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THE EFFECT OF HEALTH EDUCATION ON HEALTH RELATED QUALITY OF LIFE IN PATIENTS WITH CORONARY ARTERY BYPASS SURGERY

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ABSTRACT

The purpose of this study is to evaluate the ability of the health education program to improve patient's health-related quality of life with coronary artery bypass graft surgery. Seventy patients in pre-operation were randomized into the study, with 35 patients in the experimental and 35 patients in the control group. The demographic information, Sf-36 and Nottingham Health Profile questionnaire were administered and filled out before surgery by seventy patients. Patients in the experimental group received the educational intervention. Educational intervention was according to Mico's education planning model. For the second phase of Mico's model, knowledge, attitude and function were measured in seventy patients by questionnaire before education. These patients were followed up to 1 month. Afterwards Sf-36 and Nottingham Health Profile questionnaires were administered 1-month after education to be filled out by patients again. SPSS and EXCEL softwares analyzed all data. Significant improvements in quality of life between the two groups, as measured by the Nottingham Health Profile, were seen in energy ($p<0.001$), pain ($p<0.006$), emotional reaction ($p<0.00001$), sleep ($p<0.01$), physical mobility ($p<0.00001$) and total average quality of life ($p<0.00001$). Significant improvements in quality of life between the two groups, as measured by the Sf-36, were seen in physical function ($p<0.00001$), role limitations resulting from emotional status ($p<0.007$), role limitations resulting from physical status ($p<0.005$), mental health ($p<0.03$), vitality ($p<0.02$) and total average quality of life ($p<0.02$). In conclusion, the findings demonstrate that health education results in improved quality of life for patients with CABG.

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Keywords: Health education, coronary artery bypass graft surgery, quality of life.

INTRODUCTION

Coronary heart disease is the leading cause of death in the majority of countries.[1] According to health education results, 30% of all deaths (15.3 million deaths) as well as 10.3% of the total disability adjusted life year (DALY) lost in 1998 were attributable to CVD.[2] The World Health Organization estimated that CVDs accounted for 28.5% of all deaths in developing countries.[2] Each year, approximately 150,000 Iranians die of cardiovascular disease.[3] Cardiovascular disease accounted for 40% of Iranian deaths in 1999.[4] Future increases in CVDs are expected in the near accounted future in developing countries. According to the Global Burden of Disease study,

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a 55% increase would occur in CVD attributable loss, between 1990 and 2020, in developing countries.[5] Ischemic heart disease is caused by an imbalance between myocardial blood flow and the metabolic demand of the myocardium. Reduction in coronary blood flow is related to progressive atherosclerosis with increasing occlusion of coronary arteries.[6]

The future prevention of cardiovascular disease will likely depend on three approaches. The ideal approach would be the prevention of the development of atherosclerosis beginning at younger ages and continuing throughout life. The second would be the prevention of progression of atherosclerosis to a Critical level associated with a substantial increased risk of CHD, and the third approach would be among individuals who have established high-risk atherosclerosis to identify and modify other risk factors that will modulate the subsequent development of clinical heart attacks.[7] Coronary artery bypass graft surgery is performed to restore blood flow to the heart. This relieves chest pain and ischemia, improves the patient's quality of life, and in some cases, prolongs the patient's life. The goals of the procedure are to enable the patient to resume a normal lifestyle and to lower the risk of a heart attack. [8] The number of CABG procedures performed each year in the United States has risen from approximately 150000 in 1979 to 598000 in 1990- a 425% increase.[9] In Iran, 60% of total open-heart surgery was CABG.[10]

Patient education for people with a chronic disease is gaining attention.[11] Patient education can be defined as the process of improving knowledge and skills in order to influence the attitudes and behavior required to maintain or improve health.[12] Patient education includes all educational activities directed at patients, including aspects of therapeutic education, health education and clinical health promotion.[13] Quality of life has emerged as an important concept and outcome in health and health care.[14] In public health and in medicine, the concept of health-related quality of life refers to a person or group's perceived physical and mental health over time. Physicians have often used health-related quality of life to measure the effect of chronic illness in their patients in order to better understand how an illness interferes with a person's day-to-day life. Similarly, public health professionals use health-related quality of life to measure the effects of numerous disorders, short-and long-term disabilities, and disease in different populations. Tracking health-related quality of life in different populations can identify subgroups with poor physical or mental health and can help guide policies or interventions to improve their health.[15] Increasing attention has been given to monitoring health-related quality of life variables in relation to the outcome of surgery.[16]

Therefore, considering the increase of atherosclerosis and CABG surgery and regarding the quality of life in these patients and the positive effect of health education on quality of life in bypass surgery patients, this study was undertaken.

MATERIAL AND METHODS

Sample

This was an experimental design and clinical trial. Seventy male patients were selected by random sampling method for the study, with 35 patients in the experimental and 35 patients in the control group. All patients attending the Shahid Rajaei Heart Hospital in Tehran between April 2002 and August 2002 were evaluated. Selection criteria were 40-65 years, having atherosclerosis diagnosed by angiography,were evaluated and considered eligible for coronary artery bypass graft surgery. These patients were interviewed 3-5 days before operation and at an average time of 4 weeks after operation.

Study setting

Shahid Rajaei Hospital in Tehran is a major heart center in Iran. The survey was conducted between April and August 2002 in Shahid Rajaei Hospital in Tehran.

Interview

A face-to-face structured questionnaire was administered to all participants. The questionnaire consisted of up to 118 questions and could generally be filled out in 20-25 minutes. It examined demographic information (18 questions), knowledge, attitude and practice (26 questions), Sf-36 questionnaire (36 questions) and Nottingham Health Profile (38 questions).

Procedures

After receiving Ethics Committee approval, 80 male patients were selected and assigned to either experimental or control groups. Initially, we selected the experimental group, and then the control group. Nine patients were lost to follow-up and one patient died. 70 participants remained in the study. In stage one, 35 patients in the experimental group received the questionnaires (demographic information, knowledge, attitude, function, and Sf-36 and Nottingham Health Profile questionnaire) at 3-5 days before operation and then the educational intervention planning according to Mico's Health Education Planning Model. Mico's model for health education planning (also applicable to health promotion) is divided into six phases, which include:

1- Initiation of the planning activity
2-Need assessment
3- Goal setting
4- Planning or programming the activity
5- Implementing the activity

6- Evaluating the activity's effectiveness.[17]

According to this model, success or failure of the activity often depends upon what happens in phase 1 (initiate). The key elements understand the client's problems and the client's system, devising an entry strategy, making an initial contract, and making the clients aware that a problem exists so they are ready to change. Obviously, the health educator's credibility is pivotal to initial success of the project.

Phase 2 of the model is Need Assessment. Mico pointed out that the technology for needs assessment can be simple and inexpensive or highly refined and costly, depending on the purpose. In this study, for phase two of the model, patients, knowledge, attitude and function were measured. Knowledge questionnaire consisted of 6 questions that measured the knowledge of patients about the nature of atherosclerosis and bypass surgery, risk factors, diet, exercise, procedures in prevention of pain, activity for pain control and control of disease. The attitude questionnaire consisted of 13 questions that measured the attitude of patients. Motivation refers to a process that is directed toward the future goal and an integrative process of goal setting and self-evaluated reaction. Function or behavior questionnaire consisted of 8 questions that measured function of patients in healthy diet, use of fruit and vegetables, physical activity and walking, blood examination, giving up smoking and consuming alcohol, sleep, rest interval activities and healthy sexual function. All data where analyzed by SPSS for identification of patient educational needs.

Phase 3 of the model is goal setting. Mico defined goal as a future event toward which a committee endeavor is directed. He defined objectives as steps to be taken in pursuit of a goal. Objectives often carry built-in indicators of success. In this study, for phase 3, the goals in 3 domains, i.e., cognitive, affection and motion-mental were assessed. Examples for cognitive goals include, what is Atherosclerosis? , What is a major sign of disease? , What are the risk factors in Atherosclerosis? Examples for affection goals include, correctly understand the reason to control atherosclerosis, belief in the positive effect of surgery, correctly understand the importance of control of disease and prevention. Examples for motion-mental goals include, patients used healthy diet for control of disease, and patients do blood tests regularly.

In phase 4 of Mico's model, planning/programming, an implementation plan is established, system and tools for managing the activity are designed, and commitment from those involved is negotiated. In this study, for phase 4, three educational meetings for the experimental patient's group were planned. Three educational sessions of 20-25 minutes were conducted. Educational method was face-to-face education for patients. The experimental group received a booklet that focused on exercise, diet, healthy sexual function, deep breathing, anatomy and physiology of the heart, procedure of bypass surgery, importance of lipids in atherosclerosis formation, healthy travel in road, use of drugs regularly. In this study, for phase 5 of the model, educational meeting was performed in 3 meetings (10-20 min per meeting) for the experimental group.

Phase 6, evaluation, is a four-step procedure that is crucial to success of the new program.

1- Clarify the evaluation measures.

2- Collect and analyze data.

3- Report the evaluation so participants will have feedback on the extent of success of the activity.

4- Use what was learned in evaluation to redefine the problem, and refine measures and standards to determine its nature and extent.

In this study, for phase 6, evaluation was 1-month post-operation by measurement of knowledge, attitude, function and quality of life in patients that used the questionnaires.

After that 35 patients selected as the control group filled out the questionnaires before operation. Finally, all patients in both groups were followed up to 1-month. At that time, Sf-36 and Nottingham Health Profile questionnaires was administered 1-month post-operation to be filled out by patients again.

Sf-36 questionnaire: the sf-36 is a validated,[9] concise, 36 item health status questionnaire measuring 8 dimensions: physical function (10 items); role limitation caused by physical problems (4 items); bodily pain (2 items); mental health (5 items); role limitations caused by emotional problems (3 items); vitality-energy/fatigue (4 items); and general health perception (5 items).

Nottingham Health Profile questionnaire: The NHP is in two parts. Part I contains 38 questions in the six dimensions of physical mobility, pain, energy, social isolation, and emotional reactions. A score from 0 to 100 is calculated for each dimension, with higher scores indicating higher levels of dysfunction or distress. In part II of the NHP, patients indicate whether seven areas of daily living are affected by their state of health: work, home life, social life, home relationships, sex life, interest/hobbies, and holidays. In this study, we used part I of the NHP as a questionnaire for measurement of quality of life.

Data analysis

The survey of association between demographic information and quality of life were analyzed with Pearson correlation analyzed, and the association between demographic information and quality of life were analyzed with chi-square test. Mean and interaction effect of edu-

cation on knowledge, attitude, function and quality of life in the experimental group (in pre-and 1-month post-education) were analyzed with paired t test. Comparison of knowledge, attitude, function and quality of life between the two groups in the stage pre-and 1-month post-education were analyzed with independent sample t test. A P-value less than 0.05 was considered to be statistically significant. Analyses were performed using SPSS (version 9.0).

RESULTS

Of the 80 patients, 9 were lost to follow-up; 1 patient had died. Completed questionnaires were returned by 70 patients, 35 in the experimental and 35 in the control groups. The mean age of patients enrolled in this study was 53.5 years in the experimental group and 52.8 years in the control group. Independent sample t test showed no significant difference in age variable between the two groups (p= 0.6). Chi-square test showed no significant difference in level of education variable between the two groups (p= 0.9). The majority of patients in the two groups were retired. Chi-square test showed no significant difference in occupation variable between the two groups (p= 0.6).

60% of patients in each group had a history of smoking. 17.1% of patients in the experimental group had a history of diabetes and 20% of the control group had a history of diabetes. 31.4 % of patients had a history of high blood pressure and 37.1% of patients in the control group had a history of high blood pressure.

68.6% of patients in the experimental group had a history of high blood lipids and 71.4% of the control group had a history of high blood lipids. 2.9% of patients in the experimental group had a history of bypass surgery and 5.7% in the control group had a history of bypass surgery. Chi-square showed no significant difference in history of smoking (p= 0.5), history of diabetes (p= 0.5), history of high blood pressure (p= 0.4), history of high blood lipids (p= 0.5) or history of bypass surgery (p= 0.5) between the two groups. Table I shows the KAP scores in the experimental and control group before education. T test analysis showed no significant difference in knowledge and function between the two groups before education. But, it showed a significant difference in attitude.

Table II shows the KAP scores in the experimental and control group 1-month post education. T test analysis showed significant difference in knowledge and attitude between the two groups before education. However, it showed no significant difference in function.

Table III shows the quality of life scores (NHP) in experimental and control groups before education. The two groups had no significant difference in total mean quality of life after education. Table IV shows the quality of life scores (NHP) for patients in the two groups 1-month post education. Results shows a significant difference in total mean QOL 1-month post education between the experimental and control group (by Nottingham Health Profile questionnaire).

Table V shows the quality of life scores (SF-36) in experimental and control groups before education. The two groups had no significant difference in total mean quality of life before education. Table VI shows the quality of life scores (SF-36) in both groups 1-month post-education. Data show a significant difference in total mean quality of life between the two groups 1-month post-education. Table VII shows the results of correlation analysis between age, number of children, salary and quality of life in the experimental group. Table VIII shows the results of correlation analysis between age, number of children, salary and quality of life in the control group. Results showed no significant difference between age, salary, number of children and quality of life for patients in the two groups.

The result show that there is no significant difference between occupation, level of education, history of diabetes, BP, smokeing, high blood lipid, bypass surgery and quality of life in the two groups before and after education.

Table I. Mean comparison of KAP in the experimental and control group at pre-educational intervention.

KAP	Mean in experimental group (n=35)	Mean in control group (n=35)	P value
Knowledge	18.40	17.68	0.5
Attitude	26.51	32.63	<0.009
Function	14.11	13.91	0.7

P-value less than 0.05 was considered to be statistically significant.

Table II. Mean comparison of KAP in the experimental and control group at 1-month post-educational intervention.

KAP	Mean in experimental group (n=35)	Mean in control group (n=35)	P value
Knowledge	23.14	19.97	<0.00001
Attitude	42.77	39.31	<0.01
Function	17.06	16.66	0.3

Table III. Mean comparison of quality of life in the experimental and control group at pre-educational intervention by NHP questionnaire.

	Mean		
NHP construct	**Experimental (n=35)**	**Control (n=35)**	**P value**
Energy	4.34	4.5	0.8
Pain	21.54	22.03	0.8
Emotional reaction	27.37	21.7	<0.02
Sleep	12.26	13.3	0.5
Physical mobility	25.57	21.2	<0.004
Social isolation	18.03	17.09	0.5
Total mean QOL	108.9	99.9	0.3

Table IV. Mean comparison of quality of life in the experimental and control group at 1-month post-educational intervention by NHP questionnaire.

	Mean		
NHP construct	**Experimental (n=35)**	**Control (n=35)**	**P value**
Energy	11.05	7.2	<0.001
Pain	33.63	29.1	<0.006
Emotional reaction	38.57	29.4	<0.00001
Sleep	19.02	14.9	<0.01
Physical mobility	32.97	26.1	<0.00001
Social isolation	20.9	18.8	0.1
Total mean QOL	154.83	125.5	<0.00001

Table V. Mean comparison of quality of life in the experimental and control group at pre-educational intervention by SF-36 questionnaire.

	Mean		
SF-36 construct	**Experimental (n=35)**	**Control (n=35)**	**P value**
Physical function	19.6	14.4	<0.00001
Role limitation (physical)	5.5	4.8	<0.004
Role limitation (emotional)	4.5	4	<0.02
Vitality	11.8	12.1	0.7
Mental health	18	17.3	0.4
Social function	6.1	6.2	0.6
Pain	6.8	7.3	0.5
General health	17.4	20.3	<0.00001
Total mean QOL	89.5	86.2	0.1

Table VI. Mean comparison of quality of life in the experimental and control group at 1-month post-educational intervention by SF-36 questionnaire.

	Mean		
SF-36 construct	**Experimental (n=35)**	**Control (n=35)**	**P value**
Physical function	25.3	21.8	<0.00001
Role limitation (physical)	5.8	5.2	<0.005
Role limitation (emotional)	4.7	4.3	<0.007
Vitality	11.3	12.9	<0.02
Mental health	20.4	18.9	<0.03
Social function	6	6.1	0.2
Pain	7.03	6.6	0.4
General health	17.6	18.2	0.2
Total mean QOL	98.4	94.4	<0.02

Table VII. Correlation between age, number of children, salary and quality of life in the experimental group.

QOL 1-month post-education (Sf-36)	**QOL before education (Sf-36)**	**QOL1-month post-education (NHP)**	**QOL before education (NHP)**	
r= 0.07 (p= 0.6)	r= 0.18 (p= 0.2)	r= 0.26 (p= 0.1)	r= 0.4 (p= 0.8)	**Age of patients**
r= 0.29 (p<0.009)	r= 0.05 (p= 0.7)	r= 0.08 (p= 0.6)	r= 0.22 (p= 0.1)	**Number of children**
r= 0.008 (p= 0.9)	r= 0.12 (p= 0.4)	r= 0.04 (p= 0.7)	r= 0.07 (p= 0.6)	**Salary**

Table VIII. Correlation between age, number of children, salary and quality of life in the control group.

QOL 1-month post-education (Sf-36)	**QOL before education (Sf-36)**	**QOL1-month post-education (NHP)**	**QOL before education (NHP)**	
r= 0.1 (p= 0.5)	r= 0.05 (p= 0.7)	r= 0.5 (p= 0.6)	r= 0.02 (p= 0.8)	**Age of patients**
r= 0.07 (p<0.6)	r= 0.02 (p= 0.8)	r= 0.25 (p= 0.1)	r= 0.08 (p= 0.6)	**Number of children**
r= 0.05 (p= 0.7)	r= 0.13 (p= 0.4)	r= 0.2 (p= 0.1)	r= 0.4 (p= 0.005)	**Salary**

DISCUSSION

Summary of results show that knowledge and attitude had a significant difference between the two groups 1-month after educational intervention. Comparisons of experimental and control groups showed that function had no significant difference among the groups 1-month after education. The results of study show a positive

effect of health education (according to Mico's model) on knowledge and attitude in bypass surgery patients.

Attention to results shows a significant difference in quality of life (by Sf-39 and NHP) between the experimental and control group 1-month post educational intervention.

Significant improvements in quality of life between the two groups, as measured by the Nottingham Health Profile, were seen in energy ($p<0.001$), pain ($p<0.006$), emotional reaction ($p<0.00001$), sleep ($p<0.01$), physical mobility ($p<0.00001$) and total average quality of life ($p<0.00001$). Significant improvements in quality of life between the two groups, as measured by the Sf-36, were seen in physical function ($p<0.00001$), role limitations resulting from emotional status ($p<0.007$), role limitations resulting from physical status ($p<0.005$), mental health ($p<0.03$), vitality ($p<0.02$) and total average quality of life ($p<0.02$). The findings demonstrate that health education results (according to Mico's model) increase quality of life for patients after CABG.

Shuldham et al. demonstrated the beneficial effects that pre-operative education exerts on postoperative recovery of patients having cardiac surgery. The results of this study showed a significant difference in length of hospital stay ($p= 0.01$) in the experimental group versus the control group.[18] Christophearson and Pfeiffer selected 41 patients in the experimental and control group. The experimental patients received a booklet at the time of 1-2 days before bypass operation. The booklet contained information on tests and procedures, actions that would be expected of patients post-operatively, e.g. deep breathing and coughing, sensations that might be experienced such as pain, and facts about the heart, atherosclerosis and the operation. The findings suggested that, although there was differences in knowledge and anxiety within groups between the two measurement points, with significant ($p<0.05$) increase in knowledge in those who read the booklet, there was no significant difference between the two groups. Length of stay in the ICU was reduced for people in the experimental arm ($p<0.05$).[19] Baghery (2001) in Iran showed that group-counseling had a positive effect on quality of life in MI patients. In this study, 62 patients (35-65 years) with MI were selected in the experimental and control group. Patients in the experimental group were counseled in a two hour meeting. Analysis of the data 1-month post counseling showed that quality of life pre- and post-counseling had a significant difference in the experimental group ($p<0.001$) but there was no significant difference in the control group ($p=0.74$).[20] Ahmadzadeh (2000) in Iran demonstrated the positive effect of health education on reducing anxiety in bypass surgery patients. She selected 80 patients in the experimental and control group before operation. The experimental group received the education intervention (face to face and booklet) before the operation. Data showed a significant difference in anxiety between the two groups after operation.[21] Cupples in a study showed that pre-operation education had a positive effect in knowledge of the patients ($p=0.03$).[22] Anna Stromberg evaluated the effect of education on patients with heart failure. Results showed patient education is an important component in the care of patients with heart failure and improved the quality of life of patients.[23] Devine and Cook's meta-analysis showed a positive effect in respect of pain, psychological well being and satisfaction.[24] In 1992, Davine reported a meta-analysis and demonstrated that with respect to recovery, pain and psychological distress, patients receiving psycho-educational interventions benefited more than those in the control group.[25]

REFERENCES

1. Haidari M, et al : Apolipoprotein B as the best predictor of coronary artery disease in Iranian normolipidemic patients. Clinical Biochemistry 34: 149-155, 2001.
2. The World Health Report 1999. Geneva: World Health Organization, 1999.
3. Safari M: The effect of nursing education with group discussion method on the quality nursing care. A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science (M.S.) in nursing. Iran, Tarbiat Modarres University, 2002.
4. Kiaveh Faragi F: Satisfaction of patients, length of stay in the C.C.U. in a general hospital in Tehran. A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science (M.S.) in nursing. Iran, Tarbiat Modarres University, 2002.
5. Murraj CJL, Lopez AD: Alternative projective of mortality & disability by cause 1990-2020: Glohac Burden of Disease Study. Lancet 349: 1498-1504, 1997.
6. Myocardial Infarction (what is ischemic heart disease?) medlib.Med.Utah.edu/web path/TUTORIAL/MYOCARDIO/MYOCARDIO.htm,2002.
7. Lewis H, Kuller MD: Beyond lipids: Markers of coronary risk and events. ACC Current Journal Review 10(4): 30-34, 2001.
8. Coronary artery bypass graft surgery.www.ehendrick.org/healthy/0004399.htm.
9. Hunt JO, Mallanie V, Hendrata M, Pauls S, et al: Quality of life after coronary artery bypass graft surgery. Heart & Lung 29 (6):401-410, 2000.
10. Yosefnia MA, Sabzi F: Coronary artery surgery. Third edition, Tehran, Samir publication, 1999.
11. Visser A: Chronic disease, aging and dementia: Implications for patient and education counseling. Patient Educ Couns (39): 293-302, 2000.
12. Stromberg A: Educating nurses and patients to manage

heart failure. European Journal of Cardiovascular Nursing (1): 33-40, 2002.
13. Visser A, Deccache A, Bensing J: Patient education in Europe: United differences. Patient Educ Couns 44:1-5, 2001.
14. Harrison MB, Juniper EF, Dicenso AM: Quality of life as an outcome measure in nursing research" May you have a long and healthy life". Canadian Journal of Nursing Research 28(3): 49-68, 1996.
15. Health-related quality of life? www.cdc.gov/nccdphp/hrqol, 2002.
16. Gray M, Kiebzak Lee M, et al : Use of the Sf-36 general health status survey to document health-related QOL in patients with coronary artery disease, effect of disease and response to coronary artery bypass graft surgery. Heart & Lung 31 (3): 207-231,2002.
17. Butler JT: Principles of health education and health promotion. Third Edition, Delaware State University, pp. 276-279, 2000.
18. Shuldham CM, Fleming S, Goodman H: The impact of pre-operative education on recovery following coronary artery bypass surgery. European Heart Journal (23):666-674, 2002.
19. Christophearson B, Pfeiffer C: Varying the timing of information to alter pre-operative anxiety and post-operative recovery in cardiac surgery, reduces psychological distress and reduces the incidence of acute post-operative hypertension. J Consult Clin Psych (55): 513-20, 1987.
20. Baghery H: Survey effect of counseling on quality of life in MI patients in Tehran, 2002. A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science (M.S.) in nursing. Iran, Tarbiat Modarres University, School of Medical Science, 2001.
21. Ahmadzadeh M: The effect of health education on anxiety in CABG patients. A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science (M.S.) in health education. Iran, Tarbiat Modarres University, School of Medical Science, 2000.
22. Cupples SA: Effect of timing and reinforcement of pre-operative education on knowledge and recovery of patients having coronary artery graft surgery. Heart &Lung (20): 654-60, 1991.
23. Stromberg A: Educating nurses and patients to manage heart failure. European Journal of Cardiovascular Nursing (1): 33-40, 2002.
24. Devine EC, Cook TD: A meta-analysis of effects of psychoeducational interventions on length of post-surgical hospital stay. Nurs Res (32): 267-74, 1983.
25. Devine EC: Effects of psycho-educational care for adult surgical patients: A meta-analysis of 191 studies. Patient Educ Coun (19): 129-42, 1992.