Relation Between Compliance of Patients Post Coronary Artery Bypass Surgery Towards Symptoms Management Strategies and Experienced Discomforts

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Abstract

Background: Patients who undergone Coronary artery bypass graft (CABG) often experience a variety of discomfort symptoms after hospital discharge including ;shortness of breath, chest pain or angina pain, incisional pain, atrial fibrillation fatigue, leg swelling, sleep disturbance, loss of appetite, anxiety and depression. Therefore, patient compliance with symptom management strategies (SMS) is a crucial to minimize and manage the experienced discomforts . **Aim**: to assess the relation between compliance of patients post CABG towards SMS & experienced discomforts. **Design**: descriptive correlational design. **Setting**: This study was conducted in outpatient clinics at Cardio Thoracic Academy affiliated to Ain Shams University Hospital. **Study subject**: A purposive sample of (150) patients post CABG were recruited from the previous mentioned setting. **Data collection tools**: This study utilized; patients demographic and medical data tool, patients' Cardiac Symptoms Survey (CSS) and patients' compliance scale. **Results**: low percentage of the studied patient (12.7%) were compliant and (87.3%) were non-compliant .Regarding experienced discomfort symptoms (60%) had severe level (26.7%) had moderate level and (13.3%) had mild level, **Conclusion:** There was highly statistically negative correlation between compliance level of patients post CABG towards SMS and experienced discomforts level. **Recommendation**: The importance of implementing educational program to patients post CABG regarding SMS to enhance their compliance

Key words: Experienced discomforts post CABG, Symptom management strategies, patients' compliance.

Introduction

Coronary heart disease (CHD) is a main cause of morbidity and mortality throughout the world. World Health Organization (WHO) expects 11.1 million deaths will occur from CHD in 2020. The CABG has been the mainstay of treatment for revascularization in CHD patients, since 1960, in providing symptomatic relief and increasing life expectancy **(Tsai et al., 2019).**

The main goal of coronary artery bypass graft (CABG) is release of angina and improved life expectancy. Although modern advances have enhanced the success rate of CABG surgeries, they are not adequate to eliminate altogether the physical, psychological and social problems that patients tackled in the period following discharge. Patients post CABG conveyed that they experienced postoperative discomfort symptoms such as sleep disturbances, fatigue, swelling, shortness of breath (SOB),fatigue, loss of appetite, chest pain, gastrointestinal disturbance, weight loss, anxiety related to the treatment and their capability to adhere to the recommended physical activity, edema of chest and leg incisions, weakness, dizziness and depression **(Bsharat & Karadag, 2019)**.

The most important component of nursing care following CABG is concentrated on teaching patients to distinguish and manage

postoperative symptoms Nurses involved in postoperative teaching in acute care and home settings should deliver symptoms management strategies to patients and their families. Patients often learn through vicarious experience or modeling from others with similar experiences. Symptoms management strategies that other post-CABG patients have used successfully may improve a patient's preparedness to try a strategy. Symptom management teaching could be enhanced with more explicit knowledge of strategies essentially used by patients **(Schulz, et al., 2012).**

Compliance is the process whereby the patient follows the prearranged and dispensed regimen as reinforced by the prescriber and dispenser. Compliance with treatment is a sign of a positive behaviour in which the patient is motivated appropriately to adhere to the prescribed treatment as a result of a perceived self-benefit and constructive consequence. Many studies suggested that patients who adhere to their treatments have better outcomes; they get long life, enjoy a higher quality of life. Compliance necessitates the patients to be active and to cooperate with health care professionals when setting goals for their treatment and describing the methods by which these goals can be attained. Patients should modify their lifestyle **(Mahdy & Ali, 2014).**

Significance of the study:-

In today's world, most of the deaths in the developing and developed countries are attributable to non-communicable diseases and over half of this result in cardiovascular diseases. It is considered one of the prominent causes of illness and death in the world. According to the World Health Organization (WHO), around 17.9 million people die annually due to cardiovascular disease worldwide, with an estimated 23 million deaths by year 2030 **(World Health Organization, 2019).**

Coronary Artery Disease (CAD) is a universal public health problem. Its occurrence rate is growing all over the world including Egypt, According to ministry of health in Egypt, 2014 stated that CAD deaths reached 107,232 (23.14%) of all deaths. Age adjusted death rate is186.36/100,000 population; this ranks Egypt #23 in the world. CAD deaths were 78,897 (21.73%) of all deaths, which make CAD the first killer in Egypt **(El-Moselhy, et al., 2018).**

Aim of the study:

This study aimed to assess relation between compliance of patients post CABG towards symptoms management strategies and experienced discomforts, through the followings:

- Assess compliance level of patients post CABG towards symptoms management strategies.
- Assess experienced discomfort symptoms level post CABG
- Assess relation between compliance level of patients post CABG and their experienced discomfort symptoms level

Research questions:

1.What is the compliance level of patients post CABG towards SMS?

2.What is the experienced discomfort symptoms level of patients post CABG?

3.Is there a relation between compliance of patients post CABG and experienced discomfort symptoms level?

Subjects and methods:

1- Technical design:

(A)-Research design:

A descriptive correlational design was followed to achieve the aim of this study.

(B)-setting:

This study conducted in outpatient clinics at Cardio Thoracic Academy that affiliated to Ain Shams university hospital. This setting selected because increasing the flow rate of patients. The out patient clinics located in the ground floor consisted of 8 clinics (wound care clinic, triage clinic, pediatric cardio clinics, 2 adult cardio clinics, International Normalized Ratio clinic, cardio surgery clinic and admission clinic). The outpatient clinics are working from Saturday to Thursday from 9 am to 1.30 pm.

(C)-Subject:

A purposive sample of 150 adult patients post **CABG** who follow up at outpatient clinic in Cardio- Thoracic academy at the time of data collection were recruited in this study.

Inclusion Criteria:

The selected patients were an adult, post CABG surgery for first time, from both gender, oriented, able to hear & speak, discharged within 7 days after surgery & agreed to contribute in the study.

Exclusion criteria

The patients excluded if they had an active psychiatric diagnosis that might affect the ability to participate in the current study or physical impairment that limit their physical function after surgery.

Sample Size

As revealed from the statistical medical record department of Cardio –Thoracic academy which affiliated to Ain shams university hospital during the period of 2016-2017, the total number of patients post CABG surgery followed up in cardio thoracic outpatient clinics were [n=1200]. Based on the sample size the patients participating in this study were (150). So, the sample size was calculated by adjusting the power of the test to 80% and the confidence interval to 95% with margin of error accepted adjusted to 5% and a known total population of patients using the following equation:

$X = Z(c/100)2r(100-r)$

$N = Nx/((N-1)E2+x)$

$E = Sqrt [(N-n)x/n(N-1)]$

Where N is the population size, r is the fraction of responses that you are interested in, and Z(c/100) is the critical value for the confidence level **(Chow et al., 2007).**

(D)-Tools of data Collection: Tools of data collection

The study data were collected through using the following tools;

Part I- Patients' demographic and medical data tool

This tool was developed by the researcher and written in Arabic to suit the level of education for the studied patients who mostly rely in the use of Arabic language. It included two parts divided as following:

Part A:- it was concerned with assessment of demographic data for the studied patients, which included (age, gender, level of education, marital status, working status, nature of work, place of residence and monthly income). It composed of 8 items.

Part B: it was concerned with assessment of the studied patients' medical data which included; 10 MCQ questions and 2 questions (Yes or No), related to the following; risk factor (1) question, smoking status (2) questions, body mass index (1) question, practicing exercise (2) questions, current complaints (1) question, current medications (1) question, allergic status (2) questions, patient's medical history (1), family history (1) question **(Hajar, 2017)**

Part II: Patients' Cardiac Symptoms Survey (CSS)

It was used to assess level of the discomfort symptoms experienced by patients post CABG. It was adopted from **Nieveen, et al., (2008).** It consisted of 10 symptoms which included the following; (angina, SOB, incision pain, a fluttering or racing heartbeat, fatigue, leg swelling sleep disturbance, loss of appetite, anxiety, and depression).

Each of these ten symptoms was measured in regards to three an individual's dimensions which included perception (10 items), evaluation included two subcategories; frequency (20items) & severity (20 items) and response to symptoms included two subcategories; interference with physical activity (20 items), enjoyment of life (20 items).

Total items were 90, the response of subject should be either presence / Yes took 1 score or absence / No took zero. So, total score was 90 degrees classified as the following;

- 0 < 50% = < 45 degrees considered as mild level
- 50 < 70 % = < 63 degrees considered as moderate level
- >70% = > 63% degrees considered as severe level

Part III- Patients' compliance scale

It was used to assess extent to which patients' behaviors complied with symptoms management strategies based on **Sanaie et al., (2016)** and modified by researcher. Patients' responses were assessed through three numerical rating scale ranged from (1 = Non or rarely, 2= sometimes and 3 = always). It was consisted of (10) common symptoms and management strategies items for each one as following;

Chest pain or angina pain; (5 items), SOB (6 items), incision pain; (9 items), fluttering heart beat; (4 items), fatigue; (7 items),

leg swelling; (6 items), sleep disturbance; (13 items), loss of appetite; (10 items) anxiety; (11 items), depression; (3 items). The total items were used to evaluate the patients 'compliance to management strategies were 74 items

Scoring system:

The total score for patients compliance scale for the total 10 SMS classified as the following;

- > 60 % = >44 items indicated that they were compliant
- < 60 % = < 44 items indicated that they were non-compliant

2- Operational Design:

A. The preparatory Phase:

It comprised revising of related literature, and theoretical knowledge of numerous parts of the study using books, articles, internet, publications and magazines to develop data collection tools.

B. Content validity and Reliability

Content validity was conducted to determine whether the tools covered the aim of the study. It was established by a group of (7) experts in medical surgical nursing from different academic categories (3 professors and 4 assistant professors) the faculty of nursing, Ain Shams University. The expertise's opinion was elicited regarding the tools for clarity, consistency, accuracy relevance, comprehensiveness, simplicity and applicability and minor modification was done.

Testing reliability of the used tools was carried out by Alpha Cronbach's test .The reliability values were (0.97, 0.96, and 0.99) for Demographic data tool, Cardiac Symptoms Survey and Compliance scale respectively. This indicated high total internal consistency of the used tools.

C. Pilot Study:

Pilot study carried out for 10% of the subjects under the study (15 patients) to test feasibility, applicability, clarity and to estimate the time required for data collection tools. Based on the finding of pilot study, the essential modification was done to the tools. The patients who contributed in pilot study were omitted from the main study subjects.

Filed work

1.The approval from ethical committee of Faculty of Nursing was obtained

2.The recent updated resources (journals, articles, books), reviewed and data collection tools prepared, tested for validity and reliability.

3.The researcher visited the medical team at outpatient clinics in Cardiothoracic Academy. The researcher introduced herself to the medical team, explained to them the aim of the study and obtained the clinic patient an appointment schedules for each week with their assigned surgeons.

4.The researcher interviewed the patients who meet the inclusion & exclusion criteria to explain the aim of the study and took their approval. The researcher interviewed the patient in one room in outpatient clinic it was spacious enough , with adequate ventilation , good lightening and near to nursing triage room then the patient won't feel worried to miss his appointment.

5.Data collection tools were assessed from the studied patients including demographic, medical data, cardiac symptoms survey and compliance at the first month of follow up visit in the outpatient clinic. The tools took about 30 -45 minutes to be filled from each patient. They filled by researcher during waiting time in outpatient clinics.

6.The data collection duration took around 4 months started from December 2019 till March 2020 The researcher was available 4 days per week from 9 am till 1:30 pm and met about 3 to 5 patient patients per day.

3- Administrative Design:

Approval obtained according the process of research approval from Ain Shams University ethical committee before study conducted. The purpose of the study was explained to each patient and verbal consent obtained. Subject informed that they can be withdraw at any time

Ethical Considerations:

The research approval was acquired from the faculty ethical committee before starting the study. Each patient was informed about the purpose and benefit of the study. The researcher assured sustaining anonymity and confidentiality of patients' data. Patients were informed that they were permitted to select to

share or not in the study and they had the right to withdraw from the study at any time.

4- Statistical Design:

The collected data were prepared, categorized, tabularized and statistically analyzed through a computer system by using by statistical packages for social science (SPSS) version 22. Linear regression model is a linear approach to modelling the relationship between a scalar response and one or more explanatory variables. Chi-square statistic is commonly used for testing relationships between categorical variables.

Results:

Table (1) reveals that mean age of the studied patients was 48.6 ± 9.8 & 58% with age from 50- 60 years old. Regarding gender, 58% of them were females and only 18% of them had university education. Concerning marital status, 82% of the studied patients were married. In addition, this table presented that 63.3% of the studied patients had work, 59.3% of them from urban area and 68% of them had not enough income.

Table (2) shows that 52.7% & 47.3% and 41.3% of the studied patients suffered from anxiety sleep disturbance and fatigue, respectively. Regarding current medication, 100% of the studied patients were taking antilipidemic, antihypertension and anticoagulant. Meanwhile, 26% of studied patients had allergies and 35.9% of them suffered from allergies to medications .In addition 34.7 % of the studied patients suffered from hypertension risk factors. Meanwhile 56% were smoking 24% of the had smoking duration from 5-10 years. Concerning BMI 56% of the studied patient had normal weight .Moreover 16.7% of them were practicing exercise.

Table (3) shows that 53.3% of the studied patients had severe level of perception of symptom .Moreover, 62.7% and 59.4% respectively of patient had severe level of frequency and severity of symptoms. In addition, 57.3% respectively of the patients had severe level of interference with physical activity and enjoyment of life.

Figure (1) shows that, (60%) of studied patients had severe level of total experienced discomfort symptoms. While, 13.30% of them had mild level.

Table (4) shows that the highest percentage of the studies patients were non-compliant with 10 SMS; SOB 85.3%, chest pain 83.3%, sternal pain 80%, fluttering heart rate 84%, fatigue & tiredness 88%, leg swelling 85.3%, sleep disturbance 90.7%, loss of appetite 81.3%, anxiety & depression 89.3% & 92% respectively.

Figure (2) presents that 12.7% of studied patients were complaint towards SMS post CABG. While 87.3% were non-compliant.

Table (5) shows that, there was highly statistically significant relation between the studied patients, total level of experienced discomfort symptoms post CABG and their demographic characteristics as age, level of education, marital status and monthly income at (P= < 0.01). While, there was no statistically significant relation with their gender, working status and place of residence at (P= > 0.05).

Table (6) presents that, there was highly statistically significant relation between the studied patients' total compliance level towards SMS and their demographic characteristics as age, level of education, marital status and monthly income at (P= < 0.01). While, there was no statistically significant relation with their gender, employment and place of residence at (P= > 0.05).

Table (7) shows that there was high significant negative correlation between patients' experienced discomfort symptoms and total compliance level post CABG where (p=<0.01).

Table (1): Frequency and Percentage Distribution of the studied patients regarding to demographic data (n=150).

Demographic Data		N	%
Age			
20		15	10
30		27	18
40		43	28.7
50 – 60		**65**	**43.3**
SD	**48.6 ± 9.89**		
Gender			
Male		63	42
Female		**87**	**58**
Level of Education			
Illiterate (not read and write)		30	20
Primary school		38	25.3
Secondary school		55	36.7
University		**27**	**18**
Marital status			
Single		20	13.3
Married		123	82
Divorced		**4**	**2.7**
Widow		3	2
Working Status			
Not working		55	36.7
Working		**95**	**63.3**
Nature of work (N=95)			
Need mental effort only		35	36.8
Need muscle effort only		20	20.1
Need mental and muscle effort		**40**	**42.1**
The place of residence			
Rural area		61	40.7
Urban area		**89**	**59.3**
Monthly income			
Enough		48	32
Not Enough		**102**	**68**

Table (2): Frequency and Percentage Distribution of the studied patients regarding to present medical history and experience discomfort symptoms (n=150).

Present Medical History	N	%
***Chief complaint**		
Shortens of Breathing	45	30
Chest pain	33	22
Sternal Pain	18	12
Fluttering heart rate	65	43.3
Fatigue	**62**	**41.3**
leg swelling	17	11.3
Sleep Disturbance	**71**	**47.3**
Loss of appetite	59	39.3
Feeling Anxious	**79**	**52.7**
Depression	9	6
Others	7	4.7
***Current Medication**		
Antilipidemic	150	100
AntiHypertension	150	100
Antiarrythmic	117	78
Anticoagulant	150	100
Others	77	51.3
***Suffering from any allergies**	39	26
***Risk factors**		
Hypertension	52	34.7
Diabetes	25	16.7
Obesity	44	29.3
Stress	25	16.7
Other	16	10.7
Non	13	8.7
Smoking	85	56.7
Duration of smoking (n=85)		
less than 5 years	20	13.3
From 5-10 years	36	24
More than 10 years	22	14.7
Ex-smoker	7	4.7
BMI		
Underweight (<18.5)	22	14.7
Normal weight (18.5-24.9)	84	56
Over weight (25-29.9) ≥ 25	44	29.3
Daily exercise	25	16.7

Table (3): Frequency and percentage distribution of the studied patients' total level of the experienced discomfort symptoms post CABG according to three dimensions (n=150).

Items	Experienced discomfort symptoms		
	Mild N (%)	Moderate N (%)	Severe N (%)
Perception of symptoms	14 (9.4)	56 (37.3)	**80 (53.3)**
Evaluation of symptoms			
Frequency	16 (10.6)	40 (26.7)	**94 (62.7)**
Severity	16 (10.6)	45 (30)	**89 (59.4)**
Response to symptoms			
Interference with physical activity	18 (12)	46 (30.7)	**86 (57.3)**
Interference with enjoyment of life	22 (14.7)	42 (28)	**86 (57.3)**

Figure (1): Percentage distribution of the studied patients regarding to total level of experienced discomfort symptoms post CABG (n=150).

Table (4): Frequency and percentage distribution of the studied patients' total compliance level towards management strategies for the experienced discomfort symptoms post CABG (n=150).

Items	Total compliance level			
	Compliance		Non-Compliance	
	N	%	N	%
Management Strategies for Shortness of breath	22	14.7	128	85.3
Management Strategies for chest pain	25	16.7	125	83.3
Management Strategies for incisional sternal pain	30	20	120	80
Management Strategies for fluttering heart rate	24	16	126	84
Management Strategies for Fatigue and Tiredness	18	12	132	88
Management Strategies for leg swelling	22	14.7	128	85.3
Management Strategies for sleep disturbance	14	9.3	136	90.7
Management Strategies for loss of appetite	28	18.7	122	81.3
Management Strategies for Anxiety	16	10.7	134	89.3
Management Strategies for Depression	12	8	138	92

Figure (2): Percentage distribution of patients total compliance level toward management strategies for the experienced discomfort symptoms post CABG (n=150).

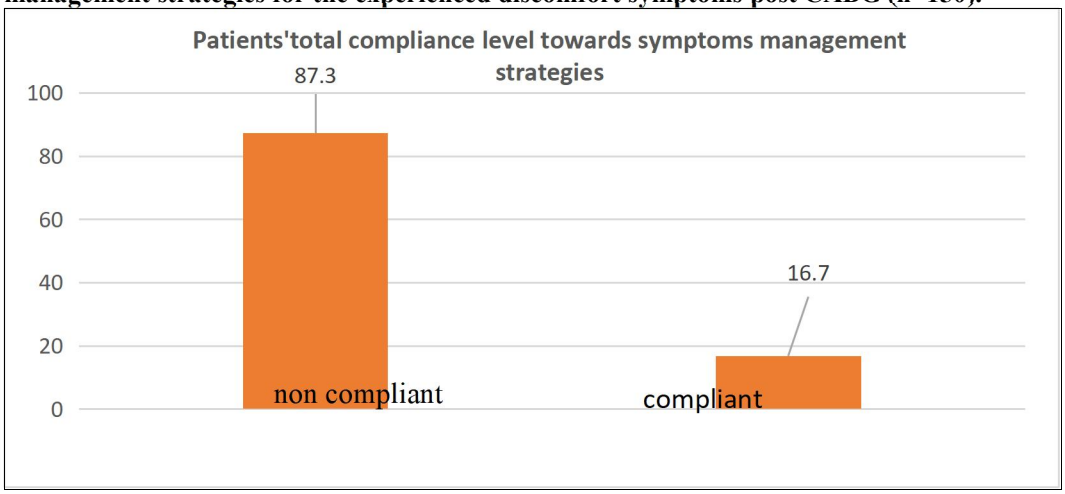

Table (5): Relation between total level of the experienced discomfort symptoms post CABG and demographic characteristics among the studied patients (n=150).

Items		Total level of discomfort symptoms						X2	P-Value
		Mild (n=90)		Moderate (n=40)		Severe (n=20)			
		N	%	N	%				
Age (year)	20 - <30	12	13.3	3	7.5	0	0.0	9.360	.018*
	30 - <40	20	22.2	7	17.5	0	0.0		
	40 - <50	33	36.7	5	12.5	5	25		
	50 – 60	25	27.8	25	62.5	15	75		
Gender	Male	30	33.3	25	62.5	8	40	1.671	.187
	Female	60	66.7	15	37.5	12	60		
Level of Education	Illiterate	5	5.6	15	37.5	10	50	9.101	.023*
	Primary school	20	22.2	13	32.5	5	25		
	Secondary school	40	44.4	10	25	5	25		
	University	25	27.8	2	5	0	0.0		
Marital Status	Single	0	0.0	10	25	10	50	20.33	.000**
	Married	90	100	30	75	3	15		
	Divorced	0	0.0	0	0.0	4	20		
	Widow	0	0.0	0	0.0	3	15		
Working status	Not working	40	44.4	5	12.5	10	50	2.360	.124
	Working	50	55.6	35	87.5	10	50		
Place of residence	Rural area	30	33.3	25	62.5	6	30	1.025	.210
	Urban area	60	66.7	15	37.5	14	70		
Monthly income	Enough	40	44.4	8	20	0	0.0	19.67	.000**
	Not Enough	50	55.6	32	80	20	100		

Table (6): Relation between and total compliance level toward management strategies for the experienced discomfort symptoms post CABG and demographic characteristics among studied patients (n=150).

Items		Total compliance toward symptoms management strategies				X2	P-Value
		Compliance (n=19)		Non-Compliance (n=131)			
		N	%	N	%		
Age (year)	20 - <30	15	78.9	0	0.0	14.30	.008**
	30 - <40	4	21.1	23	17.6		
	40 - <50	0	0.0	43	32.8		
	50 - 60	0	0.0	65	49.6		
Gender	Male	8	42.1	55	42	1.365	.206
	Female	11	57.9	76	58		
Level of Education	Illiterate	0	0.0	30	22.9	14.90	.006**
	Primary school	0	0.0	38	29		
	Secondary school	3	15.8	52	39.7		
	University	16	84.2	11	8.4		
Marital Status	Single	0	0.0	20	15.3	18.63	.001**
	Married	19	100	104	79.4		
	Divorced	0	0.0	4	3.1		
	Widow	0	0.0	3	2.2		
Employment	Not working	10	52.6	45	34.4	2.603	.144
	Working	9	47.4	68	65.6		
Place of residence	Rural area	8	42.1	53	40.5	1.360	.201
	Urban area	11	57.9	78	59.5		
Monthly income	Adequate	16	84.2	32	24.4	22.63	.000**
	Not Adequate	3	15.8	99	75.6		

Table (7): Correlation between the studied patients' total compliance level and their total level of experienced discomfort symptoms post CABG

Items		Patients compliance scale
Total level of experienced discomfort symptoms	r.	-0.642
	p	.003**

Discussion

Part I: patients' demographic data:

According demographic data of studied patients, the current study demonstrated that mean age of studied patient was 48.6 ± 9.8, 58% with age from 50- 60 years old. From the researcher's point of view, this could be attributed to elevation of CAD in Egypt especially among middle age group. Regarding gender, more than half were females and only less than one fifth of them had university education. Concerning marital status, more than three quarters of studied patients were married. These results explained as increasing at age and females' gender had high risk for cardiac disease than young people and male's gender. These results were in cohort with the study performed by **Camera et al., (2020)** about Association of microvesicles with graft patency in patients undergoing CABG surgery, at Italy with sample size 60 patients and found mean age of them was 64±8 and the majority of them were males.

In addition, the present study presented that less than two thirds of studied patients had work, more than half of them from urban area and more than two thirds of them had not

enough income. From the researcher point of view these results attributed to setting of study was university hospital which it wavered part of the cost of the surgery. These results were in cohort with the study conducted by **Ambina et al., (2020)** entitled Quality of Life among Post CABG Patients, at India with sample size 101 patients and found that more than half of patients were employee and had low income.

Regarding general medical data, the present results showed that more than one third of studied patients were suffered from hypertension, slight more than half of them were smokers, with about one quarter of them were from 5-10 years. Regarding BMI, more than half of studied patients had normal weight. In addition, only less than one fifth of studied patients were practicing exercise and about slight less than half of them were practicing walking as daily exercise. These results explained as overweight, smoking and limit exercise were predisposing factors for cardiac disease. From the researcher's point of view, these result might be due to the newly customs and traditions eating habits that introduced to Egyptian, society especially in the last 10 years majority of Egyptian were eating unhealthy and junk foods and practising regular exercise. These results were supported with the study performed by **Pulimala et al., (2020)** about Assessment and evaluation of health related quality of life after CABG in a tertiary care teaching hospital, at India with sample size 100 patients and reported that slight less than half were smokers and suffered from more than one co-morbidities.

About the present medical history of studied patients, the current study revealed that more than half and more than one third of studied patients were suffered from anxiety and fatigue, respectively. Regarding current medication, all the studied patients were taking antilipidemic, antihypertension and anticoagulant. Meanwhile, about one quarter of studied patients had allergies and more than one third of them suffered from allergies to medications. From the researcher point of view , these results could be attributed to the anxiety may be a normal response to a stressful situation, such as an acute cardiac event and the heart can't pump enough blood to the rest of the body consequently the fatigue symptom was considered one of the frequent symptoms. These results were in consistent with the study conducted by **Celano et al., (2016)** about anxiety disorders and cardiovascular disease, at Boston and stated that among patients with cardiovascular disease, anxiety and formal anxiety disorders are common and associated with poor cardiovascular health. Also, the study finding was in agreement with the study conducted by **Zakeri et al., (2021)** entitled in Evaluation of liver function tests after CABG, at Iran with sample size 359 patients and detected that more than three quarters of them took antihypertensive medication and half of them took inotrope drug.

Part II: Patients' Cardiac Symptoms Survey (CSS):

Regarding to total level of experienced discomfort symptoms among the studied patients post CABG the present results demonstrated that, less than two thirds of the studied patients had severe level. From the researcher point of view these finding necessitate the importance of conducting educational program to enhance their information regarding SMS and their capabilities to manage such experienced symptoms.

These results were in agreement with the study conducted by **Abass et al., (2017)** about effects of implementing clinical pathway on pain and anxiety for patients undergoing cardiac surgery, at Egypt with sample size 50 patients and found that the intervention group had significantly lower level of anxiety and pain than the control group before and after surgery at p value < 0.01**.

Part III: Compliance with symptoms management strategies

According to the studied patients' total compliance level towards SMS, this study finding displayed that. Less than one fifth of them were. From the researcher point of view, these results reflect the critical need of such

group of patients for educational program included valuable knowledge about SMS to improve their compliance. These results were in cohort with the study performed by **Ding et al., (2020)** entitled Effects of tele monitoring on patient compliance with self-management recommendations and outcomes of the innovative tele monitoring enhanced care program for chronic heart failure: randomized controlled trial, at Australia with sample size 104 patients and found significant improvement at participant compliance with weight monitoring, although the withdrawal rate was high

Part IV: Relations & correlations:

The study finding revealed that there was highly statistically significant relation between the studied patients' total level of discomfort symptoms and their demographic characteristics as marital status and monthly income at (P= < 0.01). Also, there was statistically significant relation with their age and level of education at (P= < 0.05). While, there was no statistically significant relation with their gender, working and place of residence at (P= > 0.05). From the researcher's point of view, these result could be due to unmarried patients didn't receive any help or support compared to patients who had partners and families. In addition, the patients with sufficient income can purchase any medication or supplies which can help to reduce experienced discomfort symptoms level. Furthermore , the patients with young age and highly educated had low experienced discomfort symptoms compared to patients old age and low educational levelThese results were in cohort with the study conducted by **Micah et al., (2019)** entitled in Factors Associated with Postoperative Pain among Patients after Cardiac Surgery in the Tertiary Care Teaching Hospital of Karachi, Pakistan, with sample size 136 patients, who found that BMI and the types of surgery were significantly associated with postoperative pain. Also, the study results were in disagreement with the study conducted by **Kankaya & Bilik, (2019)** about Three enemies of circadian rhythm: anxiety, sleeplessness and pain in patients following open-heart surgery, at Turkey with sample size was 126 patients and found that age, gender and marital status had no effect on anxiety and pain level post open heart surgery with p value > 0.05.

Furthermore, this study finding revealed that there was highly statistically significant relation between the studied patients total' compliance level towards SMS and their demographic characteristics as age, level of education, marital status and monthly income at (P= < 0.01). While, there was no statistically significant relation with their gender, working status and place of residence at (P= > 0.05). These results were in agreement with the study performed by **Ali et al., (2017)** about Frequency and predictors of non-adherence to lifestyle modifications and medications after CABG: A cross-sectional study, with sample size was 265 patients and stated that unmarriage and expensive were the predictors to non-compliance to medication. Meanwhile, these result was inconsistent with the study performed by **Taha et al., (2018)** about Factors Affecting Compliance with Therapeutic Regimen for Patients with CABG Suggested Nursing Guidelines, at Egypt with sample size was 72 patients and reported that patient related factor had no significant relation with their compliance score at p value >0.05.

Related to Correlation between the studied patients' total level of experienced discomfort symptoms post CABG and their compliance level , the current study reported that there was high significant negative correlation, where (p=<0.01). From the researcher's point of view, these results explained that the patients who had high compliant level would had low level of experienced discomfort symptoms and vice versa; as well as the patients adhered to health instructions and educational program lead to decrease the level of experienced discomfort and improve the quality of their life. These results were in cohort with the study performed by **Hasandokht et al., (2016)** about Medication adherence and quality of life in CABG patients, results of retrospective cohort study , at Iran with sample size 196 patients and found that Physical and mental components of quality of life were negatively associated with medication adherence (B:-0.18, p:0.04; B:-0.29,

p:0.02, respectively) and follow-up visit compliance observance (B:-0.3, p:0.01; B:-0.3, p: 0.01, respectively).

Conclusion

There was highly statistically significant negative correlation between patients compliance level towards symptoms management strategies and their experienced discomfort symptoms level.

Recommendation

- Offer in – service training program focusing on symptoms management strategies for patient post CABG to enhance their compliance.

- Develop guidelines and proper framework for nurses on how to assess experienced discomfort symptoms with three-dimensional level (perception, evaluation and response to symptoms) among patients post CABG.

- Multi-disciplinary team is important to reduce patient's experienced discomfort symptoms and enhance their compliance toward symptoms management strategies.

- Ensure the cardiac rehabilitation program contained a part related to symptoms management strategies among patient post CABG during their follow-up phase.

- Provide patients with the instructional booklet regarding symptoms management strategies for experienced discomfort post CBG.

- Establish patient education team and offer hotline call 24/7 at hospital setting and telemedicine follow up call to evaluate their compliance on long run.

- Using existing technology (online chat) to deliver educational session that allow patients to interact, report any discomfort symptoms and required strategies to be applied.

- further study is recommend to evaluate factors affecting the compliance of the patient post CABG with symptoms management strategies

- Further study is recommend to evaluated the impact of patients compliance post CABG towards symptoms management strategies on their quality of life.

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