ORIGINAL ARTICLE

Phenomena of Physical Activity in with Myocardial Infarction Patients of Karachi, Pakistan

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ABSTRACT

Objectives: To assess the physical activity level among MI patients and to examine the relationship of physical activity with some MI risk factors such as age, gender, body mass index(BMI), waist circumference(WC), obesity, and occupation.

Methods: The data of the present study were collected from different cardiac hospitals (Civil Hospital, Liaquat National Hopsital and National Institute of Cardiovescular Diseases) of Karachi. 235 patients of ages 30-70 years were interviewed through a questionnaire. The questionnaire included basic demographic and some socio-economic information and risk factors associated with MI patients. The questionnaire also included questions on the type, frequency and duration of physical activity of the patients. Activities were classified into five intensity categories and assigned metabolic equivalents (MET) according to the compendium of physical activity. Subjects were classified into physically active or inactive categories.

Results: Activity prevalence (10.2%) was very low among MI patients. There were more active male patients (10.8%) than female patients (7.8%). Activity prevalence decreases with age and increases with increasing educational level. In the risk assessment model, age group (P<0.0001), occupation categories [(skilled vs. semi skilled) (p=0.028)] and [(skilled vs. house wife) (p=0.003)] were significant. Highly educated patients were significantly (p=0.022) more active than others. Furthermore, active patients had lower values of body mass index and waist circumference.

Conclusion: The finding of the study revealed that most of the MI patients have sedentary life style and due to increasing age and low level of education they are inactive.

Key words: Myocardial Infarction, Coronary Artery Disease, Physical Activity, Karachi, Pakistan.

INTRODUCTION

Coronary artery disease (CAD) is a major public health problem in the world. The prevalence of CAD in the subcontinents is now parallel to those in the industrialized countries[1] and people of Indo-Asian origin show one of the highest susceptibilities.[2] It is now the leading cause of death in this region.[3] In Pakistan CAD plays a preponderant role in the mortality indicator (12%) as reported by National Health Survey of Pakistan 1990-1994.[4]

Interventions using physical activity can improve the quality of life.[5] The increased risk of coronary heart disease and mortality is associated with overweight/obesity and decreased risk is associated with leisure-time physical activity.[6] Manson *et al*[7] indicated that both walking and vigorous exercise were associated with substantial reductions in the incidence of cardiovascular events among postmenopausal women, irrespective of race or ethnic group, age, and body-mass index. One of the studies showed that overweight subjects, even if they are regularly engaged in vigorous sport activities during leisure time, still have equal or lower heart rate variability at rest compared with sedentary lean subjects.[8] Physical fitness showed beneficial effects on numerous mediators of CVD risk including obesity.[9] Consequently, weight loss can improve multiple CVD risk factors.[10,11] Therefore, increased physical activity appears to be an ideal therapy for CHD.

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Most of the obesity related studies, however, have not adequately measured physical activity and functional capacity, which are also known to predict risk of CHD.[12-15] A study on CAD indicated that aerobic exercise was effective for increasing VO2 max in stable CAD patients.[16] Many risk factors are associated with Myocardial Infarction (MI) and lack of physical activity is one of them.[5] These studies clearly showed the importance of physical activity for MI & CAD patients. However, no significant amount of work is reported in the literature for Pakistan in this regard. Therefore, a study was conducted on MI patients regarding the risk factors of MI and other related information. In this study the effect of physical activity on MI patients is reported.

METHOD

The data of the present study were collected from different cardiac hospitals (Civil, National Institute of Cardiovascular Disease, Karachi Institute of Heart Disease, Liaquat National Hospital) of Karachi. The population of Karachi for the year 2007 was an estimated 13.16 million. Using the information of 1998 census[17] and assuming the burden of CAD in the selected population as 26.9%[18], the sample size was calculated as 233 with 95% confidence interval and maximum error ±5.7%.[19] The questionnaire included basic demographic and socio-economic information in detail and risk factors associated with MI patients. The questionnaire also included information on the type, frequency and duration of physical activity of the patients. The types of physical activity were divided into 5 intensity categories and each category was assigned Metabolic Equivalent (MET) values according to the compendium of physical activity.[20] One MET equals to the energy expenditure at rest, or roughly 3.5 ml of oxygen consumed per kilogram of body weight per minute.[21] The type of physical activity categories included in the questionnaire were: 1. Vigorous intensity aerobic activity such as running, vigorous swimming and cycling (MET = 7.5), 2. Vigorous-intensity intermittent sport activity such as basketball, tennis and racquet balls (MET=7), 3. Moderate-intensity aerobic activity such as moderate intensity icycling and light jogging (MET=6), 4. Moderate intensity activity such as brisk walking and recreational volleyball (MET=3.5), and 5. Light aerobic activity such as normal walking and golfing (MET=2.5). Based on the intensity, duration and frequency of physical activity, participants were classified into 2 categories, active and inactive, as described below.

The physical activity was calculated as MET value multiplied by the duration of activity in minutes, multiplied by the frequency of activity per week, i.e.

Activity = MET x (Duration of activity in minutes) x (Frequency of activity per week),

If this value was more than 600, patient was considered as active; otherwise inactive.[21] The study was approved by the Institutional Review Board (IRB) of Dow University of Health Sciences (DUHS). The second author (NK) belongs to this university and there is no IRB in first author's (SA) institution. All the study hospitals accepted the IRB approval of DUHS and gave permission for the study. The study was explained to the patients and the consent was taken verbally. The author (SA) herself visited all the selected hospitals and collected the information regarding demographic, socio-economic, anthropometric variables and physical activity information. Lab reports and other information were taken from their hospital files. The data collection covered the period from August 2008 to December 2008.

Data were entered into computer using SPSS (ver. 15). Descriptive statistics were computed and multivariate binary logistics regression was employed to determine risk assessment model for physical activity.

RESULTS

Two hundred thirty five patients were included in this study. Sixty seven percent of the patients were males with an average age of 52.31 years. Ninety percent of the subjects were from urban areas, 70% percent were married and 33% were illiterate. Twenty nine percent were unskilled, 33.6% were from the income group of PRs. 10,000— PRs 15,000. Seventy one percent had no previous history of chest pain and 34% had positive history of parental death through CAD.

The mean ± SD of age, weight and height of all patients were (52.79±9.96) years, (67.58±13.00) Kg and (161.89±10.95) cm, respectively. Age, body mass index (BMI) and waist circumference were not statistically significant among males and females, while height and weight were significant. Males were heavier (male: 67.32±13.15 kg, female: 61.51±13.22 kg, P=0.005) and taller (male: 164.50 ± 10.89 cm, female: 156.55±9.01 cm,

p<0.0001) than females. Only 10.8% (95% CI: 5.9-15.6) of males and 7.8% (95% CI: 1.8-13.8) of females were in active group and this difference was insignificant (p=0.321). Age group was significantly different for males (p=0.024) and females (P=0.002).

The prevalence of active MI patients in the sample size was 10.2%. There was no significant difference in the proportion of activity between urban and rural residents (p=0.455). There was a significant upward trend of prevalence of activity with increase in educational level (p=0.022). University educated patients showed the highest prevalence of activity (25.9%, 95% CI: 9.3-42.4). Income level was significantly different among active and inactive patients (p=0.004). The highest prevalence of activity was observed in highest paid (PRs. >30,000) patients (27.3%, 95% CI: 12.1-42.5). Occupation of the patients was also significant (p=0.001) with activity. Highest prevalence of activity was observed in skilled workers (31.2%, 95%CI: 15.1-47.2) (Table 1).

Table 1 : Proportion of patients who are active or inactive relative to some demographic characteristics

Variable		N	Active		Inactive		P-value
			N (%)	95%CI	N (%)	95%CI	
Gender	Male	158	17(10.8)	5.9-15.6	141(89.2)	84.4-94.0	0.321
	Female	77	6(7.8)	1.8-13.6	71(92.2)	86.2-98.2	
Male	30-44	38	9(23.7)	10.2-37.2	29(76.3)	62.8-89.8	0.024
	45-59	68	5(7.4)	1.2-13.6	63(92.7)	86.4-98.8	
	>60	52	4(7.7)	0.5-14.9	48(92.3)	85.1-99.5	
Female	30-44	12	4(33.3)	6.63-59.9	8(66.7)	40.1-93.3	0.002
	45-59	39	1(2.6)	2.3-7.5	38(97.4)	92.5-102.3	
	>60	26	1(3.8)	3.5-11.1	25(96.2)	88.9-103.5	
Residence	Urban	211	21(10.0)	6.0-14.0	190(90)	85.9-94	0.455
	Rural	24	3(12.5)	0.73-25.7	21(87.5)	74.27-100.7	
Occupation	Skilled	32	10(31.2)	15.1-47.2	22(68.8)	52.8-84.8	
	Intermediate	30	4(13.3)	10.7-25.5	26(87.7)	75.5-99.9	0.001
	Semi skilled	38	1(2.6)	2.4-7.7	37(97.4)	92.3-102.5	
	Unskilled	69	5(7.2)	1.1-13.3	64(92.8)	86.7-98.9	
	House wife	58	3(5.2)	0.5-10.9	55(94.8)	89.1-100.5	
	Others	8	1(12.5)	10.4-35.4	7(87.5)	64.6-110.4	
Education	Illiterate	77	4(5.2)	0.3-10.1	73(94.8)	89.9-99.9	0.022
	Read &write	15	1(6.7)	5.9-19.3	14(93.3)	80.7-105.9	
	Primary	31	5(16.1)	3.2-29	26(83.9)	71.0-96.8	
	High school	36	1(2.8)	2.5-8.2	35(97.2)	91.8-102.6	
	College	49	6(12.2)	3.0-21.4	43(87.8)	78.6-97.0	
	University	27	7(25.9)	9.3-42.4	20(74.1)	57.6-90.6	
Income	6000-10,000	43	3(7.0)	0.6-14.6	40(93.0)	85.4-100.6	0.004
	10001-15,000	79	4(5.1)	0.3-9.9	75(94.9)	90.1-99.7	
	15001-30,000	80	8(10.0)	3.4-16.5	72(90.0)	83.5-96.5	
	>30,000	33	9(27.3)	12.1-42.5	24(72.7)	57.5-89.9	
Total		235	24(10.2)		211(89.8)		

*Chi-square for proportion differences

The proportion of male and female patients who were active or inactive relative to BMI and waist circumference (WC) was discussed in Table 2. There were no significant differences among active and inactive patients with respect to BMI and WC (p > 0.05). Table 3 shows mean (± SD) values of age, BMI and waist circumference in male and female patients. Only mean age and mean BMI were statistically significant between active and inactive females with respective p-values of 0.031 and <0.0001. Inactive females were older and heavier than active females.

Table 2 : The proportion of male and female patients who are active or inactive relative to body mass index (BMI) and waist circumference (WC)

BMI/WC		N	Active		Inactive		P-value
			N (%)	95%CI	N (%)	95%CI	
Male (BMI)	<23	51	10(19.6)	8.7-30.5	41(80.4)	69.5-91.3	0.054
	23.00-24.99	36	4(11.1)	0.8-21.4	32(88.9)	78.6-99.2	
	≥25.	71	4(5.6)	0.3-10.9	67(94.4)	89.1-94.7	
Female (BMI)	<23	23	2(8.7)	2.8-20.2	21(91.3)	79.8-102.8	0.651
	23.00-24.99	16	2(12.5)	3.7-28.7	14(87.5)	71.3-103.7	
	≥25.	38	2(5.3)	1.8-12.4	36(94.7)	87.6-101.8	
Female (WC)	<85	28	1(3.6)	3.3-10.5	27(96.4)	89.5-103.3	0.659
	≥85.	35	1(2.9)	2.6-8.4	34(97.1)	91.6-102.6	
Male (WC)	<90	72	8(11.1)	3.8-18.3	64(88.9)	81.7-96.1	0.588
	≥90.	56	6(10.7)	2.6-18.8	50(89.3)	81.2-97.4	

Table 3 : Mean and standard deviation of age, body mass index (BMI) and waist circumference (WC) male and for female patients who were active or inactive

Variable		Active	Inactive	P-value
Male	Age	51±9.354	52.56±10.417	0.557
	BMI	23.39±4.75	25.38±4.11	0.06
	WC	92.93±8.616	93.53±13.96	0.864
Female	Age	49.84±6.021	55.07±9.0726	0.031
	BMI	21.63±3.37	26.21±3.51	<0.0001
	WC	88.23±10.23	92.49±10.16	0.118

*T-test for mean differences

Table 4 illustrates the results of multivariate binary logistics regression for physical activity (active vs. inactive) on significant risk factors obtained through univariate analysis.

Age-group [(30-44)yrs, (45-59)yrs, (≥60)yrs],Sex (male, female), Occupation (skilled, intermediate, semiskilled, unskilled, housewives, others) and BMI [<23 kg/m^2,(23-24.99) kg/m^2, ≥25 kg/m^2], Income (6,000-10,000, 10,001-15,000,15001-30,000, >30,000), Education (illiterate, read & write, primary, high school, college, university) were included in multivariate binary logistic regression. Age

group and occupation showed significant effect in this risk assessment model. The patients of age group (30-44) years were 4 times (p=0.001) more active than the patients having ages (45-59) years and 7 times (p<0.0001) more active than the patients having ages (>60) years. The patients (senior professionals, managers, doctors, directors, etc) were 4 times (p=0.028) more active than the patients (junior clerk, mechanics, traders etc) and 9 times (p=0.003) more active than house wives.

Table 4 : Multivariate logistic regression of physical activity with respect to age groups, sex education, occupation, BMI & income categories

Variable in the equation	B	SE	Wald	df	P-Value	Odds
Occupation			10.357	5	0.066	
Skilled vs intermediate	-1.16	0.69	2.830	1	0.093	3.19
Skilled vs semiskilled	-1.442	0.656	4.824	1	0.028	4.2
Skilled vs unskilled	-0.951	0.532	3.191	1	0.074	2.59
Skilled vs house wives	-2.15	0.731	8.652	1	0.003	8.6
Skilled vs others	-1.131	1.177	0.924	1	0.333	3.09
Age in groups			15.520	2	<0.0001	
(30-44)yrs vs 45-59)yrs	-1.364	0.445	9.414	1	0.002	3.9
(30-44)yrs vs (=60)yrs	-2.012	0.570	12.459	1	<0.0001	7.4
Constant	-1.759	0.271	43.839	1	<0.0001	6.02

DISSCUSSION

This study investigated the effect of physical activity of different risk factors of MI i.e. age, gender, BMI, WC, obesity and occupation on the age group of 30 - 70 years. The data for this study were collected from four cardiac hospitals (National Institute of Cardiovascular Diseases, Karachi Institute of Heart Diseases, Civil Hospital, and Liaquat National Hospital). The inclusion criteria for the patients were definite MI patients, diagnosed by the hospital consultants. The major findings of the study were low prevalence of activity in MI patients (10.2%) which was much lower as compared to other populations.[22, 23] To improve the conditions of MI patients this percentage of physical activity should be improved because the low level of physical activity has been identified as a major modifiable risk factor for cardiovascular diseases.[22] Busy life of this metropolitan city could be one of the reasons for this low level of physical activity. In an Indian study, it was found that daily moderate physical activity (*e.g.*, the equivalent of brisk walking of 35-40 min per day) has lowered the risk of CHD by 55%.[24] The low prevalence of physical activity is particularly important since it negatively impacts the health status and also increases the economic burden on the society.[25]

In the present study the prevalence of activity was higher in males than in females (10.8% male and 7.8% female). This result is consistent with another Middle East study which showed that the majority of MI patients who exercised (75%) were males.[27]However; this finding is inconsistent with the result of a study conducted in Saudi Arabia which showed that women were more or moderately active than men.[26] It is not in our culture that females involve in physical activities, such as outdoor games or walking in the parks. Furthermore, there are not enough physical fitness facilities available, especially for lower or upper middle classes. This result of low level of physical activities among females is also consistent with Western studies.[28, 29] But the reasons could be different. Since they have dual responsibilities of family and profession, they do not have enough time for physical fitness. This study showed that there was no significant difference in the activity level of urban and rural population which is in contrast with another study.[23] Furthermore the findings of the study showed that inactivity prevalence decreases with increase in education because education increases health awareness. This result is consistent with a previous study according to which an association exists between a low level of education and acute myocardial infarction.[30, 31] The prevalence of obesity was lowest among unmarried people, which is consistent with another study,[32] which could be a proxy of low level of activity. The result of our study also showed that the skilled worker with higher pay scales had the highest prevalence of activity. A cross-sectional study (National Health and Nutrition Examination Survey III) reported that the likelihood of being obese could be reduced by as much as one half with a physically active occupation.[33] The present study also indicated that physical activity decreases with advancing age. Age related decline in physical activity has been well described in the literature.[27, 34] Waist circumferences of inactive MI patients for both genders was also higher in our study and this result is consistent with another study according to which inactive patients with elevated waist circumference have a high risk of coronary heart disease.[35]

CONCLUSION

In summary the findings of the study revealed that mostly MI patients were physically inactive with higher values of BMI and waist circumference. The patients having ages from 30 to 44 years were found more active than the other age groups. Skilled and highly educated patients were more active than the patients belonging to other occupational categories.

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