

Factors Affecting Compliance with Therapeutic Regimen for Patients with Coronary Artery Bypass Graft: Suggested Nursing Guidelines.

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Abstract: Background: Compliance with therapeutic regimen after CABG is very important to keep patients' well-being and away from complications. So it is important for patients to modify their lifestyle and accept their new life with new changes. **The aim** of this study was to determine factors that affecting compliance with therapeutic regimen for patients with CABG and develop suggested nursing guidelines, **Design:**A descriptive exploratory design was utilized, **Setting:** the study was conducted in the Cardio-Thoracic Surgery outpatient Clinic at Suez Canal University Hospitals, **Sample:** A purposive sample of 72 patients, **Tools:** three tools were used to collect the study data. Self-administered questionnaire, factors affecting patients' compliance with therapeutic regimen and compliance with therapeutic regimen. **Results:** the study revealed that 87.5% of the studied patients had unsatisfactory knowledge about disease and its' treatment, 77.5% of patients believes toward therapy, 54.2% of patients attitude toward therapy, 48.9% of health literacy related factors, 60% of therapy related factors, 48.7% of socioeconomic related factors, 44.4% of disease related factors, 33.3% of health care system related factors. 79.2% of the studied patients had uncompliance behavior with therapeutic regimen. **Conclusion:**There were many factors which had significant impact on Coronary Artery Bypass Graft patients' ability to comply with therapeutic regimen such as; patients-related factors, therapy-related factors,socioeconomic-related factors, disease-related factors and healthcare system-related factors, the majority of the studied patients were un-compliant with therapeutic regimen. **Recommendation:** Educational guidelines should be conducted for CABG patients to improve their compliance.

Keywords: Coronary Artery Bypass Graft, Therapeutic Regimen, Compliance, Guidelines.

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I. Introduction

Cardiovascular Diseases are the number one cause of death worldwide, more people die yearly from CVDs than from any other cause. An estimated 11.1 million people died from CHD in 2020, representing 31% of all deaths (*American Heart Association, 2017*). Coronary Artery Disease (CAD) is a progressive disease leading to narrowing or occlusion of the coronary arteries. The patient may experience symptoms of ischemia such as chest tightness and angina (*Katz & Ness, 2015*).

The CAD has been cured by myocardial revascularization since the 1960, and the most common CABG techniques have been implemented for more than 35 years (*Diodato & Chedrawy, 2014*). CABG is a surgical procedure in which blood vessel is grafted to an occluded coronary artery so that blood can flow beyond the occlusion. Number of CABG surgery that had been performed in the United States every year was 395,000

(*Center for Disease and Control Prevention, 2017*).

CABG is more effective than medical therapy for improving survival in patients with left main or 3-vessel CAD, relieving angina symptoms, treatment for complications from an unsuccessful PCI and prevention and treatment of MI, dysrhythmias, or heart failure(*Habib et al., 2015*).A vessel commonly used for CABG is the greater saphenous vein, followed by the lesser saphenous vein, Cephalic, basilic veins, the right, left internal mammary and occasionally the radial and gastroepiploic arteries are also used(*Cheng & Slaughter, 2013*).

The vein is removed from the leg or arm and grafted to the ascending aorta and to the coronary artery distal to the lesion. Arterial conduits have demonstrated improved patency rates over venous conduits due to their ability to resist atherosclerotic development (*Punjabi & Chan, 2015*).

Nurse play an important and greater role in emphasizing patients compliance to therapeutic regimen and life style changes to prevent repeated revascularization (Alikari & Zyga, 2014). Patient compliance is paramount in the effectiveness of therapeutic regimens. Without compliance therapeutic goals cannot be achieved, resulting in poorer outcomes (Hajje et al., 2015). Noncompliance is significant problem and a major challenge for the health care team. Patient provider relationship, communication skills, information giving and the utilization of existing social support networks are essential practical factors provided by health care team (Lama et al., 2012).

Therapeutic regimen after CABG includes: Comply with prescribed diet that include low fat, low cholesterol, low salt intake, low fried foods and increasing intake of fruits, vegetables, grilled and boiled foods, physical activity that include walking and range of motion exercise, follow precautions to prevent wound infection, taking prescribed drugs, smoking cessation and follow up with surgeon and cardiologist to early detection of complications (Bojar, 2011). Complications after CABG include, decrease cardiac output, bleeding, cardiac tamponade, fluid over load, hypothermia, dysrhythmias, cardiac failure, stroke, infection, graft occlusion, myocardial ischemia and death (Khorsandi et al., 2015).

There are many factors prevent patients from adherence to therapeutic regimen which include, patient-related factors, therapy-related factors, socioeconomic-related factors and health care system-related factors (Iuga & McGuire, 2017). The nurse has a critical role in teaching patients and caregivers about diet, exercise, medications and follow up medical care (Sharon et al., 2011). Nurse helps patient in a construct list of drugs and time of administration that can be posted at home, Instruct patient to avoid certain over counter drugs, Teach patient for daily monitor coagulation profile to early detect risk and presence of bleeding and discuss life style changes that may be required to prevent

Inadequate compliance with the recommended treatment regimen after CABG remains an important problem that facing health care providers in all settings and populations. Based on previous researches, it was noted that non-compliance with the treatment create a threat to satisfactory outcome (Krzych et al., 2013). If the patient is unable to maintain compliance with therapeutic regimen, these will lead to increase patient's morbidity and mortality and raising the costs of treatment and in time and increasing effort of the care providers (Ibrahim et al., 2015).

II. Subjects and Methods

This descriptive exploratory study was carried at Cardio-Thoracic surgery outpatient clinic in Suez Canal University Hospitals, from beginning of February 2017 to the end of August 2017. A total 72 adult subjects of both (female and male patients) of aged ≥ 18 years were for in this study.

Study Design:

A descriptive exploratory design was used in the current study.

Study Location:

This study was conducted at Cardio-Thoracic Surgery outpatient Clinic in Suez Canal University Hospitals, at the outpatient clinics building.

Study Duration: February 2017 to the end of August 2017.

Sample Size: 72 patients after exclusion of pilot study.

Sample size calculation: Sample size was determined according to the following equation:

$n = (Z\alpha)^2 \times p / d^2$. Where: n = sample size, $Z\alpha$ = the value of standard normal distribution for type I error probability for the sided test and equals 1.96, p = Patients' compliance on therapeutic regimen = 30%, $q = 1 - p$, d^2 = the accuracy of estimate = 0.01. So according to the calculations after adding 10% drop out. The sample size were 81 patients.

Subjects & selection method: A purposive sample of eighty one adult patients after CABG, admitted in the previous mentioned sitting at the time of data collection, and accepted to participate in the study (32) female patients and (49) male patients. 9 of them were excluded for pilot study.

Inclusion Criteria:

- 1- Adult patients aged 18 years or more.
- 2- Patients had follow up within 6 months or less after CABG.
- 3- Adult patients with both sex.
- 4- Patients willing to participate in the study.

Exclusion Criteria:

- 1- Patients who had repeated revascularization.
- 2- Patients who is unconscious or/ and mentally retarded.
- 3- Patients with severe chronic illness as a third stage of cancer, liver cirrhosis, rheumatoid arthritis, thyroid disorder,etc.
- 4- Patients with valve repair or replacement, thoracic aortic aneurysm repair, heart transplantation and congenital repair.
- 5- Patients with severe complications after CABG as: cardiac arrest, Stroke, Arrhythmias,

Demographic Characteristics	No	%
Age		
40 – 45	10	13.8
46 – 51	37	51.4
52 – 57	13	18.1
58 – 63	10	13.9
64 +	2	2.8
Mean ± SD	51.06 ± 5.78	
Range	42-65	
Median	50	
Sex		
Male	40	55.6
Female	32	44.4
Marital Status		
Married	58	80.6
Single	14	19.4
Work		
Yes	39	54.2
No	33	45.8
Work with hard effort		
Yes	28	38.9
No	44	61.1
Educational Level		
Can't read and write.	16	22.2
Read and write.	7	9.7
Primary education.	15	20.8
Secondary/technical education.	23	31.9
High education.	11	15.3
Residence		
Rural.	45	62.5
Urban.	27	37.5
Income		
Enough.	21	29.2
Not-enough.	51	70.8
Treatment Fees.		
Health decision.	54	75
Health insurance.	18	25
Type of transportation		
Car	6	8.3
Taxi	12	16.7
Bus	54	75

Procedure Methodology:

The researcher started by reviewing the related literature to gain more in- depth information about the subject and to be able to design the appropriate data collection tools, This took about five months. Then, the developed tools were reviewed by expertise in nursing and cardiology for validation, this stage was completed in two months. When the tools were finalized after pilot testing, the actual field work started. After obtaining official permissions, the researcher introduced herself and explained the aim and the purpose of the study to participant patients in order to obtain their cooperation and they were reassured that the information obtained were strictly confidential.

Data were collected in the Cardio Thoracic Surgery Outpatient Clinic at Suez Canal University Hospitals, it composed of three rooms; one of them was waiting room for patients where the researcher interviewed with them, it had one a disk and three chairs, another room had a dressing change equipment trolley , sink and patients records and the last room was the examination room which had one a disk, two chairs, examination bed and curtains. In the outpatient clinic, one nurse works in it and she helped the researcher more in persuasion the patients in collecting data process.

Data were collected through period of 7 months from beginning of February 2017 to the end of August 2017. The researcher visited the clinic for 2 days per week (Saturday & Tuesday) from 9 am to 12pm but most

visits had done in the holidays and when the researcher had day off work, with the rate of follow up 2-4patients had CABG a day, but in some visits the researcher hadn't found the needed subject with desired inclusion and exclusion criteria. The researcher used the previous mentioned tools to collect the data, The questionnaire was administered to patients individually in the clinic, each patient took about 30-45 minutes to complete the questionnaire. After questionnaire administration, the researcher presented guidelines to the patients depending on their assessment and level of compliance.

Statistical design:

After the collection of data, it was revised, coded and fed to statistical software statistical package for the social sciences (SPSS) version 20. Microsoft office excel software was used to construct the needed graphs. After data coding the following data manipulation were done. t-test, ANOVA test and Linear relation, using pearson's correlation coefficient.

III. Results

Table no 1 revealed that 51.4% of the studied patients were at age of 46-51 years old. Male patients were about 55.6%. 80.6% were married. About 54.2% had a work. While 61.1% of the studied patients' work doesn't require effort. In relation to educational level 31.9 had secondary/ technical education. Regarding to residence 62.5 % of the studied patients were lived in rural areas. Additionally, income was low for 70.8% of studied patients and about 75% depended on ministry of health decision and only 25% of them had health insurance. And 75% of the studied patients came to the cardiothoracic clinic by bus.

Table no 1Distribution of demographic characteristics of CABG patients.

Table no 2 showed that 100% of the studied patients had angina, 83.3% of the studied patients had hypertension. Only, 13.9% of the studied patients had history of rheumatic fever and hepatitis. While, 23.6% of the studied patients had a history of renal failure. Additionally, 54.2% of the studied patients had Diabetes Mellitus.

Table no 2Distribution of past medical history of CABG patients.

Medical History	No	%
History of Angina	72	100
History of HTN	60	83.3
History of Rheumatic Fever	10	13.9
History of Renal Failure	17	23.6
History of Hepatitis	10	13.9
History of Diabetes Mellitus	39	54.2

Figure no 1 Showed that 9.7% of the studied patients were a present smoker. 65.3 % of the studied patients had a history of previous smoking. While, 47.2 % of the studied patients had family member smoker.

Figure no 1 Distribution of smoking history regarding studied patients.

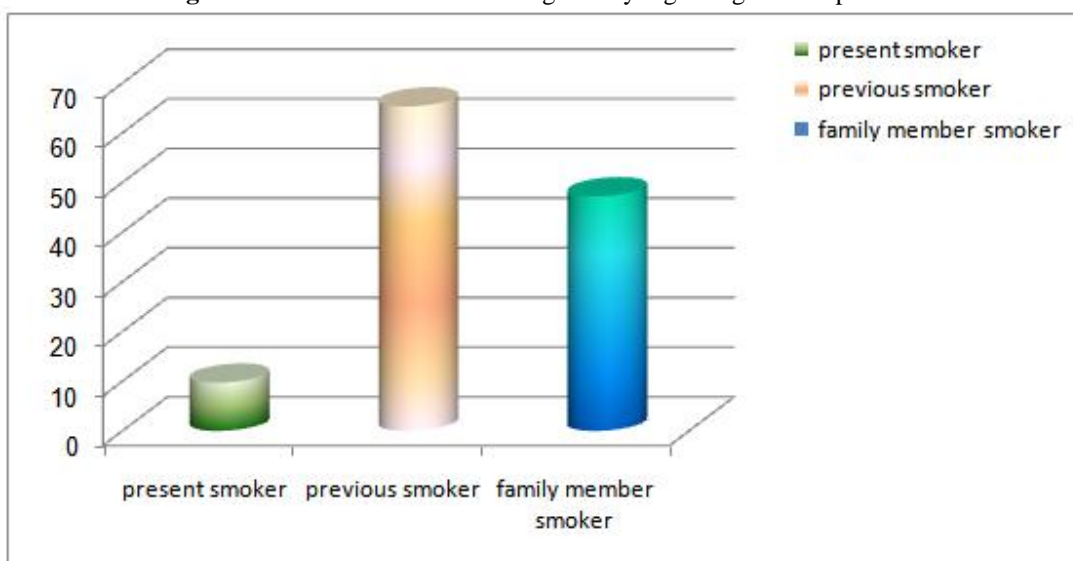


Table no 3 showed that 26.3% of the studied patients comply with medications and diet regimen. 23.6% of the studied patients comply with personal hygiene regimen. 100% of the studied patients comply with follow up

regimen. Only, 16.7% of the studied patients comply with precautions to avoid complications. Only, 20.8% of the total compliance score toward therapeutic regimen.

Table no 3 Distribution of overall patients' compliance toward therapeutic regimen.

Compliance toward	frequency	Percentage
Medications Regimen	19	26.3
Diet Regimen	19	26.3
Personal Hygiene Regimen	17	23.6
Follow Up Regimen	72	100
Exercise Regimen	41	56.9
Precautions to avoid Complications	12	16.7
Total compliance score	15	20.8

Table no 4 showed that there was a significant relation between total compliance score socioeconomic factors with p value = 0.003**and health care system related factor with p value= .043*.

Table no 4 Correlation between total compliance score and factors affecting compliance scores among CABG patients.

Factors affecting compliance toward therapeutic regimen	Total compliance score	
	r	P value
Patients related factors	-.216	.069
Socio- economic factors	.307	0.003**
Disease related factors	.023	.845
Health care system related factors	.240	.043*

IV. Discussion

Compliance is one of the most important educational outcomes in patient education to judge how effective all of the teaching efforts. So, the nurse should start compliance education for patients undergoing CABG from the day of their admission to the cardio-thoracic department (*White & Hall, 2013*).

The present study revealed that, the age range of the studied patients were 42-65 years, this finding agreed with (*American Heart Society, 2011*), (*Cardiology Channel, 2012*) in a study about "identifying risk factors for CAD" and (*Gendy et al., 2013*) in Saudi Arabia in a study about "factors affecting Compliance of Patients with Coronary Artery Bypass Graft toward Therapeutic Regimen", reported that age ranged from 30-50 years. In my point of view, coronary artery disease' incidence increase with age because of the anatomic structure of coronary arteries differs with advanced age, increasing susceptibility to plaques formation and developing atherosclerosis.

As regards to gender, the current study revealed that, more than three quarter of the studied patients were males, This finding was in harmony with (*Wang et al., 2014*) in the Mazankowski Alberta Heart Institute in a study about " the Association between older age and outcome after cardiac surgery", reported that three quarter of patients were males.

Also this finding agreed with (*Vaccarino et al., 2010*) in Yale New Haven Hospital in a study about "Gender Differences in Recovery After Coronary Artery Bypass Surgery", which reported that about more than half of patients were males. In my point of view, males exposed to stressful situations and more smokers than females.

In the other hand, this finding disagreed with (*Petro et al., 2003*) in Washington university school of medicine in a study about "minimally invasive coronary revascularization in women: a safe approach for high risk-group", reported that half of patients were females. In my point of view, this difference may be due to different place of setting in each study or study sample participants were females more than males.

In relation to marital status the present study showed that the most of the studied patients were married, This finding was in accordance with (*Parry et al., 2017*) in a study about "impact of marital status and comorbid disorders on health-related quality of life after cardiac surgery", reported that the majority of the studied patients were married. This finding may be due to the study sample age range from 40 to 70 years and this age was the marriage age and may be presence of spouse support to another to perform CABG to improve quality of life.

Concerning the occupation, the finding of the present study showed that nearly three quarters of the studied patients were working, This finding agreed with (*Mehrdad et al., 2016*) in a study conducted in Iran about "Identify Predictors of Early Return to Work after CABG", which reported that the majority of the studied patients were working. In my point of view, this may be due to current high economic status and the nature of work was suitable with their health condition and didn't require effort such as driver, barber, plumber and shopkeeper.

In the other hand, this finding disagreed with (*Irfan et al., 2013*) in Dhaka in a study about "Health Related Quality of Life Among Coronary Artery Bypass Graft Patients Attended at Combined Military Hospital", reported that the majority of the studied patients were un employed. This may be due to many factors such as having difficulty with daily activities as daily working, walking, climbing stairs, psychological status such as depression, fatigue and general weakness.

Regarding to educational level this study represented that above one third of the studied patients were secondary/ technical education. This finding agreed with (*Nery et al., 2007*) in Brazil in a study about "Identifying Influence of the Practice Physical Activity in The Coronary Artery Bypass Graft Surgery Results", reported that about half of the studied patients were primary and technical education. In contrast with (*Shahmansouri et al., 2012*) in Iran in a study about "Fear, Anxiety and Beliefs about Surgery in Candidates Patients for Coronary Artery Bypass Grafting", reported that the majority of the study patients were illiterate.

The result of the present study portrayed that, about two thirds of the studied patients were lived in rural area. This finding agreed with (*Yu et al., 2015*) in Taiwan in a study to explore "The Association between Coronary Artery Bypass Surgery Patients' Residence and Quality of Care in Terms of 30-day Mortality", reported that about a half of the studied patients were lived in rural area. This may be due to unhealthy practices like unhealthy diet, lack of medical care and follow up.

But this finding disagreed with (*Ancona et al., 2000*) in Rome in a study to evaluate "whether coronary artery bypass graft surgery is equally provided among different socioeconomic status groups in accordance with need", reported that rural patients were only one quarter.

Concerning the income, the finding of the current study showed that more than three quarter of the studied patients had an insufficient income. This finding was in accordance with (*Hou et al., 2014*) in Taiwan in a study about "Determining Whether Low-Income Coronary Artery Bypass Surgery (CABG) Patients Receive Healthcare Services with Poorer Quality", reported that about half of the studied patients were had low income. This may be due to patients' employment status, high cost of therapy and transportation expenses.

Concerning the treatment fees, the finding of the present study represented that most of the studied patients depended on ministry of health decision for cost coverage. This finding agreed with (*Takousia et al., 2016*) in USA in a study about "Health-Related Quality of Life after Coronary Revascularization", who reported that cost of treatment after CABG were expensive.

In the other hand disagreed with (*Kwesigabo et al., 2012*) in Tanzania in a study "Tanzania's Health System and Work force crisis", reported that about three quarters of the patients were treated by health insurance service. In my point of view, this finding may be due to employment status, high cost of treatment and insufficient income, for this population ministry of health decision provide cost coverage to support them.

In relation to transportation the current study showed that, most of the studied patients came to cardio-thoracic clinic for follow up by bus. This finding agreed with (*Anees et al., 2014*) in Pakistan in a study about "Demographic Factors Affecting Quality of Life of CABG patients" who founded that nearby half of patients came by public transportation for medical care follow up.

Past Medical History of CABG patients:

Regarding to past history, the current study showed that all of the studied patients had a history of angina, this finding agreed with (*Giustino & Mehran, 2015*) in USA in a study about "CABG Surgery Versus PCI in Coronary Artery Disease" and (*Oda et al., 2014*) in Japan in a study about "Coronary Artery Bypass Grafting in a Patient with Unstable Angina" this indicate that CABG is the main stone treatment for unstable angina if PCI and other lines of treatment failed and it is the most effective one.

In relation to Hypertension, the findings showed that most of the studied patients had a history of hypertension, this finding was in accordance with (*Špinar, 2012*) in the united kingdom in a study entitled "Hypertension and Ischemic Heart Disease" this indicates that Hypertension is the major risk factor for Coronary artery Disease.

Concerning Diabetes Mellitus, the present study showed that three quarter of the studied patients had a history of DM, this finding agreed with many studies; (*Aronson & Edelman, 2014*) in Roma in a study to "Identify Incidence of Coronary Artery Disease among Diabetic Patients", reported that the majority of CAD had a diabetes mellitus, and with (*Al-Nozha et al., 2016*) in Taibah University in study about "Coronary artery disease and diabetes mellitus". reported that the prevalence of diabetes in patients with CAD was up to half percent in many countries in a study about "Coronary Artery Disease and Diabetes Mellitus".

Also, agreed with (*Chiha et al., 2012*) in Chicago in a study about "Diabetes and Coronary Heart Disease: A Risk Factor for the Global Epidemic", who reported that the incidence of cardiovascular disease among diabetic men was twice that among non-diabetic men and similarly was three times more elevated in diabetic women compared to non-diabetic women. This may be due to diabetes has a silent effect on the heart vessels causing endothelial dysfunction, hypercoagulability, platelet dysfunction and atherogenic dyslipidemia which is associated with hyperglycemia.

History of Smoking among CABG patients:

The present study showed that more than three quarters of the studied patients were a previous smoking, this finding was agreed with many studies; (*Stallones, 2015*) in USA in a study about "The association between tobacco smoking and coronary heart disease", reported that there is a positive correlation between smoking and incidence coronary artery disease, also with (*Benedetto et al., 2014*) in UKA in a study about "Smoking cessation before coronary artery bypass grafting improves operative outcomes", reported that about a half of the studied patients were previous smokers.

In my point of view, most of the patients gave up smoking when their status become complicated and planned for CABG due to fear of operation technique, fear of intraoperative death and to improve post-operative outcome.

As regard to total compliance score, about one quarter of studied patients had a compliance behavior with therapeutic regimen, this was in harmony with (*Gendy et al., 2013*) in Saudi Arabia in a study about "Guidelines for the Factors Affecting Compliance of Patients with Coronary Artery Bypass Graft toward Therapeutic Regimen", reported that the majority of the studied patients had poor compliance toward therapeutic regimen. This may be due to lack of knowledge about disease, its' consequence and importance of compliance with therapeutic regimen.

The study revealed that there is significant relation between socio- economic related factors and total compliance score, this finding was on the same line with (*Ibrahim & Mahmoud, 2012*) in Taibah University in a study about "Compliance with treatment of patients with hypertension in Almadinah Almunawwarah: A community-based study", reported that there is high significant relation between socio-economic factor and level of compliance.

The study showed that there was significant relation between health care system related factors and total compliance score, this finding was agreed with (*Kalogianni, 2011*), who reported that there was positive association between health-care system and adherence to medication regimen.

V. Conclusion

The result of the present study concluded that There were many factors which had a significant impact on CABG patients' ability to comply with therapeutic regimen such as; patients-related factors; level of education, knowledge about disease and its' treatment, patients' attitude, patients' believes, patients' relationship with doctor and nurse, health literacy, therapy-related factors; routes of medications administration, taking more than one type of medications at the same time, continuity with medications causing annoying, socioeconomic-related factors; problems preventing follow up, income suitable with treatment, Family member accompanying and encouraging you for follow up, feeling of family negligence, feeling of burden on family, disease-related factors; presence of physical problems, types of physical problems, visual and hearing problem, healthcare system-related factors; satisfaction of health care system facility and causes of dissatisfaction. Based on these factors, suggested nursing guidelines were developed. Most of the studied patients were un-compliant with therapeutic regimen.

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