Medications Adherence for Patients with Myocardial Infarction

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Abstract

Background: Adherence to prescribed medication is crucial part for patients with myocardial infarction and prevent catastrophic complications unfortunately death. **Aim of the study:** Was to assess medications adherence level for patients with myocardial infarction. **Subjects and Methods: Research design:** A descriptive design was adopted to carry out this study. **Setting:** The study was conducted at cardiac outpatient clinics at Zagazig University hospitals, Egypt. **Subjects**: A purposive sample of (100) patients with MI was conducted. **Tools of data collection:** Two tools were used, tool I: An Interview questionnaire about demographic characteristics and medical history of studied patients Tool II: adherence to refill and medication scale. **Results:** The current study revealed that (65%) were males with the mean age was 58.75±10.4, (70%) were educated, (87%) had scarce income, (52%) were smokers, the mean of disease duration per years was 4.2±3.5, (48%) had hypertension while (65%) were diabetic, (50%) organized follow up visit to outpatient's clinic each three months or earlier, finally, (82%) of the studied patients were adherent to cardiovascular medications with mean± SD (21.66±5.4). **Conclusion:** Studied patients with MI were adherent to cardiovascular medications. And gender, education, duration of the disease had relation to medication adherence. **Recommendations** Further studies to assess adherence of patients with myocardial infarction patients to therapeutic regimen not medications only and factors affecting on adherence.

Key words: Cardiovascular Medications, Adherence and Myocardial Infarction

Introduction:

According to report from WHO [1] Cardiovascular diseases (CVDs) are the leading cause of death globally; where an estimated 17.9 million people died from CVDs in 2019, Ogungbe et al. [2], estimate that CVD deaths is projected to increase to over 23.3 million by 2030. The CVD mortality rates in low- and middle-income countries continue to rise to about 300–600 CVD deaths per 100,000 population every year.

Ivers et al. [3] estimate that half of patients cease their medications by 12 months after myocardial infarction (MI). Among hospitals in the United States, there is significant variability in medication adherence after MI, and patients discharged from hospitals with low adherence rates have higher incidence of major adverse cardiovascular events.

Baumgartner et al [4] defined medication adherence as taking ≥80% of prescribed medication and define poor/partial adherence as taking <40% of prescribed medication. In contrast, Ford [5] defined non-compliance as the behavior of a patient or caregiver that fails to comply with the therapeutic plan that prescribed by health care provider.

Basu et al. [6] categorized Medication non-adherence into four categories: primary non-adherence: means failure to begin taking prescribed medications. Secondary non-adherence: medications are attained through refill but are not taken as prescribed. Unintentional non-adherence: patient incapable to refill medication. And Intentional non-adherence: medication non-adherence despite the availability of drug stocks due to patient-related factors.

Medication adherence is commonly measured in one of three ways: Patient self-report, Pharmacy

refill records and Use of electronic equipment. [7] & [8]

Patient self-report is simple and economically achievable and has the advantage of requesting information about situational factors that affect medication adherence. Patients are liable to overemphasize their medication adherence unless they not responding to therapy. [9]

Pill counts are calculated by counting the number of dosage units used up by the patient between two scheduled appointments or clinic visits. The medication bottle or strips handed out during the preceding visit are brought by the patient. [10]

Directly observed therapy (DOT); while the patient is taking the recommended medication, he is observed by an external observer like a family member or a trained provider. It can be considered as the closest to the gold standard for judging medication adherence. [11]

Other method of direct assessment of adherence is drug assays and biomarkers; these methods require obtaining blood and urine samples, [12]

Significance of the study:

Patients who survive an acute myocardial infarction (AMI) remain at high for major cardiovascular adverse events, including recurrent AMI, heart failure, stroke, and death. One of contributing factors to such catastrophic events was medication non-adherence. [13]. Ahmed et al. [14] in study conducted in Mansoura university hospitals found 76% of studied patients were adherent to therapeutic regimen.

Aim of the study:
The aim of the study was:

Assess medications adherence for patients with myocardial infarction.

Research Question:

What is the level of medications adherence for patients with myocardial infarction?

Subjects and Methods:
Research design:

A descriptive research design was used in this study.

Study Setting:

The study was conducted in cardiac outpatient clinics at Zagazig University hospitals, which located in the first floor and consists of an stress ECG clinic, an hypertension clinic, an heart rhythm disorders clinic, an ECG clinic, a cardiac disorders clinic, a cardiothoracic surgery clinic, two classrooms and waiting area.

Study Subjects:

A purposive sample of patients (100) with myocardial infarction.

Sample size is 100 patients; our probability of selection will be 1040/100=10.4. So, we need to select one patient from every ten patients till sample size well be attained

Inclusion criteria;

Patients should be able to communicate, the duration of disease is more than 6 months and free from chronic end disease within 6 months.

Exclusion criteria:

Patients with cognitive disorders.

Tools of data collection:

Tool I: An interview questionnaire, it was develop by the investigator to assess patient's demographics, past medical and surgical history of the studied patient.

The tool composed of two parts:

Part I; Demographic characteristics of the studied patients, which were composed of ten closed ended questions including "patients' age, gender, marital status, educational level, occupation, residence, income, living with whom times of visits to outpatient clinics and smoking"

Part II; Medical history of the studied patients, which were composed of eight questions about "chief complain, diagnosis, date of disease onset, duration of the disease, times of hospital admissions and cause of admission, previous cardiac surgery and other chronic diseases."

Tool II; Adherence to refill and medications scale (ARMS): Was adapted from Culig & Leppée, Lomper,et.al [15] & [16] to assess level of patients' adherence to prescribed medications and refill the medication.

The 12 items included in the final questionnaire comprise two subscales: adherence to taking medications (eight items) and adherence to refilling prescriptions (four items). Each item was structured for response on a Likert scale with responses of "none", "some", "most", or "all" the time, which were given values from 1 to 4 consecutively.

The scoring system:

Most items were written so that lower scores indicated better adherence. Item scores were summed to produce an overall adherence score of 12–48, with lower scores indicating better adherence. The high adherence level was ≥60% but, low adherence level was <60%.

Validity and reliability.

The tools were revised by a panel of five experts from different specialties including medical and nursing faculty staff, which included three professors of medical surgical nursing, two professors of cardiology reviewed the tool's content for clarity, relevance, comprehensiveness, applicability, understanding, and ease for implementation. All recommended modifications were done. Cronbach's Alpha that used to measure the internal consistency (reliability of used tool) was 0.752 Adherence to refill and medications scale

Pilot study

It was conducted on 10% (10) patients to assess the appropriateness, the accuracy of the tools, and determine the time required for each tool. The used tools were adjusted, and the final form was created. The pilot study patients were excluded from the study sample

Field work description

The data collection phase lasted for 7 months during the period from the beginning of April 2021 to the end of October 2021

Administrative and ethical considerations:

An official permission for data collection in Zagazig University Hospitals was obtained from the hospital administrative personnel by the submission of a formal letter from the dean of the faculty of nursing Zagazig University explaining the aim of the study in order to obtain permission and help. At the interview, each subject (patient) was informed about the purpose, benefits of the study, and they were informed that their participation is voluntary and he/she had right to withdraw from the study at any time without given any reason. In addition, confidentiality, and anonymity of the subjects were assured through coding of all data. The researcher assured that the data collected will be confidential and would be used only to assess factors associated with medications adherence for Myocardial infarction patients.

Statistical analysis:

All data were collected, tabulated and statistically analyzed using SPSS 20.0 for windows. Quantitative data were expressed as the mean ± SD & (range), and qualitative data were expressed as absolute frequencies (number) & relative frequencies (percentage). Percent of categorical variables were compared using Chi-square test or Fisher's exact test when appropriate. Spearman correlation coefficient was calculated to assess relationship between various study variables, (+) sign indicate direct correlation & (-) sign indicate inverse correlation, also values near to 1 indicate strong correlation & values near 0 indicate weak correlation. All tests were two sided. P-value < 0.05 was considered statistically significant (S), p-value < 0.001 was considered highly statistically significant (HS), and p-value ≥ 0.05 was considered statistically insignificant (NS). Logistic regression analysis was performed to identify the independent predictors for satisfactory drug adherence to cardiovascular medications.

Results:

Table (1); Demographic characteristics of studied patients, the

study found that more than two third of patients in the study sample (65%) were males with the mean age of all patients was 58.75±10.4 ranged from 25 to 84 years old. Regarding, marital state the majority (80%) were married. Concerning the educational level, nearly three quarters (70%) were educated. About two third (60%) of studied patients were Not work. Also, the majority (87%) had scarce income. And half (52%) of studied were smokers.

Table (2); reveals that the duration of the disease, the mean of disease duration per years was 4.2±3.5. Regarding past medical history, (65%) of studied patients were diabetic, (48%) of studied patients had hypertension. All most of studied patients (95%) were hospitalized to manage cardiac disease, frequency of hospitalizations was 2.2±1.4 with range (0–8) where the major cause of hospitalization was chest pain (95%). Concerning cardiac operative history; (90%) of studied patients underwent cardiac surgery, where percutaneous coronary intervention represented the highest percentage (77%). The half of studied patients (50%) organized follow up visit to outpatient's clinic each three months or earlier.

Table (3); the study found that the most (82%) of the studied patients were adhere to cardiovascular medications with mean± SD (21.66±5.4) and range from 12 to 34. More than two third (67%) of the studied patients never forgot to get the prescribed medications and never decide not to take medications and most (79%) of studied patients never miss taking medications when they are careless

Table (4); Illustrates that there was a statistically significant relation between patient's adherence level to treatment of myocardial infraction, sex and education (p=0.043 and p=0.0001 consecutively).

Table (5); Reveals that there was statistical significance relation between

patient's adherence to refill and medications scale and duration of disease with p=0.007. The satisfactory level of patients' adherence to refill and medications was significantly higher with the duration of disease < 3 years compared to those who had the duration of disease ≥ 3 years.

Table (6); logistic regression of predictors variable revealed that There was significant positive predictors for satisfactory drug adherence to cardiac medications throughout the study phase was the education p-value (p=.009) neither sex nor disease duration.

Discussion:

Regarding demographic characteristics, the present study revealed that more than half of studied patients were more than 60 years, three quarters of studied patients educated of all levels of education, the income was scarce for the majority of studied patients, more than half of studied patients was smokers.

Regarding medical history of studied patients, all most of studied patients' chief complaint is chest pain. This is in agreement with Lindahl et al. [17] who reported that chest pain represented the majority of studied patients either Non-STEMI or STEMI. Also, about two third of patients had diabetes mellitus and about half of patient had hypertension. This is in the agreement with Tscherny et al. [18] reported that half of studied patient had hypertension.

Regarding adherence to refill and medication, the present study found that three quarters of patients adhere to medications. This is consistent with Lai et al. [19] found that about three quarters of the patients adherent to their prescribed medication regardless difference of ethnic group.

The most frequently reported reasons for adherence to refill and medication scale were unintentionally forgetfulness to take and refill

medications and the forgetfulness to take medications when prescribed more than once a day represent the almost of causes. However, almost of them had never decided to take their medication, didn't miss taking medication when feeling careless and didn't change the dose of the prescribed medication.

These results consistent with Kurdi et al. [20] who observed that the most frequently reported problem was forgetfulness to take the medication, whereas more than two third of patients reported forgetting their medication when it was more than once daily. Other problems were missing medication when getting better and running out of medications was represented the half of reported patient's problem.

Also, the current study found that majority of studied patients didn't miss taking medication when they fell sick and careless. While Mahrous [21] reported that more than half of studied patients didn't intentionally forget taking medications, didn't stop medications when feeling well and frequently stop medications because of expenses.

The current study found that there was a statistically significant difference of patient's adherence level to treatment of MI, sex and education. Where male and educated patients had better level of adherence than female and uneducated patients. This result is constant with Hussein et al. [22] found that there was statistical significant difference of education, gender in relation to medication adherence. Another study of Granger et al. [23] where found that adherence was significantly worse in women when compared with men .

Regarding the relation between duration of the disease and medication adherence, the present study found that there was statistically significant relation between duration of the disease and medication adherence, where adherence level was higher among patients with MI less than 3 years and decreased among patients with MI more than 3 years. This is in the agreement with Shang et al. **[13]** who revealed that the rate of good adherence for all prescribed medications was decreased over time. Furthermore, Bakry et al. [24] found that there was statistical significant relation between the duration of the disease and adherence to medications.

The current study reported that the education was positive predictors of satisfactory drug adherence to cardiac medications throughout the study phase. Al-Haj Mohd et al. [25] found that the strongest predictor for adherence as predicted by the multi-logistic regression model was the patient's level of education.

Conclusion:

On the light of the current study results, it can be concluded that, studied patients with MI had adherence to cardiovascular medications. And adherence to refill and medication related to gender, education and duration of the disease. The present study findings answered the research questions.

Recommendation:

Based on the results of the study the following recommendations were suggested:

- Further studies to assess adherence of patients with myocardial infarction to therapeutic regimen.

Table (1): Frequency and percentage distribution of demographic characteristics of studied cardiac patients. (n=100)

Demographic data	No.	%
Age per years know		
<60	54	54.0
≥60	46	46.0
Mean	58.75±10.4	
Median (Range)	58 (25-84)	
Sex	.	.
Males	65	65.0
Females	35	35.0
Social Status	.	.
Married	80	80.0
Widow	20	20.0
Education	.	.
Educated	70	70.0
Illiterate	30	30.0
Occupation	.	.
Worked	40	40.0
Not Work	60	60.0
Residence	.	.
Urban	50	50.0
Rural	50	50.0
Income	.	.
Cont. Table (1): Frequency and percentage distribution of demographic characteristics of studied cardiac patients. (n=100)		
Enough	13	13.0
Scarce	87	87.0
Living	.	.
With Family	83	83.0
Alone	17	17.0
Smoking	.	.
Smokers	52	52.0
Non-Smokers	48	48.0

Table (2): Frequency and percentage distribution of medical history of cardiac patients under study (n.100)

Medical history	No.	%
Disease duration per years		
< 3years	39	39.0%
≥ 3 years	61	61.0%
Mean ±SD	4.2±3.5	
Range	15 days -18 years	
Frequency of follow up visit		
≤ three months	50	50.0
> three months	50	50.0
Diagnosis		
IHD	93	93.0
Heart failure	7	7.0
History of hospital admission		
Yes	95	95.0
No	5	5.0
Causes of hospital admission		
Chest pain	95	95.0
Dyspnea	49	49.0
Number of hospital admission		
≤1	36	36.0%
≥2	64	64%
Mean ±SD	2.2±1.4	
Range	2(0-8)	
Cardiac operative history		
Yes	90	90.0
No	10	10.0
Type of operation		
Coronary angiography	12	12.0
Percutaneous coronary intervention	77	77.0
Coronary artery bypass grafting	1	1.0
Comorbidity		
Hypertension	48	48.0
Diabetes	65	65.0
Osteoarthritis	2	2.0
Cont. Table (2): Frequency and percentage distribution of medical history of cardiac patients under study (n.100)		
Brain Stroke	1	1.0
Bronchial asthma	7	7.0
Others	48	48.0

Table (3): Frequency and percentage distribution of studied patients' Adherence to refill and medications scale (n=100)

Items	Never %	Sometimes %	Most of time %	Always %
Unintentionally forget to take medications.	6	47	47	0
Decide not to take medicine.	67	27	5	1
Forgetting to refill the prescribed medications.	17	67	16	0
Running out of medications before refilling it.	37	47	16	0
Skipping a dose of medications before going to the doctor.	65	18	14	3
Missing to take the medications when feeling better.	38	32	21	9
Missing to take the medications when feeling sick.	81	16	2	1
Missing to take the medications when feeling careless.	79	19	2	0
Adjusting the dose of the medications to suit patient's needs	53	35	9	3
Forgetting to take medications when supposed to take it more than once a day.	13	48	33	6
Put off refilling medications because the cost is too much money.	14	38	35	13
Planning ahead and refill the medications before running out.	49	36	14	1
Patients' Adherence to treatment (48) *				
adherent		82(82.0%)		
not-adherent		18(180%)		
Mean ±SD		21.66±5.4		
Range		20.5(12-34)		

Maximum score (*)

Table (4): Relation between the studied patients' adherence level to refill and medication of myocardial infraction and their demographics . (n=100)

Demographic data	Patients drug adherence level		n.	χ2	p-value
	adherent (n.82) %	Not-adherent (n.18) %			
Age per years					
<60	87.0	13.0	54	2.2	0.16
≥60	76.1	23.9	46		
Gender					
Males	87.7	12.3	65	4.08	0.043*
Females	71.4	28.6	35		
Marital state					
Married	81.3	18.8	96	F	0.99
Widow	100.0	.0	4		
Education					
Educated	91.4	8.6	70	14.1	0.0001**
Illiterate	60.0	40.0	30		
Occupation					
Worked	90.0	10.0	40	2.9	0.089
Not work	76.7	23.3	60		
Residence					
Urban	88.0	12.0	50	2.4	0.12
Rural	76.0	24.0	50		
Income					
Enough	100.0	.0	13	3.3	0.07
Scarce	79.3	20.7	87		
Living					
With family	80.7	19.3	83	F	0.73
Alone	88.2	11.8	17		
Smoking					
Smokers	84.6	15.4	52	0.5	0.48
Non smokers	79.2	20.8	48		

χ 2 Chi square test   f=Fisher exact test   *=significant p<0.05   **=significant p<0.001
p>0.05 non-significant

Table 5: Relation between patients' adherence to refill and medications scale and medical history. (n=100)

Medical history	patient's adherence to refill and medications scale		n.	χ2	p-value
	Adherent (n.82)	Not-adherent (n.18)			
	%	%			
Duration of disease					
<3years	94.9	5.1	39	7.2	0.007*
≥ 3years	73.8	26.2	61		
diagnosis					
IHD	82.8	17.2	93		
Heart failure	71.4	28.6	7	f	0.61
Frequency of follow up					
<3 months	78.0	22.0	50	1.08	0.3
≥3 months	86.0	14.0	50		
Hospital admission					
yes	81.1	18.9	95	f	0.58
No	100.0	.0	5		
History of operation					
yes	83.3	16.7	90	f	0.38
No	70.0	30.0	10		

χ 2 Chi square test   f=Fisher exact test   *=significant p<0.05   p>0.05 non-significant

Table (6): Logistic regression for predictors variables for satisfactory drug adherence to cardiovascular medications

Variables	p	odds ratio	95%CI	
			Lower limit	upper limit
Education	.009	4.831	1.478	15.790

Variables entered and excluded sex and disease duration,

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