the prevalence of obesity increased by increasing TV watching time.¹⁵

Another cohort study on females showed high BMI and waist circumference was related to low level of their physical activity and high TV watching time.⁴¹

Several studies have showed the association of watching TV with lipid profile.^{4,11,42,43} Moreover, the effect of factors such as family history and genetics were not investigated in this study. Thus further investigations are recommended in which wider ranges of subjects from different age groups and with varying occupations and socioeconomic, cultural, and educational backgrounds, as well as a larger number of risk factors can be studied.

CONCLUSION

As demonstrated by the results of the present and other studies, increased leisure time physical activity is related to improvement of lipid profile and reduction of atherosclerosis risk factors, especially obesity. In the light of this and the limitations faced by women for engaging in leisure time physical activities, it is recommended that new strategies be adopted to encourage and promote culturally appropriate physical activities especially among women in our society, because it is a way to control obesity and lipid profile in treatment and preventing CVD.

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