

## PHARMACOLOGICAL TREATMENT, LIFESTYLE MODIFICATION AND AWARENESS IN CORONARY ARTERY AND CEREBROVASCULAR DISEASE PATIENTS

MOJGAN GHARIPOUR\*  
ABDOLMEHDI BAGHAIE\*  
KATAYUN RABIEI\*  
NIZAL SARRAFZADEGAN\*

*SUMMARY: Cardiovascular diseases (CVD) and cerebrovascular diseases (CeVD) are large and growing problems in low- and middle-income populations. Secondary prevention, which can reduce the risk of recurrent CVD includes changes in lifestyle, pharmacological interventions and revascularization procedures. The aim of the first phase of this project was to perform situation analysis and identify gaps in secondary prevention of major cardiovascular diseases. This study estimated the physicians' awareness and the patients' knowledge and behavior towards CVD and CeVD complications. It also assessed the efficacy of methods for decreasing recurrent events.*

*A sample of consecutive patients was selected from the outpatient units of the health care facilities selected for the study. Stratified random sampling of primary and secondary private and public health care facilities in cities and villages was performed to select 449 eligible cases. A total of 257 men and 192 women were selected. The inclusion criteria were as follows: Age above 21 years, established diagnosis of CVD and/or CeVD defined as any of the following alone or in combination with others: previous myocardial infarction, stable/unstable angina, percutaneous transluminal coronary angioplasty (PTCA), coronary artery bypass graft (CABG), stroke, transient ischemic attack (TIA), and/or carotid arterectomy. The patients were included if their first event had occurred more than a month, but no earlier than three years before the study.*

*The prevalence of high systolic and diastolic blood pressure was 40.1% and 26.9% respectively in MI patients, and 70.1% and 51.2% respectively in CeVD patients. In most of the patients, fasting blood sugar and total cholesterol were within the normal range. Among MI patients, 93.9%, 68.5% and 48.2% were already taking aspirin, beta-blockers and statins, respectively. Among CeVD patients, 79.9%, 61.1% and 23.2% were taking aspirin, beta-blockers and statins, respectively. Blood pressure had been managed in 94.9% and 93.7% of MI and CeVD patients, respectively. Among MI patients, 85.8% and 83.2% had correct behavior towards blood sugar and cholesterol control and 68% had adequate knowledge of the risk of recurrent events.*

*Secondary prevention of vascular diseases should be regarded as a key component of public health strategies to reduce the rising burden of CVD and CeVD in Iran.*

*Key Words: Lifestyle modification, Awareness, Myocardial infarction, CeVD.*

### INTRODUCTION

Cardiovascular disease (CVD) and cerebrovascular disease (CeVD) are large and growing problems in low-

and middle-income populations (1). Patients with established CVD are at a very high risk of experiencing further, potentially fatal episodes of the disease (2). Coronary heart disease (CHD) and CeVD are two main

\*From Isfahan Cardiovascular Disease Research Center, Iran.

contributors to global cardiovascular morbidity and mortality (3). Lifestyle factors such as physical inactivity, tobacco smoking and fat consumption in Iran are different from developed countries. Mean levels of adiposity, blood cholesterol and blood pressure are high and rising (1, 4, 5).

International long-term studies have confirmed that secondary prevention can substantially reduce the risk of recurrent events. Secondary prevention refers to measures taken to reduce the risk of recurrent vascular events in patients who have a history of CVD (especially CHD) and CeVD (6). These patients are at considerably greater risk of recurrent events.

Secondary prevention appreciably reduces the risk of recurrent CVD and includes changes in lifestyle, pharmacological interventions and revascularization procedures (7). As CHD is a multifactorial disease, the effects of cigarette smoking, physical activity and diet on the risk of CHD are largely independent of each other (7). Although not directly examined, in the secondary prevention context, it is likely that the beneficial effects of smoking cessation, increased physical activity and dietary change will be largely independent, and together they are likely to be substantial. Studies on Prevention of Recurrent Myocardial Infarction and Stroke (PREMISE) have been implemented in twelve countries. PREMISE consists of three components, (a) initial assessment, (b) intervention, and (c) outcome assessment (8). The first phase of this study was carried out between 2002 and 2003 by Isfahan Cardiovascular Research Center (ICRC), a WHO Collaborating Center active in design and implementation of projects with other centers around the world (ten countries) and the World Health Organization (WHO). The aim of the first phase of this project was to undertake situation analysis and identify the gaps in secondary prevention of major cardiovascular diseases, for example assess physicians' awareness and patients' knowledge and behavior towards CVD and CeVD complications.

## MATERIALS AND METHODS

PREMISE is a multicentric interventional study conducted on CVD and CeVD patients in a geographic area selected by ICRC and WHO. The area selected for the study had secondary care facilities with sufficient outpatient turnover. This is the pre-

liminary report of the project conducted in the city of Isfahan as the focal point of the study in Iran.

### Selection of patients

A sample of consecutive patients was selected from outpatient units of each health care facility. Stratified random sampling was performed in primary and secondary, private and public health care facilities of villages and cities to select 1000 eligible cases. Hospitalized patients were not selected. About 1400 consecutive ambulatory patients were selected. Patients with history of hospital admission for cardiac events, myocardial infarction (MI) and stroke were included. A total of 257 men and 192 women were selected. Inclusion criteria were as follows: age above 21 years, established diagnosis of CVD and/or CeVD defined as any of the following alone or in combination with others: previous MI, stable/ unstable angina, percutaneous transluminal coronary angioplasty (PTCA), coronary artery bypass graft (CABG), stroke, transient ischemic attack (TIA) and/or carotid arterectomy. Patients were included if their first event had occurred more than a month, but no earlier than three years before the study. The diagnoses were confirmed by examining the patients' health records (8).

### Data collection

During a period of six months, data were collected from cases through interviews using validated questionnaires. At each site, a trained coordinator collected data using a standardized case report form. Demographic characteristics, as well as data on medical history, presenting symptoms, duration of pre-hospital delay, biochemical and treatment practices, and hospital outcome were collected. Standardized definitions of all patient-related variables and clinical diagnoses were used. Data were entered into a data entry program supplied by WHO headquarters and sent back to this headquarters in electronic format along with hard copies of the completed questionnaires.

### Statistical analysis

The outcome of secondary prevention, i.e. the efficacy of three types of interventions for secondary prevention of vascular diseases, namely modification of lifestyle, pharmacological interventions, and revascularization procedures was assessed. Chi-square test was used to compare the effectiveness of each type of intervention in MI, CVD, stable angina and unstable angina.

### Management and coordination

The project was managed and coordinated by ICRC and WHO headquarters.

**RESULTS**

The study samples included 257 men and 192 women with MI and CeVD who were enrolled in the PREMISE study between 2002 and 2003. The mean age of patients in the study was 56.7 years (SD=8.7).

The prevalence of high systolic and diastolic blood pressure was 40.1% and 26.9% respectively in MI patients, and 70.1% and 51.2% respectively in CeVD patients. Fasting blood sugar (FBS) and total cholesterol were within normal range in most patients (Table 1).

Among the MI patients, 93.9%, 68.5% and 48.2% were already taking aspirin, beta-blockers and statins, respectively. Among CeVD patients, 79.9%, 61.1% and 23.2 % were taking aspirin, beta-blocker and statins, respectively (Table 2).

The prevalence of adequate physical activity in MI patients was 62.4%, and 96.8% of the patients had a healthy diet. 14.8% of MI patients versus 17.5% of CeVD patients continued their smoking habit (Table 3). Blood pressure had been managed in 94.9% and 93.7% of MI and CeVD patients, respectively.

Among MI patients, correct behavior towards controlling blood sugar and cholesterol was seen in 85.8%

and 83.2% of the patients, respectively, with 68% having enough knowledge about the risk of recurrent events. These values are significantly different between MI and CeVD Patients (Table 4) (P<0.001). 66.4% of MI patients had adequate knowledge of secondary prevention of recurrent events.

**DISCUSSION**

In the first phase of this study we analyzed and identified gaps in secondary prevention of major cardiovascular diseases by assessing the physicians' awareness and the patients' knowledge of CVD and CeVD complications. Recent studies have assessed the effectiveness of three types of interventions in secondary prevention of vascular disease, namely lifestyle modification, pharmacological interventions, and revascularization procedures (9). A causal relationship between total and low-density lipoprotein (LDL) cholesterol and CHD risk has been supported by observational evidence (10).

We found statistically significant differences between MI and CeVD patients in control of blood pressure and drug use.

Table 1: Clinical examination in MI/CeVD patient.

|         | Systolic blood pressure |       | Diastolic blood pressure |       | FBS   |      | Total cholesterol |      |
|---------|-------------------------|-------|--------------------------|-------|-------|------|-------------------|------|
|         | <130                    | 130>  | <85                      | 85<   | <110  | 110< | <300              | 300< |
| MI      | 59.9%                   | 40.1% | 73.1%                    | 26.9% | 99%   | 1%   | 100%              | 0%   |
| CeVD    | 29.9%                   | 70.1% | 48.8%                    | 51.2% | 100%  | 0%   | 100%              | 0%   |
| P value | 0.000                   |       | 0.000                    |       | 0.115 |      | 0.215             |      |

Table 2: Drug use in MI/CeVD patients.

|         | Aspirin |       | Beta-blockers |       | Statins |       |
|---------|---------|-------|---------------|-------|---------|-------|
|         | Yes     | No    | Yes           | No    | Yes     | No    |
| MI      | 93.9%   | 6.1%  | 68.5%         | 31.5% | 48.2%   | 51.8% |
| CeVD    | 79.9%   | 20.1% | 61.1%         | 38.9% | 23.4%   | 76.6% |
| P value | 0.000   |       | 0.104         |       | 0.002   |       |

Table 3: Lifestyle factors in MI/CeVD Patients (patient behavior towards secondary prevention).

|         | Lifestyle         |       |              |       |             |       |                        |      |             |       |                     |       |                   |     |
|---------|-------------------|-------|--------------|-------|-------------|-------|------------------------|------|-------------|-------|---------------------|-------|-------------------|-----|
|         | Physical activity |       | Healthy diet |       | Tobacco use |       | Blood pressure control |      | FBS control |       | Cholesterol control |       | Risk of recurrent |     |
|         | Yes               | No    | Yes          | No    | Yes         | No    | Yes                    | No   | Yes         | No    | Yes                 | No    | Yes               | No  |
| MI      | 62.4%             | 37.6% | 96.8%        | 3.2%  | 14.8%       | 85.2% | 94.9%                  | 5.1% | 85.8%       | 14.2% | 83.2%               | 16.7% | 68%               | 32% |
| CeVD    | 58.7%             | 41.3% | 89.5%        | 10.5% | 17.5%       | 82.5% | 93.7%                  | 6.6% | 61.5%       | 38.5% | 57.8%               | 42.2% | 47.5%             | 0%  |
| P value | 0.958             |       | 0.005        |       | 0.475       |       | 0.798                  |      | 0.000       |       | 0.000               |       | 0.000             |     |

Table 4: Patient knowledge of secondary prevention.

|         | Blood pressure control | FBS Control | Cholesterol control | Risk of recurrent event |
|---------|------------------------|-------------|---------------------|-------------------------|
| MI      | 66.4%                  | 33.6%       | 54.3%               | 45%                     |
| CeVD    | 50%                    | 50%         | 32.8%               | 67.2%                   |
| P value | 0.001                  | 0.002       | 0.000               | 0.002                   |

40.1% of MI patients versus 70.1% of CeVD patients had elevated systolic blood pressure. All of the patients in the two groups had controlled FBS and total cholesterol (Table 1) ( $P < 0.001$ ).

Changes in lifestyle, especially cessation of cigarette smoking, dietary changes, and increasing physical activity in patients with established CHD are likely to reduce the risk of both recurrent CHD and possibly other vascular events, particularly stroke.

These changes may also have other beneficial effects, including reduction of the risk of non-cardiovascular diseases and decrease in the dose of medications required (11). In patients with established occlusive vascular disease (previous MI, stroke, TIA), daily use of low-dose aspirin (75-325 mg/day) reduced the risk of recurrent vascular diseases such as MI and stroke by about one quarter (27%) for at least a month (12).

However, generalization of conclusions about the effectiveness of drugs requires evidence on whether benefits are common to different drugs in a class (e.g. statins) or common to drugs exerting a similar effect via different mechanisms (e.g. blood pressure-lowering

drugs) (13). Treatment with statins reduces the risk of recurrent vascular events in patients with CHD (14). The relative benefits appear similar in all patient groups, including those with angina and MI.

Hence the absolute benefits are directly related to the level of vascular risk and increase markedly with age (15-17). Aspirin, beta-blockers and statins were used by 93.9%, 68.5% and 48.2% of MI patients, respectively. Only 23.4% of CeVD patients used statins. No statistically significant difference was seen between MI and CeVD patients in beta-blocker use (Table 2) ( $P < 0.104$ ).

Lack of physical activity is a strong independent risk factor for the development of CHD and may cluster with other unhealthy behaviors. Other studies have shown that post-MI cardiac rehabilitation measures including exercise programs can reduce cardiac mortality by as much as 20-25% (18-19).

We observed no statistically significant difference between the two groups in respect of physical activity (Table 3) ( $P < 0.958$ ). High salt intake has been associated with an increased risk of CVD, including CHD, (20-21) and increased risk of high blood pressure (22).

We demonstrated 96.8% of MI patients and 89.5% of CeVD patients to have healthy diets (Table 3) ( $P < 0.005$ ).

Smoking is a powerful predictor of outcome in patients with left ventricular dysfunction and smoking cessation has early and substantial effects on patients in this group (23).

Considerable benefits from smoking cessation have also been observed after bypass grafting (24).

Recent meta-analyses of observational cohort studies have shown substantial reductions in mortality associated with stopping cigarette smoking after MI (25,26). Our analysis showed that 14.8% of MI patients and 17.1% of CeVD patients continued their smoking habit after their events.

Secondary prevention of vascular diseases should be regarded as a key component of public health strategies for reducing the rising burden of CVD and CeVD in Iran.

## REFERENCES

1. Murray CJL, Lopez AD : *Global comparative assessments in the health sector. World Health Organization, Geneva, 1994.*
2. World Health Organization. *The world health report 2002 Geneva.*
3. Reddy KS, Yusuf S : *Emerging epidemic of cardiovascular disease in developing countries. Circulation, 97:596-601, 1998.*
4. Reddy KS : *Cardiovascular disease in India. World Health Stat Q, 46:101-107, 1993.*
5. Drewnowski A, Popkin BM : *The nutrition transition: new Trends in the global diet. Nutr Rev, 55:31-43, 1997.*
6. Peto R, Chen Z, Boreham J : *Tobacco-the growing epidemic in china. JAMA, 245:1683-1684, 1996.*
7. World Health Organization. *Diet, nutrition and the prevention of chronic diseases. Report of a joint WHO/FAO experts consultation. WHO Technical Report series No 916. 2003 Geneva, WHO.*
8. Yusuf S, Reddy S, Ounpuu S, Anand S : *Global burden of cardiovascular diseases: part I: general considerations, the epidemiologic transition, risk factors, and impact of urbanization. Circulation, 104:2746-2753, 2001.*
9. Dennis MS, Burn JP, Sandercock PA, Bamford JM, Wade DT, Warlow CP : *Long-term survival after first-ever stroke: the Oxfordshire Community Stroke, 24:796-800, 1993.*
10. Law MR, Wald NJ, Thompson SG : *By how much and how quickly dose reduction in serum cholesterol concentration lower risk of ischemic heart disease? BMJ, 308(6925):367-372, 1994.*
11. Smeeth L, Ebrahim S *Commentary : DINS. PINS and things-clinical and population perspectives on treatment effects. BMJ, 321:952-953, 2000.*
12. John M, Ferrari D : *Collaborative meta-analysis of randomized trials of ant platelet therapy for prevention of death, myocardial infarction and stroke in high risk patients. BMJ, 324(7329):71-86, 2002.*
13. Turnbull F : *Effects of different blood-pressure-Lowering regimens on major cardiovascular events: results of prospectively designed overviews of randomized trials. Lancet, 362(9395):1527-1535, 2003.*
14. Murray C, Lopez A : *Global comparative assessments in the health sector. World Health Organization, Geneva, 1994.*
15. LaRosa JC, He J, Vupputuri S : *Effect of statins on risk of coronary disease: a meta-analysis of randomized controlled trials. JAMA, 282: 2340-2346, 1999.*
16. Shepherd J, Blauw GJ, Murphy MB, Bollen EL, Buckley BM, Cobbe SM et al : *Pravastatin in elderly individuals at risk of vascular disease (PROSPER): a randomized controlled trial. Lancet, 360(9346):1623-1630, 2002.*
17. MRC/BHF Heart protection Study of cholesterol Lowering with simvastatin in 20, 536 high-risk individuals: a randomized placebo-controlled trial. *Lancet, 360(9326):7-22, 2002.*
18. O'Connor Gt, Buring JE, Yusuf S, Goldhaber SZ, Olmstead EM, Paffenbarger RS et al : *An overview of randomized trials of rehabilitation with exercise after myocardial infarction. Circulation, 80:234-244, 1989.*
19. Berlin JA, Colditz GA : *A meta-analysis of physical activity in the prevention of coronary heart disease. Am J Epidemiol, 132:612-628, 1990.*
20. Tumileto J, Jousilahti P, Rastenyte D, Moltchanov V, Tanskann A, Pietinen P et al : *Urinary sodium excretion and cardiovascular mortality in Finland: a prospective study. Lancet, 357(9259):848-851, 2001.*
21. He J, Ogden LG, Vupputuri S, Bazzano LA, Loria C, Whelton P : *Dietary sodium intake and subsequent risk of cardiovascular disease in overweight adults. JAMA, 282:2027-2034, 1999.*
22. Law M, Frost C, Wald N : *By how much dose dietary salt reduction lower blood pressure? Analysis of observational data among populations. BMJ, 302(6780):811-815, 1991.*
23. Suskin N, Sheth T, Negassa A, Yusuf S : *Relationship of current and past smoking to mortality and morbidity in patients with left ventricular dysfunction. J Am Coll Cardiol, 37:1677-1682, 2001.*

24. Van Domburg RT, Meeter K, van Berket DF, Veldkamp RF, van Herwerden LA, Bogers AJ : Smoking cessation reduces mortality after coronary artery bypass surgery: a 20-year follow-up study. *J Am Coll Cardiol*, 36:878-883, 2000.

25. Wilson K, Gibson N, Willan A, Cook D : Effect of smoking cessation on mortality after myocardial infarction: meta-analysis of cohort studies. *Arch Intern Med*, 160:939-944, 2000.

26. Critchely J, Capewell S : Smoking cessation for the sec-

ondary prevention of coronary heart diseases. *Cochrane Database Syst Rev*, (4):CD003041, 2003.

Correspondence:  
Mojgan Gharipour,  
Isfahan Cardiovascular Disease  
Research Center,  
PO. Box: 8146-1148, IRAN.  
e-mail: gharipour@crc.mui.ac.ir