

THE ROLE OF EDUCATION ON BEHAVIORAL CHANGES TO MODIFIABLE RISKS FACTORS AFTER MYOCARDIAL INFARCTION

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Abstract: Myocardial infarction (MI) is the condition of irreversible necrosis of the heart muscle that results from prolonged ischemia. After World War II coronary heart disease (CHD) assumed epidemic proportions in western countries, nowadays, myocardial infarction is the leading cause of death in developed countries. Although conventional medical treatments may help an individual recover from a heart attack, the role of accurate information and education is important for cardiac rehabilitation. **Objective:** The objective of the present study was to evaluate the degree that education can influence the behaviour of the patients with first-manifestated myocardial infarction towards the modifiable risk factors for coronary disease. **Material and method:** The sample study included 59 patients nursing in hospitals with the diagnosis of myocardial infarction. The data were collected by the completion of anonymous questionnaire during personal interview with the researcher at the baseline and after 6 months, in 2003-04. Apart from the demographic-characteristics, the questionnaire was consisted of items related to risk factors of the disease, the personal and family history, and the medicine therapy and laboratory tests. After the completion of the questionnaire, accurate information pertaining the modifiable risk factors of coronary disease was presented to the patients and printed instructions concerning dietary rules were distributed. The follow-up took place 6 months later with the completion of the same questionnaire and laboratory tests. The compliance of the patients to the instructions given and to the new model of life according to the proposed dietary was evaluated during this follow-up period. **Results:** Statistical analysis of the data showed that 79,7% were men and 20,3% were women. The mean age was 62 ±11,88 years old. The main risk factors for myocardial infarction were hypertension (74,6%),

diabetes mellitus (40,7%), family history of coronary disease (50,8). Before acute myocardial infarction, the prevalence of high cholesterol was to a percentage of 72,9% of the patients, the percentage of current smokers was 71,2% and the percentage of alcohol users was 32,2%. Comparing the results of the first interview with the second interview, accrued a reduction to total cholesterol with statistically significant difference $p < 0,001$. According to the first laboratory test, the mean value of HDL was $46,23 \pm 13,08$ and the mean value of LDL was $144,60 \pm 46,17$. At the follow-up after the information and instructions were given to the patients, the mean values were $53,69 \pm 11,83$ for HDL with statistically significant difference, $p < 0,001$ and $131,47 \pm 58$, for LDL with statistically significant difference, $p < 0,004$. The mean value of TG at the baseline laboratory test was $157,83 \pm 95,56$ and at follow-up was $155,02 \pm 124,69$ with statistically significant difference, $p < 0,021$. **Conclusion:** The development of coronary heart disease is directly connected to the way of life and can be prevented with the management of the known risk factors which are responsible for leading to myocardial infarction. Prevention and health education is the most important aim in primary health care, especially in individuals of high-risk, whereas the discontinuation of attitudes in the modern way of living through programs of rehabilitation and information is judged necessary. An educational strategy is required to improve knowledge about a wide range of issues concerning myocardial infarction and thus initiate a new life style adjusted to the demands of the disease.

Key-words: myocardial infarction, risk factors, educational strategy, quality of life, symptomatology, cholesterol.

Introduction

Myocardial infarction (MI) is the condition of irreversible necrosis of the heart muscle that results from prolonged ischemia, approximately mainly when the coronary arteries that supply blood to heart become completely obstructed. This obstruction is usually caused by the build-up of plaque in the artery walls or a thrombus in a coronary artery that has developed over the years. A decrease in the amount of oxygen in the blood or in the body's organs can also trigger a heart attack. A healthy coronary artery spasm, which leads to the decrease of blood flow to the heart, may rarely be a cause of myocardial infarction (MI). Moreover, recent research suggests that myocardial infarction may also occur as the result of an inflammation of the heart, which is thought to be the easiest way for the formation of a clot. ^{1,2}

A number of different risk factors, contribute to coronary artery disease and therefore to myocardial infarction. These factors can be modifiable, such as smoking, hypertension, diet high in fat, poor blood cholesterol levels, particularly a high LDL value combined with a low HDL level and non-modifiable such as the gender with males at higher risk, the age and the heredity. ^{3,4,5}

After World War II coronary heart disease (CHD) assumed epidemic proportions in western countries. In many countries the peak of the epidemic occurred in 1968. Nowadays, myocardial infarction is the leading cause of death in developed countries and the induced -disability and loss of productivity are the most frequent results of the disease. M.I represents a high economic burden, as the costs increase with the disease progression. Although the incidence-rates of the manifestation of the disease have significantly declined during recent decades, myocardial infarction still remains the first cause of death in U.S. It is estimated that, every year close to 1.5 million Americans sustain a myocardial infarction (MI). Nearly 1 million patients are annually admitted to the hospitals and the event proves fatal in approximately one third of patients. In Greece, coronary diseases are responsible for the one third of mortality annually, approximately 30.000 individuals. ^{6,7,8}

It is widely accepted that cardiac rehabilitation following myocardial infarction reduces subsequent mortality and for this reason emphasis must be given to educational programmes which highlight the importance of motivating behaviour change. Although conventional medical treatments may help an individual recover from a heart attack, an educational strategy may be required to improve knowledge about a wide range of issues concerning myocardial infarction and thus initiate a new life style adjusted to the demands of the disease. ^{9,10}

Statistical analysis was performed with SPSS 10 and t-test value.

Results

Descriptive results

The data analysis has shown that 79.7% were men and 20.3% were women (Table 1) with a mean age of 62 years old (Table 2). The patients' weight ranged from 45 to 125 kgr, with a mean body weight of 77.05 kgr and standard deviation ± 13.49 (Table 3).

Among the risk factors, 74.6% of patients were hypertensive, whereas 40.7% suffered from diabetes mellitus. 50.8% of the patients demonstrated a family history of coronary artery disease, whereas in 94.9% of the patients angina pectoris co-existed. Regarding the nervous system 2.4% had suffered a stroke and 72.9% of patients showed an increased level of cholesterol prior to the MI. 71.2% of the patients were smokers, whereas alcohol was consumed by 32.2% of the patients (Table 4).

Regarding the administration of antihypertensive medication treatment and the type of medication, 27.1% of patients received no medication, whereas the remaining 63.6% was already receiving medication. As regards the antilipidemic treatment, only 55.8% received medication.

The majority of the sample showed a total lack of physical exercise at a rate of 59.3%, versus 40.7% of those who exercised, with variations in the kind and frequency of exercise.

Comparative results

Comparing the results of the first to those of the second interview it was revealed that the mean value of cholesterol during the first assessment was 216.14 with standard deviation ± 43.43 , and at the second assessment the mean value of cholesterol was 195.31 ± 31.69 , with a statistically significant difference $p < 0.001$. The mean value of HDL at the first evaluation was 46.23 ± 13.08 and the mean value of the second evaluation was 53.69 ± 11.83 , with a statistically significant difference $p < 0.001$. The mean value of LDL at the first evaluation was 144.60 ± 46.17 and the mean value of LDL 131.47 ± 58.41 during the first re-evaluation, with a statistically significant difference $p < 0.004$.

The mean value of TG displays a reduction between the two assessments. At the first assessment, the mean value of TG was 157.83 ± 95.56 and at the second assessment the mean value of TG was 155.02 ± 124.69 , with a statistically significant difference $p < 0.021$ (Table 5).

Discussion

It is shown from the present study that men prevailed in number at a percentage rate of 79.7% versus 26.3% in women, supporting the aspect that women are protected from myocardial infarction due to the presence of cardioprotective estrogens.^{11,12}

Other research studies prove that the percentage of women who suffer from acute myocardial infarction is constantly increasing¹³, without however the post-menopausal women reaching the frequency rate of men.¹⁴

A family history of coronary artery disease (CAD) existed in 50.0% of the study population and from similar studies it has been found that, the family history of CAD, prior to the age of 50 in first-degree relatives, increases the risk by two to four times.¹⁴ Furthermore, the aggravating effect of heredity may originate from the hereditary transfer of hypercholesterolemia, hypertension and diabetes.¹⁵

Hypertension is one of the most important independent risk factors for the development of CAD since it promotes atherosclerosis and leads to degenerative lesions at a cellular and vascular level.^{16,17,18}

Diabetes mellitus is a risk factor for the development of coronary artery disease (CAD). The mechanism through which it predisposes to coronary disease may possibly relate to the accelerated arteriosclerosis, which leads to lesions at the arterial walls. The risk is higher in insulin-dependent individuals for the reason that they frequently demonstrate vasculopathies. The metabolic X syndrome also represents a risk factor, a main characteristic of which is hyperinsulinemia and the reduced tolerance to glucose.^{19,20,21,22}

Another significant factor for acute myocardial infarction (MI) is smoking and at the present trial the individuals who smoke represent a percentage of 71.2%. The pathophysiological effects of smoking are multifactorial and affect the systemic vascular blood flow and the walls of the vessels. More specifically, smoking is associated with high levels of fibrinogen, resulting in an increased tendency for thrombosis of the blood and coronary artery disease. In addition, it is associated with high levels

of hematocrit, with an increased possibility of platelet agglutination and with reduced HDL levels. In accordance to a study conducted by the Cardiology Clinic of the University of Athens, the fibrinogen levels that are co-related with the occurrence of MI are significantly higher in smokers, in comparison to non-smokers. Trials have shown a decrease in the risk of heart attack with the discontinuation of smoking.^{23,24,25,25} The Framingham trial showed that discontinuation of smoking after an acute MI is accompanied by a reduction in mortality by 60% within the first 6 months.¹⁵

Physical exercise reduces hypertension, diabetes mellitus, body weight, and is associated with lower LDL cholesterol and triglyceride levels. The beneficial effects of physical exercise concerning the reduction in the risk for coronary artery disease have been fully verified. Other mechanisms which are related to physical exercise are the decrease in fibrinogen and the decrease in platelet activity.^{26,27,28}

A physical exercise recovery program may lead to a reduction in total and cardiovascular mortality by 20-25%²⁸. In the United States of America, two trials, one trial concerning the dock workers of San Francisco (1957-1972) and the other trial concerning Harvard University graduates (1962-1972), showed a lower mortality rate in those who exercised more often. In a similar way in the United Kingdom, the civil servants who regularly participated in rigorous sports presented half the incidence of coronary artery disease, in comparison to their colleagues who held a sitting mode of life.¹⁵

Atheromatosis is the most frequent disease of the vascular system and the main cause of mortality in the Western world. According to the World Health Organization (W.H.O), atherosclerosis is a combination of changes in the tunica intima of the arteries, which consist of an aggregation of lipid substances, fibrin and other factors. The disorders of the triglycerides, total cholesterol, HDL and LDL are responsible for atherosclerosis of the coronary vessels. The relationship between the increased values of lipids and coronary artery disease is very close. This risk is better evaluated when considering the plasma concentrations of HDL and LDL cholesterol.^{29,30,31} Epidemiological data show that there are geographical variations in the incidence of coronary disease, which may be due to dietary habits and are attributed to the difference in the ratio of saturated to unsaturated fatty acids in the individual's diet.^{15,32,33,34,35,36}

Medication treatment improves prognosis and the course of the patients. The first choice of medication is the use of b-blockers, for the reason that they reduce the energy needs of the myocardium and have a particular efficacy in men of middle age, especially in patients with anxiety and in patients with high renin levels.^{37,38,39,40}

Regarding the anti-lipidemic treatment, we observe that the study population received medication treatment at a 55.8% rate, and, to be more specific, they received statins. The prevalence of statins in comparison to the other hypolipidemic drugs is justified due to their effectiveness, which is established through a great number of research trials, with the prevalence of this statin, that is atorvastatin. According to another recent study, Statins can lower cholesterol concentration by an average of 1.8mmol/L which reduces the risk of ischaemic heart disease (IHD) events by about 60%.^{41,42}

The Scandinavian Simvastatin Survival Study (45) is the first great trial which confirmed the efficacy of statins in the secondary prevention of acute cardiovascular episodes. The results of this study were later on confirmed by the CARE study (Cholesterol and Recurrent Events).⁴³

According to a recent study, national service framework targets for cardiac rehabilitation and secondary prevention can be achieved in patients who survive a myocardial infarction by integrating rehabilitation services (home and hospital). Nurses in primary care facilitate long term structured care and optimal secondary prevention.⁴⁴

Conclusions

Myocardial infarction is major public health problem associated with high mortality, disability, financial cost and requires systematic approach. Apart from the significant impact on human health, it is a matter of great concern to society in all countries. Cardiac rehabilitation programmes following myocardial infarction can reduce subsequent mortality, when information about recovery is provided to the patients by health professionals. The provided-information plays a central role in people's understandings about the nature of the disease and the future risks. Adherence to such intervention-programmes is really effective and can improve health outcome. It is essential to enforce people's willingness to adopt lifestyle change after myocardial infarction as a rational action to prevent a further cardiac event.

Table 1

SEX	N	(%)
MEN	47	79,7
WOMEN	12	20,3
TOTAL	59	100

Table 2

	MIN	MAX	X	SD
AGE	37	85	62	11,88

Table 3

	MIN	MAX	X	SD
WEIGHT	54	145	77,05	13,45

Table 4 RISK FACTORS

DISEASE	(%)
HYPERTENSION	74,6
DIABETES MELITUS	40,7
ANGINA	94,9
HIGH-CHOLESTEROL	72,9
FAMILY HISTORY	50,8
SMOKE	71,2
RESPIRATORY PROBLEMS	22
DIGESTIVE PROBLEMS	35,6
CENTRAL NERVOUS SYSTEM	2,4
ALCOHOL USE	32,2

Table 5

LABORATORY TESTS	FIRST TEST		FOLLOW-UP		P
	n	$\bar{X} \pm SD$	n	$\bar{X} \pm SD$	
TOTAL CHOLESTEROL	59	216,14±43,43	59	195,31±31,69	<0,001
H.D.L CHOLESTEROL	59	46,23±13,08	59	53,69±11,83	<0,001
L.D.L CHOLESTEROL	59	144,60±46,17	59	131,47±58,41	<0,004
T.G	59	157,83±95,56	59	155,02±124,69	<0,021

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