

Effects of lifestyle modification program in reduction of risk factors in patients with coronary heart disease

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ABSTRACT

This study was conducted to study and assess lifestyle behavior in selected cases of Coronary Heart Disease (CHD) patients in Iran. Hundred patients were randomly selected among patients with first attack of Myocardial Infarction, who admitted to the CCU ward of Madani Heart Hospital from January to September, 2011. Fifty were assigned to a teaching group and the other fifty to a control group. An individualized teaching program was delivered to the teaching group during the hospitalization period. It covered aspects such as: the characteristics of heart disease, the anatomy and risk factors of atherosclerosis, diet and exercises therapy. When these patients were discharged to their homes, they received educational package for 6 months. The lifestyle and risk factors of patients such as smoking, blood pressure, pulse, blood lipid profile, Body Mass Index (BMI) and Waist Hip Ratio (WHR) were measured before and after the teaching program. Initially there was no significant difference in the number of non-smokers. After post testing the results revealed that the number of non-smokers had significantly increased in teaching group from 66% to 90.1% (CI_{95%} 0.55-0.81 vs. 0.82-0.98). Patients who exercised were significantly increased after teaching program from 30% to 88% (CI_{95%} 0.55-0.81 vs. 0.82-0.98) while no significant changes were shown by the control group. The results showed that WHR of the case group before education was in abnormal range (1.01) in comparison with the control group (0.99); while after education the mean WHR reduced in the case group (0.98), this difference in WHR was found to be statistically significant. The above findings suggest that the individualized teaching program might be helpful at reducing the risk factors of atherosclerosis in patients with CHD.

Key words: coronary heart disease, lifestyle modification, atherosclerosis, myocardial infarction, risk factors.

INTRODUCTION

Economic growth in Iran has brought about marked changes in lifestyle and in patterns of health and disease. The lifestyle of Iranian people has become more sedentary and the consumption of healthy foods such as vegetarian foods has decreased while the consumption of animal fats has increased. Regarding health status, morbidity and mortality from CHD has rapidly increased and Myocardial Infarction (MI) has now become one of the leading causes of death and their prevalence continues to rise with the extension of lifespan [1]. To prevent the onset and recurrence of myocardial infarction, the most important thing is to control the risk factors of atherosclerosis, which is the main cause of MI. Various lifestyle factors such as smoking, lack of exercise and inadequate diet are the risk

factors of atherosclerosis. Physiological factors such as obesity, high Serum Lipid Level (cholesterol, triglyceride, HDL cholesterol and LDL cholesterols) and high blood pressure are also known as risk factors [2]. Although risk factors have a significant impact on the life of patients with cardiovascular disease, considerable knowledge is needed to effect behavioral change. Interventions in patients with myocardial infarction will not have long-term effects unless lifestyle changes are made. Most patients however do not achieve satisfactory lifestyle modifications due to a lack of knowledge about the characteristics and management of the disease and lack of family support [3]. Therefore the more effective the teaching, the better the effect of education is expected to be [4].

We conducted this study to find a more effective way of reducing the atherosclerosis risk factors of patients with MI, and examined the effectiveness of a teaching program.

MATERIALS AND METHODS

Research design: A randomized comparison group of pre- and post-test experiments design was used to assess the effectiveness of an individualized teaching program on the reduction of CHD risk factors in patients with MI. The independent variable was the individualized teaching program and the dependent variables were the CHD risk factors such as smoking, exercise, BP, BMI, WHR and blood lipid profile.

Subjects: Subjects for this study were patients hospitalized in C.C.U ward to shahyd Madani Heart Hospital from January 2004 to September 2004. 100 patients participated in the study: 50 patients in teaching group and 50 patients in control group.

Method: Only routine care (verbal instruction) was given to the control group, while an individualized teaching program was given to the teaching group when the patients were in stable condition. Information was given verbally in a structured way using a booklet provided by the researchers. It contained five usual topics that are routinely addressed in cardiac rehabilitation program: Nature of disease, risk factors and their modification, diet and exercises. Teaching was provided to the teaching group during the admission period by the researcher and when the patients were ready to be discharged to their homes. These subjects received educational package about modification of lifestyle.

Statistical analysis: Data were analyzed using the SPSS program. Descriptive statistics, chi square were performed to compare demographic characteristics and differences in number of patients with CHD risk factors for the teaching and control groups. Paired t-test was used to test changes in the patients' blood lipid profiles with in and between the teaching and control groups.

RESULTS AND DISCUSSION

The demographic characteristics of the patients were matched for age, sex and family income. There was no significant difference between any of the demographic characteristics of patients in the control and teaching groups (Table 1). Age variable was matched for the cases and controls (Mean age of cases 50.20 ± 9.35 and controls 52.86 ± 8.24). Majority of these patients were male, i.e. about 90%. Majority of the patients, i.e. 84%, belong to the middle and lower socio-economic status. 26% of cases and 70% of controls experienced MI during morning hours, i.e. 0-12 A.M.

Initially there was no significant difference in the number of non-smokers in the teaching and control group. After intervention (teaching), post-testing revealed that the number of non-smokers had significantly increased from 30% to 88% in the teaching group ($CI_{95\%}$ 0.30% 0.18-0.45 vs. 88% $CI_{95\%}$ 0.78-0.97), while no significant changes were shown by the control group (Table 2).

The result of this study showed that the mean WHR of cases group before education was (1.01) compared with control group (0.99), while after intervention the mean WHR reduced in case group to (0.98), this difference in WHR was found to be statistically significant (1.01 ± 3.4 , $CI_{95\%}$ 0.04-1.98 vs 0.98 ± 2.13 , $CI_{95\%}$ 0.37-1.59).

The results in Table 3 indicate that initially the average of fasting blood sugar (FBS) in case group was 128.1, while after 9 months of intervention (modification of lifestyle of patients) the average of FBS decreased to 115.8 as

compared with the control group, in which the average of FBS did not decreased. This difference in average of FBS in case group was found to be statistically significant ($P < 0.05$).

Table 1: Characteristics of subjects between case and control groups

Variable	Case (%)	Controls (%)	Total (%)	X ²	P.value
Age					
Over 50	24 (51.1)	20 (42.6)	44 (46.6)		
Below 50	26(48.81)	30 (57.4)	50 (53.1)	6.68	0.403
Sex					
Male	45(90)	39 (78)	48 (84)		
Female	5 (10)	11 (22)	16 (16)	2.08	0.148
Educational					
Under high secondary	39 (78)	38 (76)	77 (77)		
Above high secondary	11 (22)	12 (24)	23 (23)	0.002	0.957
Married	47 (94)	44 (88)	91 (91)		
Single	3 (6)	6 (12)	9 (9)	1.098	0.294
Family income					
< 4200	46 (92)	46 (92)	92 (92)		
> 4200	4 (8)	4 (8)	8 (8)	1.57	1
Family size					
< 3	15 (30)	14 (28)	29 (43.25)		
> 3	35 (70)	36 (72)	71 (71)	0.0195	0.888
Hypertension					
Yes	15 (30)	16 (32)	31 (31)		
No	27 (54)	24 (48)	51 (51)	0.166	0.689
Diabetes mellitus					
Yes	9 (18)	12 (24)	21 (21)		
No	33 (66)	29 (58)	62 (62)	0.674	0.41
Hyperlipidomia					
Yes	15 (30)	16 (32)	31 (31)		
No	27 (54)	24 (48)	51 (51)	0.166	0.689

Table 2: Distribution of smoking habit in Iranian CHD patients before and after intervention

Variable	Before Intervention						After Intervention					
	Case			Control			Case			Control		
	N	%	CI 95%	N	%	CI 95%	N	%	CI 95%	N	%	CI 95%
Smoking												
Yes	15	30	0.18-0.44	27	54	0.43-0.71	5	10	0.01-0.18	15	30	0.18-0.44
No	33	66	0.55-0.81	20	40	0.28-0.56	43	86	0.81-0.98	33	66	0.55-81
Smoke < 20												
Yes	8	16	0.28-0.78	15	30	0.23-0.53	5	10	0.01-0.18	13	26	0.62-1
No	7	14	0.21-0.71	24	48	0.46-0.76	3	6	0.00-0.23	3	6	0.00-0.37
Smoke > 20												
Yes	7	14	0.35-0.92	12	24	0.18-0.48	0	0	-	2	4	-0.04-0.71
No	4	8	0.28-1.04	26	52	0.51-0.81	7	14	1-1	4	8	0.28-1.04

As indicated in Table 3 after modification of risk factors of patients, the mean level of total cholesterol was significantly lower in the case group than in the control group. The mean HDL-C level increased in both groups, but the increase in mean of HDL-C was not significantly different before and after intervention. At baseline there was no significant difference in the mean of T.G. in case and control groups, while after intervention the mean level of T.G. in case group was significantly decreased from 255.7 to 177.6 (CI_{95%} 204.4-3.6.9 vs. 63.04 -192). This differences in mean T.G. in case group was found to be statistically significant. As seen in Table 3, before intervention the mean of LDL cholesterol in case group was 146 mg/dl, similarly in the control group. The level of LDL cholesterol decreased from 146 mg/dl to 134.8 mg/dl. This decline in LDL cholesterol was not found statistically significant. The level of HDL cholesterol was increased from 37.4 mg/dl to 38.9 mg/dl in case group (37.4, CI_{95%} 33.9-40.9 vs. 38.9 CI_{95%} 36.55-41.25). While in the control group the level of HDL cholesterol did not increase. This increase in HDL cholesterol in case group was not found statically significant.

Table 3: Distribution of investigation in Iranian CHD patients before and after intervention according case and controls

		Variable	F.B.S	Total Cholesterol	T.G	L.D.L	H.D.L
Before Intervention	Cases	N	44	47	49	48	41
		Mean	128.1	211.9	255.7	146	37.4
		SD	62.4	66.7	178	112	11.1
		CI 95%	Lower Upper	109.1 147.07	189.6 234.1	204.4 306.9	141.5 150.4
	Controls	N	45	43	48	42	45
		Mean	135	195	227	174	41.1
		SD	43	36.2	180	216.3	11.04
		CI 95%	Lower Upper	122 147.8	183 208.2	174 278.8	107 241.4
After Intervention	Cases	N	44	47	49	48	41
		Mean	115.8	188.8	177.6	134.8	38.9
		SD	39.7	59.6	50.7	37	7.44
		CI 95%	Lower Upper	103.7 127.8	168.9 208.6	163.04 192.1	120.4 149.1
	Controls	N	45	43	48	42	45
		Mean	134.7	194.5	180.7	141.8	41.2
		SD	36.3	42.5	69.17	53.5	11.04
		CI 95%	Lower Upper	124 145.6	179 209.5	161 200.7	125 158.5

To study the effects of risk factor modification by means of nonpharmacological interventions in patients suffering from CHD, we scrutinized every risk factor separately. Each factor was amenable to modification through interventions aimed at behavior change. Behaviorally oriented interventions incorporating cognitive and behavioral smoking association techniques [5, 6], showed positive results in reducing smoking rates in MI patients. Elevated serum cholesterol concentrations were reduced by intensive dietary modification. Thus major changes in dietary habits can be achieved in CHD patients and this may even lead to stabilization or regression of coronary atherosclerosis. These favorable effects may not be attributable solely to the adoption of a low-fat diet, because in some interventions additional components were included, such as stress management or exercise training [7, 8].

Patients' education is an essential component of patients' care after MI, and it has been found to be cost effective in terms of its potential to reduce recidivism and the length of hospitalization [9]. As patients learn by a variety of methods, it is most efficacious to match an individual learning style with an appropriate teaching technique group didactic class foster a passive type of learning experience and require that the patient be ready to learn at a specific time. Individualized teaching requires that a patient be more active during the learning process and that the individual be able to choose his/ her learning time [9].

In this study we adopted individualized teaching in order to assist patients to understand the cause of MI, identify risk factors present in their lifestyle and suggest possible modifications or the removal of risk factors identified. We provided information in an easily understandable structured way to encourage patients to adopt a behavior that will result in improved health status. Our results demonstrate favorable trends in several important areas, specially a dramatic increase in non-smokers, exercise compliance and increase HDL cholesterol.

The number of non-smokers after the program was significantly higher in the teaching group. This finding coincides with the result that intervention in the form of individually planned consecutive teaching sessions achieved a reduction in cigarette consumption. However, these conflicts with findings of a previous study which reported that there were no significant differences in smoking cessation between an experimental and a control group [10]. We believe this discrepancy is due to differences in the teaching methods, and suggest that an individualized teaching program is more effective. Since most patients included in the study had a fear of chest pain and heart attack, they did not want to actively exercise, and had no specific knowledge regarding exercise. We taught each patient how to measure radial pulse to assess the intensity to exercise so that they could exercise with confidence. Regular exercising of the subjects was significantly increased after the program in teaching group. Almost the same results were reported in several previous studies [11, 12].

CONCLUSION

It is extremely hard to draw definite conclusion from these results, but it suggests that this teaching program may be helpful and beneficial at reducing the risk factors of atherosclerosis in patients with coronary heart disease.

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