ADHERENCE TO EVIDENCE-BASED THERAPIES AND MODIFIABLE RISK FACTORS IN PATIENTS WITH CORONARY ARTERY DISEASE - THE HLCP PROJECT

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Abstract

INTRODUCTION: Coronary artery disease is the most common cause of death worldwide. In patients with a history of MI, the risk of second myocardial infarction increases five-fold. This study aimed to investigate lifestyle habits, modifiable risk factors and medications in patients with coronary artery disease, as part of the first phase of Healthy Lifestyle for Cardiac Patients (HLCP) Project .

METHODS: In a cross-sectional study, patients with a definitive diagnosis of coronary artery disease during the past 6-12 months were studied. A questionnaire was filled to collect demographic details, past medical history, and all current medications. Blood pressure, height, weight, waist circumference, blood glucose and lipid profile were measured. Data was entered in SPSS 11 and analyzed via Student's t-test, chi square test and prevalence study. P values less than 0.05 were considered as significant.

RESULTS: Of 427 patients, 41.5% were women. Mean blood pressure, waist circumference, fasting blood glucose, high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C), triglycerides and body mass index were higher in women, while total cholesterol, height and weight were higher in men. Mean 6- to 12-month cardiology visits were 6.34 and 6.88 for men and women, respectively. Despite these visits, the prevalence of diabetes mellitus, hypertension and high LDL-C was 19.1%, 18.4% and 88.6%, respectively. In addition to the considerable prevalence of modifiable risk factors, consumption of medications for secondary prevention and control of these factors were not sufficient; ACE-inhibitors and anti-platelet medications were used more frequently in men, while the use of other cardiac medications was higher in women ($P<0.05$).

CONCLUSIONS: Neither men nor women had optimal control of modifiable risk factors, and medications were not taken in adequate amounts by either men or women. We recommend that patients be given proper education to adopt healthy lifestyle habits, reduce risk factors and improve medication after discharge and in visits.

Keywords: Secondary prevention, patients, sex, coronary artery disease.

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Introduction

Coronary artery disease (CAD) is the most important non-communicable disease threatening human life.[1]

Although in recent years the prevalence of CAD has decreased in developed countries, it has been rising in developing countries.

CAD accounts for 75% of mortality in developing countries.[2] In developing countries, with inadequate secondary prevention programs, younger age of patients at CAD onset is associated with higher cardiac morbidity.[3] Patients surviving myocardial infarction (MI) have a five-fold increased risk of a second MI, which warrants implementation of prevention programs.[4] Towards this end, three modalities are recommended: lifestyle improvement, the use of proper medication(s), and revascularization procedures. In spite of proven efficacy of these modalities, studies in other countries have shown that

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large numbers of CAD patients do not comply with medical recommendations regarding adoption of a healthier lifestyle and proper consumption of the prescribed medications; hence risk factor control has been less than optimal.[5-8] Moreover, the use of medications such as aspirin, beta-blockers, ACE inhibitors and statins have not been optimal.[9-15]

Performing a study of Iranian CAD patients to provide some insight into the management of these patients in this country seems necessary; such a study can assist health system policymakers in improving health and disease management in the country. Healthy Lifestyle for Cardiac Patients (HLCP) Project, as a component of Isfahan Healthy Heart Program (IHHP), deals with this problem. The results of its first phase are presented below.

Materials and methods

A cross-sectional study was performed on patients with previous history of definite CAD (past 6-12 months). WHO criteria of definitive MI (typical chest pain, electrocardiographic changes and rise in cardiac enzymes), positive angiography or past history of angioplasty were used.[16] The study was an IHHP project entitled Healthy Lifestyle for Cardiac Patients (HLCP), conducted in the provincial cities of Isfahan, Najafabad and Arak in 2001 with cluster sampling method.[17]

After taking written informed consent, a questionnaire was used to collect demographic data, history of heart disease including MI, and history of angiography. The number of visits by cardiologists during the past 6-12 months and other physicians was recorded. Current cardiac medications for secondary prevention including beta-blockers (inderal, metoral, atenolol), Angiotensin converting enzyme inhibitors (captopril, enalapril), Angiotensin receptor blockers (losartan), antilipids (lovastatin, simvastatin, atorvastatin) and anti-platelets (aspirin, ticlopidine), medications for diabetes control (oral hypoglycemic agents and insulin) and blood pressure management (calcium channel blockers, diuretics) were recorded.

Blood pressure was measured twice on the right arm in sitting position after 15 minutes of rest using a standard sphygmomanometer by a nurse.

The average of two measurements was recorded. Subjects with systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90mmHg, or those who took antihypertensive medications were regarded as hypertensive.[18]

Height, weight, waist and hip circumference were measured and body mass index (BMI) was calculated.[19] Patient with BMI ≥30kg/m^2 were considered as obese.[20]

Blood samples were taken from the patients in fasting state.

Low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), triglyceride (TG), total cholesterol (TC) and fasting blood sugar (FBS) were measured. Normal values were defined as: TC≤ 200 mg/dl, HDL-C ≥50 mg/dl for women and ≥40 mg/dl for men, LDL-C ≤100 mg/dl and TG ≤150 mg/dl.

The patient was considered hyperlipidemic if the values were out of normal range or if the patient used antilipids. Diabetes was defined as fasting blood sugar ≥126 mg/dl or use of oral hypoglycemic agents/insulin.[22]

The extracted data were analyzed with Student's t-test, chi-square test and prevalence detection, using SPSS 11. All P values were two-tailed and P values less than 0.05 were considered significant.

Results

Four-hundred and twenty-seven patients were studied (41.5% women, 58.5% men).

TABLE 1. Mean and standard deviation of patient characteristics according to sex

Variable	Female	Male	All
FBS(mg/dl)	109.10±46.80	107.00±46.66	107.66±45.97
LDL-C (mg/dl)	158.69±41.81	140.61±37.16	146.99±40.93
HDL-C (mg/dl)	44.00±7.03	40.48±7.13	41.60±7.23
TG (mg/dl)	178.27±64.36	185.79±92.54	184.49±86.24
TC (mg/dl)	239.83±43.07	218.40±45.36	225.55±46.45
Wt (kg)	69.33±12.59	75.69±14.77	73.46±14.38
Ht (cm)	155.43±6.48	167.37±7.34	162.87±9.08
WC (cm)	105.09±11.27	98.56±11.35	101.16±11.82
HC (cm)	106.20±11.10	103.43±8.09	104.55±9.45
SBP (mmHg)	138.76±23.66	130.12±19.84	133.34±21.65
DBP (mmHg)	87.12±21.44	80.32±15.28	82.87±18.01
BMI (kg/m^2)	28.78±5.37	26.98±4.61	27.67±5.00

(FBS) Fasting blood sugar, (LDL-C) Low-density lipoprotein cholesterol, (HDL-C) High-density lipoprotein cholesterol, (TG) Triglyceride, (TC) Total cholesterol, (Wt) Weight, (Ht) Height, (WC) Waist circumstance, (HC) Hip circumstance, (SBP) Systolic blood pressure, (DBP) Diastolic blood pressure, (BMI) Body mass index

TABLE 2. Mean 6- to 12-month physician visits according to sex

Visits	Female	Male	P
Visits due to cardiac problems	6.88	6.34	0.17
Visits due to non-cardiac problems	3.25	2.37	0.01
All visits	9.31	9.16	0.01

TABLE 3. Frequency of some Modifiable risk factors according to sex

Risk factors	Female (%)	Male (%)	All (%)
Diabetes	19.5	18.9	19.1
Hypertension	20.9	18.0	18.4
BMI >30 kg/m²	34.7	17.2	24.1
LDL-C >100 mg/dl	94.9	85.2	88.6
TG >150 mg/dl	61.8	54.9	57.6
TC >200 mg/dl	80.8	66.4	70.7
HDL-C <50 mg/dl (Female), HDL-C <40 mg/dl (Male)	63.3	72.0	70.1

(LDL-C) Low-density lipoprotein cholesterol, (HDL-C) High-density Lipoprotein- cholesterol, (TG) Triglyceride, (TC) Total cholesterol, (BMI) Body Mass Index

TABLE 4. Frequency of medication consumption by patients according to sex

Medication	**Female (%)**	**Male (%)**	**P**
Beta blockers	56.1	46.0	0.002
Anti platelet	50/5	62.1	0.002
ACE inhibitors and ARB	20.9	22.5	0.11
Statins	6.9	4.4	0.25
Antidiabetics	10.6	8.3	0.43
Antihypertensive			
Ca blocker	20.6	17.9	0.41
Diuretic	23.3	14.7	0.01
Others	8.5	3.7	0.001

(ACEI) Angiotensin converting enzyme inhibitors, (ARB) Angiotensin receptor blockers

The mean ages of women and men were 63.58 ±11.78 years and 61.11±12.19 years, respectively.

Table 1 presents the mean and standard deviations for blood chemistry, weight, height, waist and hip circumference, systolic and diastolic blood pressure and BMI. All values were higher in women except for weight, height and total cholesterol.

Mean 6- to 12-month physician visits are presented in Table 2. Women were visited more frequently than men. Table 3 presents the relative frequency of modifiable risk factors according to sex. The risk factors were not properly controlled in a significant number of patients. All risk factors were more frequent in women except for low HDL-C.

Table 4 shows the relative frequency of medication consumption for both sexes. All medications were more frequently used by women than men, except for anti-platelets and ACE-inhibitors, while the difference was significant for beta-blockers and anti-platelets (P<0.05).

Discussion

Our findings demonstrated that control of modifiable risk factors was not optimal in Central Iran. Most patients were hyperlipidemic but a few received statins. Although twenty percent of the patients were diabetic, 25% were still obese and 20% were hypertensive, they consumed inadequate amounts of medications Only half of the patients received anti-platelet agents such as aspirin. Fifty percent, 20% and less than 10% received beta-blockers, ACE inhibitors and statins, respectively. Control of these risk factors was not good in spite of frequent cardiology and non-cardiology visits.

The problem of non-compliance has also been noted in other studies. It results in an annual loss of 1000 billion dollars in the US.[23] Results of the GRACE project, one of the largest programs performed on CAD patients in 104 hospitals in 14 countries, shows that six months after a cardiac event, 92%, 87%, 88% and 80% of patients were receiving aspirin, statins, beta-blockers and ACE inhibitors.[24] Patient compliance improved if they were visited by cardiologists. The findings are significantly different from ours; this may be due to suboptimal secondary prevention programs. Another study in Germany showed that a maximum of 80% of patients take aspirin after MI.[25] In the Medi plus study, 60% and 50% of patients were receiving beta-blockers and ACE inhibitors, respectively, six months after their coronary event.[26]

Krumholz reported that 53% of patients received ACE ihibitors.[27] Andrade reported that 15% of post-MI patients stopped taking statins after six months, this percentage increased to 50% after two years.[29] Benner's findings show that in a 6-month period, more than 50% of patients are not willing to take medications with evidence-based benefits for secondary prevention.

Medication compliance in the GRACE study was higher than other studies including ours, probably because patients in the GRACE study were younger and medications were started in the hospital. In contrast, our patients were older and some who had undergone angiography had no history of hospitalization due to acute cardiac problems.

But what are the reasons for low compliance and inadequate risk factor management in our study sample? First, the patients' reasons must be considered; these include severity of the underlying disease, fear of recurrence of cardiac problems, fear of developing drug dependence, older age, low level of patient knowledge about their disease and ways to prevent recurrence of CAD by lifestyle change and compliance with the prescribed drug regimen.

Second, the patient-physician relationship must be examined. Physicians can improve patient compliance through effective communication with the patients and by spending enough time to inform them about risk factors and benefits of medication.[31] Many patients do not even know that taking medications can prevent recurrence of their disease

We emphasize the need for vigorous secondary preventive programs for Iranian CAD patients; this can be accomplished by planning periodic medical education programs for health providers (nurses, dietitians, general physicians, and cardiologists) in which to highlight the need to educate patients towards a healthier lifestyle; one that inevitably includes adequate physical activity and healthy nutrition. Meanwhile, group education programs should be designed for patients and their families in order to increase their compliance. In conclusion, we recommend interventional projects towards better control of risk factors in Iranian CAD patients and decreasing the recurrence of CAD.

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