# Effect of Health Literacy Intervention on Medication Adherence among Older Adults with Cardiac Disease

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## Abstract

**Background:** Cardiac diseases are leading causes of morbidity and mortality worldwide. Medication adherence is a critical component of disease management for older adults with cardiac diseases. **Aim:** The study aimed to evaluate the effect of health literacy intervention on medication adherence among older adults with cardiac disease. **Design:** A quasi-experimental research design was utilized to conduct this study. **Setting:** This study was conducted at Cardiac Outpatient Clinic, Benha University Hospital, in Benha City. **Sample:** A convenience sample included 150 older adults with cardiac diseases. **Tools:** Three tools were used **(I):** An interviewing questionnaire to assess socio demographic characteristics of older adults, their medical history and their knowledge about cardiac disease and medication adherence. **(II):** Morisky Medication Adherence Scale to assess medication adherence for older adults with cardiac disease. **(III):** (a): Reported practices of older adults toward cardiac disease. (b): Observational checklist to assess older adults' practices for measuring pulse and blood pressure. **Results:** Showed that; 40.7% of the studied patients aged from 60 to less than 65years with mean age was 64.52±6.44 and 24.7% of them were performed cardiac stent for only once. More over; only 10.7% of the studied patients had good total knowledge level regarding cardiac diseases and medication adherence pre implementation of health literacy intervention. Also, only 35.3% of the studied patients had satisfactory total practices level toward medication adherence and cardiac diseases pre implementation of health literacy intervention. **Conclusion:** Health literacy intervention program succeeded to improve knowledge, practices of the studied older adult toward cardiac disease and medication and their adherence to medication related to cardiac diseases. **Recommendations:** Continuous health literacy intervention is recommended to increase older adults' knowledge and practices about medication adherence related to cardiac disease.

**Keywords:** Cardiac Disease, Older adult, Medication adherence, Health literacy

## Introduction

Older adult are a natural, long and psycho-physiologically process that involves irreversible biological, psychological and social changes. The aging process is smooth for healthy individuals. During this process, the body and organ systems begin to slow and become unbalanced. In turn the body's composition and structural elements (tissues and organs) begin to noticeably change and deteriorate and these changes affect the functioning of all body systems**.** Older adult are identified as the major risk factor for cardiac disease. Accordingly, health status and weakening physiological functioning of vital organs, including the vascular system impairment. Globally, there are over 727 million people aged 65 years and over in many countries **(Norman et al., 2021).**

Cardiac Disease are leading cause of morbidity, mortality worldwide and result in significant and increasing economic and social burden It is a common disease in older adult and characterized by high symptoms and health care utilization. CD can result in narrowed or blocked blood vessels that restrict blood circulation to the heart, brain or other parts of the body. This can cause angina and heart attack, hypertension, stroke and Peripheral Vascular Disease. CD develops over many years, during this time the heart's blood supply is being reduced by a buildup of fatty substances known as atheroma in the coronary arteries and many other arteries in the body. This process is more commonly known as hardenings of the arteries **(Tejtel et al., 2022., Netala et al., 2024)**.

Medication adherence is a critical component of disease management for older adult with CD such as using of long-acting bronchodilators and inhaled corticosteroids prescribed for daily use. These medications are the cornerstones of CD treatment and reduce the risk of exacerbation. A clear understanding of how to use these medications and the importance of daily use is therefore essential for disease control and better quality of life **(Berkman, 2020).**

Health literacy (HL) is a degree to which older adult has the capacity to obtain, process, understand basic information and services needed to make appropriate decisions regarding their health. Health literacy is often divided into 3 levels: functional (basic skills needed to function in everyday life), interactive (more advanced literacy and cognitive skills to participate in everyday health activities), and critical (using most advanced cognitive skills to critically analyze health information and make decisions) **(Kassaw et al., 2024)**.

Low health literacy is a major barrier to medication adherence among Cardiac patients. Health literacy is a critical factor in designing interventions to support medication adherence and other self-management behaviors. Low HL has been widely documented to have a negative association with medication adherence, including limited understanding by patients of the written and verbal medication use instructions they receive from their healthcare providers and which accompany their inhalers. The problem of low HL is of particular concern for cardiac older adult because many experience cognitive impairment from their disease, conditions **(Pruette & Amaral, 2021).**

Community Health Nurse (CHN) plays an important role in improving of older adult's life and prevention of cardiac disease through prevent the occurrence of the disease and promote health through health education to raise older adult's knowledge about the disease, also motivates older adult to improve and maintain the health, make screening tests and early treatment for older adult with cardiac disease. CHN help to mitigate self-management challenges among low HL cardiac patients, and provide tangible help, such as assistance with health care related tasks, as well as emotional and informational support and companionship, which could indirectly impact health outcomes. CHN support can mitigate older adults' health related stress, improve self-management of chronic illness and positively affect long term outcomes in conditions such as CD. Thus, CHN may be able to help older adults' with low HL overcome the challenges they face adhering to CD medications **(Huisman al., 2020)**.

Community health nurses should provide information or guide the patient by

using motivational interviewing techniques and engage in the teach-back method that helps patients understand and recall their instructions. The nurse can help the patient in medication adherence by using a variety of ways: Connect taking the medication with normal daily activities, keep a written schedule for prescribed medications and use a device such as medication reminder pagers, wristwatches and automatic pill dispensers (**Winnige et al., 2021**).

**Significance of the study:**

Cardiac disease is considered a major public health problem and an important cause of morbidity and mortality worldwide. In Egypt there are 3 million from the Egyptian population have cardiac disease. In different studies the prevalence was from 3.3% up to 10%, prevalence rate in men 6.7% while it was1.5% in women. Prevalence of cardiac disease among the older adult is estimated at 14.2% in contrast with 9.9% in those aged 60 years. In 2020 approximately 19.1 million death were attributed to cardiac disease globally the aged adjusted death rate per 100,000 population was 239.8 person. The aged adjusted prevalence rate was 7354.1person per 100.000 (**Ramadan et al., 2024**).

**Aim of the study:**

The aim of this study was to evaluate the effect of health literacy intervention on medication adherence among older adults with cardiac disease.

**Research hypothesis:**

Health literacy intervention program was improved the knowledge and practices of older adults regarding medication adherence related to cardiac disease.

**Subjects and Method**

**Research design:**

A quasi experimental research design was used in this study.

**Setting:**

The current study was conducted at Cardiac Outpatient Clinic, at Benha University Hospital in Benha City.

**Sampling:**

Convenience sample included 150 older adults with cardiac disease from the previously mentioned setting through six months.

**Tools of data collection:**

**Three tools were used in this study:**

**Tool I:** A structured interviewing questionnaire was developed by the researchers, which cover the following three parts:-

**The first part:** It was concerned with socio-demographic characteristics of older adults which included 10 items such as (age, marital status, occupation, residence, family type, number of family members, monthly income, smoking habits sex, educational level).

**The second part:** It was concerned with medical history of older adult with cardiac disease and included 8 closed ended questions such as (type of cardiac diseases you suffer, comorbidity disease, onset of the disease, the reason for presence in the clinic, follow-up frequency, surgical history for cardiac operation, the number of times a cardiac stent was performed, current medications can take to treat heart disease).

**Third part: a-** It was concerned with knowledge of studied older adults regarding cardiac diseases. It included of 7 closed ended questions (multiple choice type) about (meaning of cardiac disease, causes, common signs & symptoms, methods of diagnoses, complications, prevention and treatment).

**b-** It was concerned with knowledge of studied older adults regarding medication adherence. It included of 5 closed ended questions (multiple choice type) about

(meaning of medication adherence, the importance, methods of medication adherence, complications from non-adherence to medications, the necessary precautions when starting to take the medications).

**Knowledge scoring system:** It was calculated as follows (2) score for correct and complete answer, and (1) score for correct and incomplete answer, while (0) score for don't know. These scores of the items were summed-up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into a present score. Older's adult total knowledge score was classified as the following:

**Total knowledge score = 24 points**

- **Good knowledge:** when the total score was ≥75% (≥18 points).
- **Average knowledge:** when the total score was 50 to <75% (12<18 points).
- **Poor knowledge:** when the total score was less than 50 % (<12points).

**Tool II:** Morisky Medication Adherence Scale (MMAS) adopted from **(Morisky et al., 2016)** to asses medication adherence for older adults with cardiac disease. It was translated into Arabic by the researchers which included 8 closed ended questions as (did you sometimes forget taking medications, did you forget taking medications through the previous days, have you ever stopped taking medication without telling doctor because felt worse when took it, do you sometimes forget to bring medication when travel or leave the house, do you sometimes stop taking medication when feel condition is stable, are taking the drug every day a real inconvenience for some people, do you felt one day with exhaustion about commitment with plan of treatment, find any difficulty to remember taking all medications).

- **Scoring system:** Adherence scale score designed for the assessment of medication adherence was calculated as 2 score for high adherence, 1 score for moderate adherence, while 0 score for low adherence. The score of each item summed-up and then converted into a percent score. The total scoring system in medication adherence part was classified as the following:

**The total medication adherence score = 8**

- High adherence = 8
- Moderate adherence = 7or 6
- Low adherence = ≤ 5

**Tool III: Practices of older adults regarding cardiac diseases and medication. Will be divided in to two parts:-**

**The first part:** The first part: It was concerned with older adult's reported practices regarding cardiac disease. It included 4 items divided as following (24 closed ended questions, medication), (4 closed ended questions in case of forgetting taking dose of medication, (9 closed ended questions, nutrition) and (physical exercise it included 6 questions).

**The second part:** It was concerned with older adult's observational practices regarding medication adherence. It was adopted from **(WHO., 2023).** It included 2 main items, (measuring blood pressure it included 7 closed ended questions and (measuring pulse it included 6 closed ended questions).

**Scoring system of total practices:** Designed for the assessment of reported practices, 2 score was given for always practice, 1 score was given for sometimes practice and score 0 was given for never practice. While designed for the assessment of observational practices, 1 score was given for done, 0 score was given for not done. The score of each item summed-up and then converted into a percent score.

The total scoring system in reported practices part was classified as the following:

•**The total practices score = 99**

•Satisfactory practices when the total score was ≥ 60% (≥ 59 points).

•Unsatisfactory practices when the total the score was < 60% (< 59 points).

**Content validity of the tools:**

The tools were reviewed by five experts from the Community Health Nursing Specialties Department, Benha University and gave their opinion for clarity, relevance, comprehensiveness, appropriateness, legibility and applicability.

**Reliability of tools:**

The reliability of the tools was done by Cronbach's Alpha coefficient test which revealed that each of the three tools consisted of relatively homogeneous items as indicated by the moderate to high reliability of each tool. The internal consistency of knowledge was 0.67. The internal consistency of practice was 0.85.

**Pilot study:**

A pilot study was carried out on 10% (15 patients) of the total sample (150 patients) to ensure clarity, practicability and applicability of the tools and estimate the time for tool data collection. Time needed to fill each questionnaire consumed about 30-45 minutes. According to the results obtained from data analysis, items didn't need for correction or modification, so the pilot study included in the total sample.

**Ethical considerations:**

The research approval to carry out this study was obtained from the scientific Research Ethics Committee, Faculty of Nursing, Benha University All ethical issues were assured; approval and an informed oral consent from all study participants were obtained for the fulfillment of the study. The aim of the study was explained to all older adults before applying the tools to gain their confidence, cooperation and trust. All older adults have the freedom to withdraw from participation in the study at any time. Privacy and confidentiality were assured. Ethics, values, cultural and beliefs was respected.

**Educational program implementation:**

Based on the results obtained from interviewing questionnaire and observed check lists, as well as literature review, the health literacy intervention developed by researchers. The researchers implemented the health literacy intervention program for older adults in cardiac outpatient clinic. It was implemented immediately after pretest. The researchers implemented the educational program through four phases as the following:

**1. Preparatory and assessment phase:**

Data collection tools were developed based on reviewing the past and current available national and international references about cardiac diseases and medication adherence, using journals, magazines, books, and internet search were done. During this phase, researchers assessed knowledge, adherence to medication and practices of the studied older adults through collection and analysis of baseline data from the filled tools. It was developed by researchers based on reviewing related literatures and it was written in simple clear Arabic language. The researchers carried out the pre-test during this phase. This phase also includes development of health literacy intervention program based on the results obtained from the interviewing questionnaire and literature review which developed by researchers.

During this phase the researchers prepared handouts for participants. This handout covered the meaning of cardiac disease, causes, sing and symptoms, risk factors, methods of diagnosis, complications, the prevention and treatment. The handout

also covered meaning of medication adherence, the importance, medication adherence methods, complication from non-adherence to medications and the necessary precautions when starting to take the medication.

**2– Planning phase:**

The researchers will identify the important needs for target group, set priorities of needs, goals and objectives were developed.

❖ **General objective:**

By the end of the health literacy intervention, the older adults will acquire knowledge and practices regarding cardiac diseases and will adhere to medication related to cardiac diseases.

❖ **Specific objectives:**

By the end of the nursing intervention program, the older adults would be able: Recognize all objectives of health literacy intervention and outcome.

- Explain functions and structure of the heart.
- Define cardiac diseases.
- Mention types of cardiac diseases.
- Mention causes of cardiac diseases.
- Enumerate signs and symptoms of cardiac diseases.
- List complications of cardiac diseases.
- Explain methods of management of cardiac diseases.
- Define of medication adherence.
- Apply health practices regarding nutrition and exercise.
- Apply health practices regarding medication adherence.
- Demonstrate steps of medication adherence for older adults with cardiac diseases.
- Demonstrate steps follow when start to take the medication.
- Apply health practices in case of forgetting taking dose of medication.
- Apply steps of measuring blood pressure and pulse for cardiac disease.

**3 – Implementation phase:**

Data were collected over a period of 6 months from the beginning of January 2024 to end of June 2024. Approval was obtained orally after the researchers introduces herself to the older adult after explaining the purpose of the study. The study was conducted by the researchers for the studied sample in the selected setting of Cardiac out patient Clinic in Benha City. The researchers visited the Cardiac outpatient Clinic two days per week (Saturday and Monday) from 9:00 am to 1:00 am. The average numbers interviewed at the Outpatient Clinics were 3-4 older adult/day depending on responses of older adults.

In this phase the researchers implemented the health literacy intervention program for the older adults at the suitable time through 7 sessions; 4 theoretical and 3 practical. The researchers provided the theoretical sessions through lectures, followed by discussion. Handouts, pictures, and real objects were used during the lecture to enhance acquisition of knowledge and to attract older adults' attention. The average time needed for each session was around 30– 40 minutes. Each session starts by a summary about what was given during the previous session and the objectives of the new topics and ended by a summary of essential items discussed and performed.

Discussion, motivation and reinforcement during session were used to enhance learning. Direct reinforcement in the form of a copy of the illustrated handout with picture about cardiac diseases was given as a gift for each older adults to use it as a future reference. At the end of each session, older adults participated in a discussion to correct any misunderstanding. Also, they were informed about the time of next session. Finally, the

post test was done to evaluate the gained knowledge and practices immediately after the health literacy intervention program.

The researchers discussed theoretical and practical sessions as following

**Theoretical part: It include four sessions as follows:**

**Session I:** At the beginning of the first session, the researchers welcomes and introduces herself to the older adults, an orientation to the program and its process were presented with clearance general and specific objectives of the program explain function, structure of heart and define cardiac disease.

**Session II:** Covered the types of cardiac diseases, risk factors for cardiac diseases and causes of cardiac diseases.

**Session III:** Covered the Signs and symptoms of cardiac diseases, complications of cardiac diseases, methods of management of cardiac diseases.

**Session IV:** Covered the definition of medication adherence, methods of medication adherence, importance of medication adherence, steps follow when start to take the medication.

**Practical part: It include three sessions as follows: -**

**Session V:** Covered health practices regarding nutrition ,exercise and importance of follow up for older adults with cardiac disease.

**Sessions VI:** Covered health practices regarding medication adherence, right dose, time and rout of the prescribed medication and health practices in case of forgetting taking dose of medication.

**Session VII:** Covered steps of measuring blood pressure and steps of measuring pulse.

**Teaching methods:** All older adults received the same program content using the same teaching methods, there were:

- ✓ Lectures.
- ✓ Discussion.
- ✓ Demonstration and re-demonstration.

**Teaching aids:** Suitable teaching aids were specially prepared for intervention, as: Hand out, pictures, real objects (equipment) and videos.

**4– Evaluation phase:**

After implementation the health literacy intervention, the researchers applied the post-test immediately after the end of the program by using the post-test that was the same format of the pre-test questions.

**Statistical analysis:**

All data were organized, tabulated and analyzed by using the Statistical Package for Social Science (SPSS version 20), which was used frequencies and percentage for qualitative descriptive data and chi square was used for quantitative data, spearmean correlation test (r) was used for correlation analysis and degree of significant was identified.

**Significance levels were considered as the following:**

| | |
|---|---|
| High statistically significant | $P \leq 0.001$ |
| Statistically significant | $P < 0.05$ |
| Not significant | $P > 0.05$ |

**Results**

**Table (1):** Shows that; 40.7% of the studied patients aged from 60 to less than 65years with mean age was 64.52±6.44 and were married. Concerning residence; 86.7% of them were living in rural areas, 68% of them were living in extended family and had 3to5 family members or more. Regarding occupation; 73.3% of the studied patients were retired and 48.7% of them didn't have enough monthly income. Regarding smoking;

only 10.7% of them were smoking for more than 10 years.

**Figure (1):** Illustrates that; 46% of the studied patients couldn't read and write and 27.4% had primary education. While 13.3% of the studied patients had secondary, university education and more respectively.

**Table (2):** Demonstrates that; 62% of the studied patients suffered from hypertension. In addition; 40.7% of them diagnosed with cardiac diseases since ≥ 10 years, 62% of them felt pain which was the reason for the patients' presence in the clinic, and 40.7% of them visited cardiac outpatient clinics according to the situation. Regarding surgical history for cardiac operations; 33.3% of them were performed aortic valve replacement .While; 24.7%of them were performed cardiac stent for only once. Concerning current medications; 78.7% of studied patients were taking Ator (atorvastatin) to treat high cholesterol and triglycerides.

**Figure (2):** Illustrates that; only 10.7% of the studied patients had good total knowledge level regarding cardiac diseases and medication adherence pre implementation of health literacy intervention while this percentage increased to 80.7% post implementation of health literacy intervention. While; 46% of them had poor total knowledge level pre implementation of health literacy intervention while this percentage decreased to 7.3% post implementation of health literacy intervention.

**Figure (3):** This figure illustrates that Pre implementation of health literacy intervention; only 13.4% of the studied patients had high total medication adherence regarding cardiac diseases, while this percentage increased to 87.3% post implementation of health literacy intervention.

**Figure (4):** Illustrates that; only 26.7% of the studied patients had satisfactory total practices level pre implementation of health literacy intervention while this percentage increased to 90% in post implementation of health literacy intervention. Also, 37.3% of the studied patients had unsatisfactory total practices level toward medication adherence and cardiac diseases pre implementation of health literacy intervention while this percentage decreased to 10% in post implementation of health literacy intervention.

**Table (3):** Clarifies that; there were highly statistically significant positive correlation between the studied patients' total knowledge score, total practices score and total medication adherence scores.

**Table (1): Distribution of studied patients regarding their socio-demographic characteristics, (n=150).**

| Socio-demographic characteristics | No. | % |
|---|---|---|
| **Age/ years** | | |
| 60 < 65 | 61 | **40.7** |
| 65 < 70 | 48 | 32.0 |
| 70 < 75 | 37 | 24.7 |
| ≥ 75 | 4 | 2.7 |
| **Mean ±SD** | **64.52±6.44** | |
| **Marital status** | | |
| Single | 16 | **10.7** |
| Married | 61 | 40.7 |
| Divorced | 49 | 32.6 |
| Widow | 24 | 16.0 |
| **Occupation** | | |
| Work | 16 | 10.7 |
| Don't work (housewives) | 24 | 16.0 |
| Retirement | 110 | **73.3** |
| **Residence** | | |
| Rural | 130 | **86.7** |
| Urban | 20 | 13.3 |
| **Family type** | | |
| Nuclear | 48 | 32.0 |
| Extended | 102 | **68.0** |
| **Number of family members:** | | |
| < 3 members | 28 | 18.7 |
| From 3 < 5 members | 20 | 13.3 |
| ≥5 members or more | 102 | **68.0** |
| **Monthly income** | | |
| Enough and save | 16 | 10.7 |
| Enough | 61 | 40.7 |
| Not enough | 73 | **48.7** |
| **Smoking habits** | | |
| Yes | 16 | 10.7 |
| No | 134 | **89.3** |
| **If yes (n=16)** | | |
| ≥ 10Years | 16 | **100.0** |

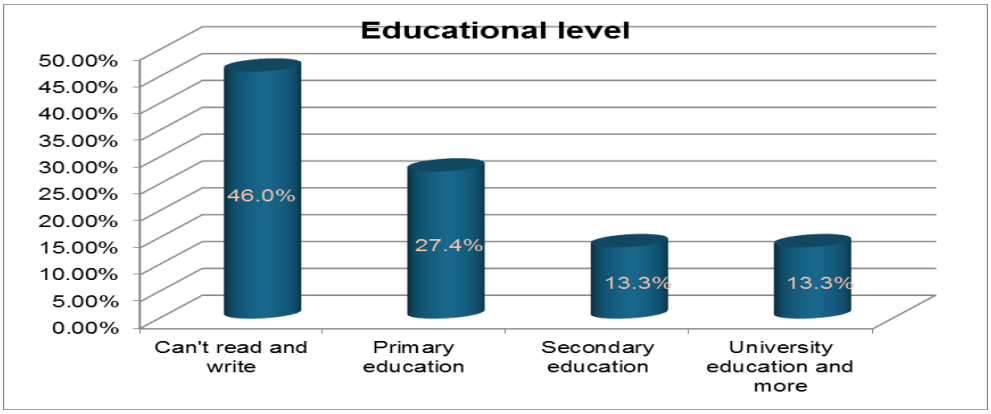


**Figure (1): Percentage distribution of studied patients regarding their educational level, (n=150)**

**Table (2): Distribution of studied patients regarding their medical history, (n=150).**

| Medical history | No. | % |
|---|---|---|
| ***Comorbidity diseases:** | | |
| Diabetes mellitus | 76 | 50.7 |
| Hypertension | 93 | **62.0** |
| Kidney diseases | 1 | 0.7 |
| Liver diseases | 13 | 8.7 |
| **Onset of the disease:** | | |
| <5 years | 48 | 32.0 |
| 5<10 | 41 | 27.3 |
| ≥ 10 years | 61 | **40.7** |
| **The reason for your presence in the clinic:** | | |
| Feeling pain | 82 | **62.0** |
| Doing an X-ray | 68 | 38.0 |
| **Follow-up frequency:** | | |
| Once a month | 8 | 5.3 |
| Twice a month | 28 | 18.7 |
| Three times a month | 53 | 35.3 |
| According to the situation | 61 | **40.7** |
| **Surgical history for cardiac operation:** | | |
| Open heart | 37 | 24.7 |
| Heart stent | 24 | 16.0 |
| Aortic valve replacement | 50 | **33.3** |
| Mitral valve repair or replacement | 18 | 12.0 |
| Atrioventricular septal defect repair surgery | 16 | 10.7 |
| No surgery was performed | 5 | 3.3 |
| **The number of times a cardiac stent was performed (n=24).** | | |
| Once | 24 | 16.0 |
| ***Current medications you take to treat heart disease** | | |
| Aspirin (acetylsalicylic acid) Anticoagulant | 81 | 54.0 |
| Plavix (clopidogrel) Anticoagulant | 49 | 32.7 |
| Brilinta (ticagrelor) Anticoagulant | 12 | 8.0 |
| Ator (atorvastatin) to treat high cholesterol and triglycerides. | 118 | **78.7** |
| Water tablets (diuretics) | 28 | 18.7 |
| Digoxin | 8 | 5.3 |

****Answers are not mutually exclusive**

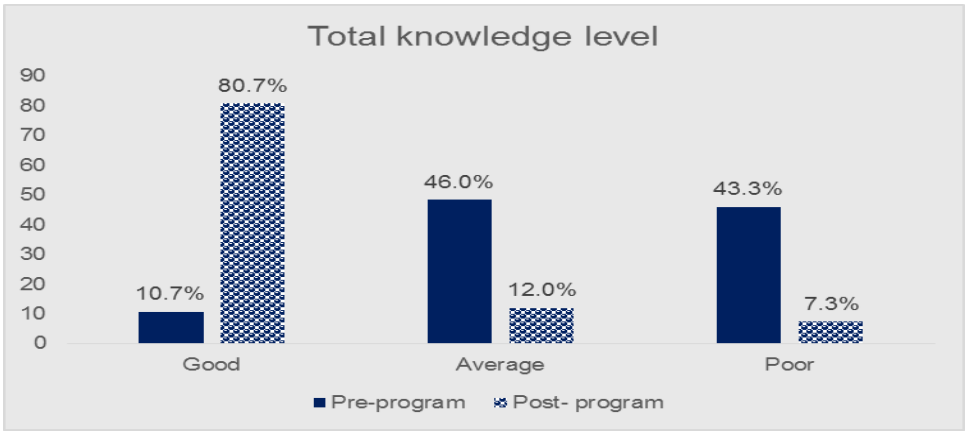


**Figure (2): Percentage distribution of studied patient regarding their total knowledge level regarding cardiac diseases and medication adherence pre and post health literacy intervention, (n=150).**

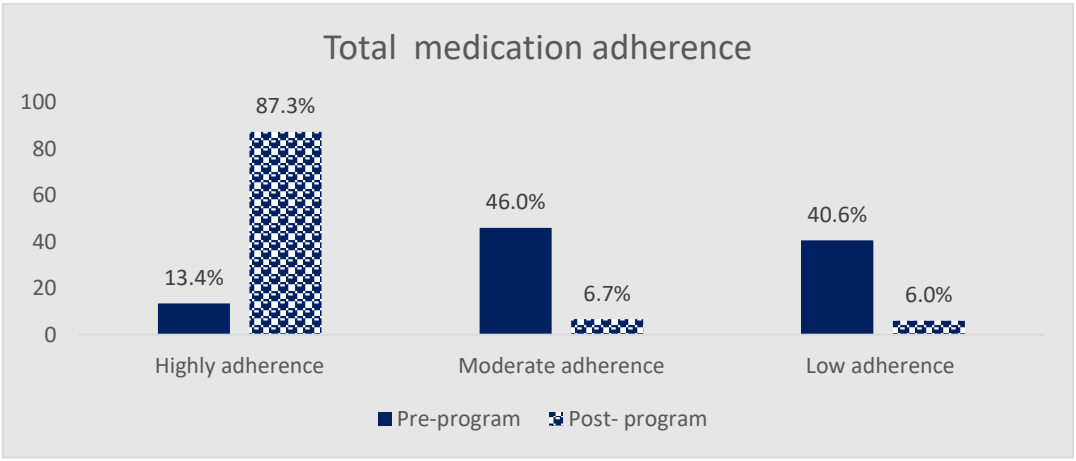


**Figure (3): Percentage distribution of studied patients regarding their total medication adherence level Pre and post implementation of health literacy intervention, (n=150).**

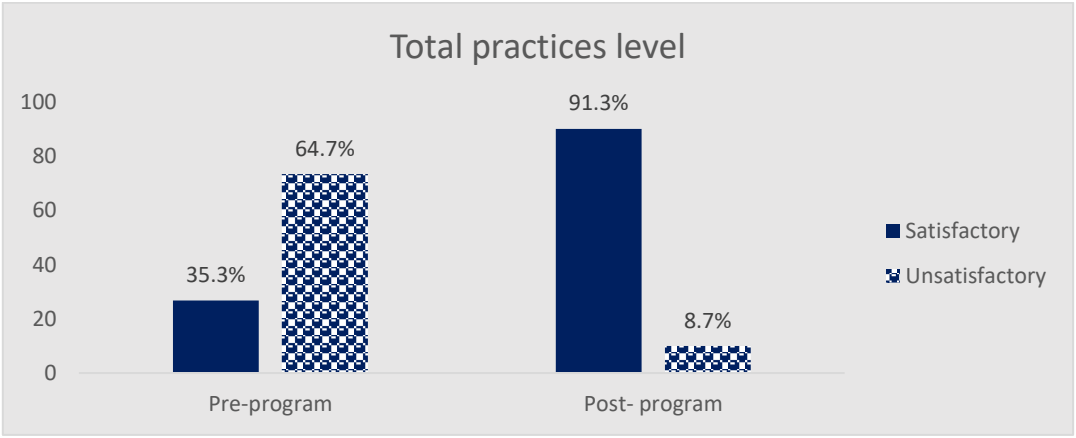


**Figure (4): Percentage distribution of studied patients regarding their total practices level regarding medication adherence pre and post implementation of health literacy intervention, (n=150).**

**Table (3): Correlation matrix between total knowledge score, total practices score and medication adherence score among studied patient Pre & post implementation of health literacy intervention.**

| Items | | | Total knowledge | Total practices | Total Morisky medication adherence scale |
|---|---|---|---|---|---|
| Pre | Total knowledge | r | 1 | .028 | .037 |
| | | p-value | | .731 | .657 |
| | Total practices | r | .028 | 1 | .149 |
| | | p-value | .731 | | .068 |
| | Total Morisky medication adherence scale | r | .037 | .149 | 1 |
| | | p-value | .657 | .068 | |
| Post | Total knowledge | r | 1 | .788 | .851 |
| | | p-value | | .000** | .000** |
| | Total practices | r | .788 | 1 | .791 |
| | | p-value | .000** | | .000** |
| | Total Morisky medication adherence scale | r | .851 | .791 | 1 |
| | | p-value | .000** | .000** | |

**Discussion**

Medication adherence is a key factor of the treatment of cardiac diseases in older adults. Treatment can involve lifestyle changes, such as diet and exercise, as well as medication. The management of cardiac diseases should include healthy behaviors related to medication adherence, physical activity, nutritional status, developing and communicating treatment plans with the patient and caregivers, tell the patient what to expect from the treatment, including recommended lifestyle changes, what degree of improvement is realistic, and when the older adults may start to feel better **(Pruette & Amaral, 2021) .**

Regarding the studied patients' socio-demographic characteristics the current study showed that; slightly more than two fifth of the studied patients' aged from 60 to less than 65years with mean age was 64.52±6.44, nearly three quarters of them were retired and nearly half of them didn't have enough monthly income.

These results were consistent with the study performed by **Oscalices et al. (2019),** which titled "Health literacy and adherence to treatment of patients with heart failure in Bangladesh" (n=100), and revealed that the mean age of patients was 63.3± 15.2 years. Also, these results agreed with the study conducted by **Selvakumar et al., (2023),** who studied "Relationship between treatment burden, health literacy, and medication adherence in older adults coping with multiple chronic conditions in Saudi Arabia"(n=520), and revealed that patients aged was from 60 to 69 years and more than

half of them were retired. This might be due to cardiac diseases are generally more common in elderly due to a combination of biological, age related changes, hormonal, and lifestyle factors.

Concerning the studied patients' educational level, the current study illustrated that less than half of the studied patients' couldn't read and write and more than one quarter had primary education. While less than one fifth of the studied patients had secondary, university education and more. This finding was incompatible with **Li et al. (2024),** which titled "The effectiveness of a web based information knowledge attitude practice continuous intervention on the psychological status, medical compliance, and quality of life of patients after coronary artery bypass grafting surgery in Lebanon" (n=220), who revealed that more than half of patients hold middle school or less. Also, this result was different with **Selvakumar et al., (2023),** and revealed that less than half of patients had secondary education. This might be due to several socio-economic, cultural, geographical and infrastructural challenges.

As regard to the studied patient's medical history, the current study showed that less than two thirds of the studied patients suffered from hypertension. This result was congruent with **Oscalices et al., (2019),** who found that almost of the patients had hypertension.

Concerning current medications; more than three quarters of studied patients were taking Ator (atorvastatin) to treat high cholesterol and triglycerides.

This result was supported by **Awad et al., (2017),** who studied "Medication adherence among cardiac patients in Khartoum State, Sudan: a cross-sectional study"(n=304), and revealed that nearly half of patients were taking ator medication. This might be due to hypertension forces the heart to work harder to pump blood against the higher pressure in the arteries.

According to studied patients' total knowledge level regarding cardiac diseases and medication adherence pre and post health literacy intervention, the current study illustrated that slightly more than tenth of the studied patients had good total knowledge level regarding cardiac diseases and medication adherence pre implementation of health literacy intervention while this percentage increased to the majority post implementation of health literacy intervention. While less than half of them had poor total knowledge level pre implementation of health literacy intervention while this percentage decreased to minority post implementation of health literacy intervention.

This result was in the same line with the study conducted by **Hunt., 2023),** who studied "Utilizing interactive digital media to impact patient knowledge and medication adherence in cardiovascular disease Patients in United States of America" (n=130), and indicated an overall increase in cardiovascular disease knowledge and self-reported medication adherence. While this result was different with the study performed by **Yu et al. (2022),** who studied "Knowledge, attitudes, and barriers related to medication adherence of older patients with coronary heart disease in China" (n=120), and reported that participants' knowledge of medication adherence was high. This might be due to health literacy intervention focused on simplifying complex concepts and using plain language by presenting information in an accessible and patient-centered manner about heart disease and medication adherence.

As regard to the studied patients total medication adherence level pre and post

implementation of health literacy intervention ,the current study illustrated that pre implementation of health literacy intervention; less than one fifth of the studied patients had high total medication adherence regarding cardiac diseases, while this percentage increased to the majority post implementation of health literacy intervention.

This finding agreed with **Mohsen et al. (2021),** who studied "Effect of health literacy intervention on medication adherence among older adults with chronic diseases in Egypt" (n=140), who revealed that in post-intervention; nearly half of patients had high medication adherence degree among the study group. Additionally, these results were supported by **Wangungu, (2021)**, who studied "The effect of an educational intervention on medication adherence in persons with coronary artery disease in South Korea" (n=240) , and revealed that before the intervention, one quarter (25%) of the participants were identified as having high adherence, while three quarters of them (75%) were identified as having moderate adherence. While after the intervention, most of them (94.4%) scored high adherence, while minority of them (5.6 %) had moderate adherence.

Concerning the studied patients total practices level regarding medication adherence pre and post implementation of health literacy intervention, the current study illustrated that; more than one third of the studied patients had satisfactory total practices level pre implementation of health literacy intervention while this percentage increased to most in post implementation of health literacy intervention. Also, less than two thirds of the studied patients had unsatisfactory total practices level pre implementation of health literacy intervention while this percentage decreased to minority post implementation of health literacy intervention.

These results were compatible with **Sarhadi et al., (2023)**, who studied "Effect of self-efficacy-based training on treatment adherence of patients with heart failure in Iran" (n=70), who indicated that there were a significant increase in treatment adherence scores for patients in the intervention group post-intervention compared to pre-intervention (P = 0.001). These results were supported by **Subih et al., (2023)**, who studied "Medication adherence among patients with cardiovascular diseases: a cross-sectional study in Jordan (no=250)", who revealed that the majority of Jordanian patients with CVDs had low medication adherence.

These results disagreed with the study conducted by **Rezaei et al., (2022)**, who studied "Medication Adherence and Health Literacy in Patients with Heart Failure in Iran (no=250)", and revealed that nearly two fifth of patients showed moderate adherence scores and none of the patients had high medication adherence rates. This might be due to improved knowledge, practical skills, and motivating patients to take an active role in their self-care, the health literacy intervention resulted in more accurate and consistent self-monitoring of their cardiac health, leading to a dramatic improvement in their total practices.

Regarding correlation matrix between total knowledge, practices and medication adherence among studied patients' pre and post implementation of health literacy intervention, the current study cleared that pre implementation of health literacy intervention there were moderate positive correlation

between the studied patients' total knowledge score, total practices scores and medication adherence scores. Also, after implementation of health literacy intervention there were moderate positive correlation between the studied patients' total knowledge score and total practices score and between total practices score and total medication adherence scores, while there was strong positive correlation between total knowledge score and total medication adherence scores.

These results compatible with **Kilic et al. (2020)**, who revealed that there was a moderate positive relationship between the level of health literacy and medication adherence among hypertensive patients. Also, these results different with the study conducted by **Ocakoglu et al. (2020)**, who studied "Association between health literacy and medication adherence in the elderly population with chronic disease United Arab Emirates " (n=175), and revealed that medication adherence in elderly patients was not associated with total knowledge score about health literacy.

Additionally, these results different with **Tantoh. (2024)**, who studied "Knowledge, attitude and practices of the modifiable risk factors of cardiovascular diseases amongst the adult population of the Bokova community" (n=306) and concluded that respondents' practices do not reflect their knowledge levels. This might be due to knowledge is the prerequisite of practice and providing adequate knowledge empowers patients to understand the importance of their health behaviors and medication adherence, leading to better practices and more consistent adherence to treatment regimens.

## Conclusion

Health literacy intervention succeeded in improving knowledge and practices of older adults toward cardiac disease, medications and improved their adherence to medications. As evidence, more than tenth of the studied patients had good total knowledge level regarding cardiac diseases and medication adherence pre implementation of health literacy intervention while this percentage increased to more than majority post implementation of health literacy intervention. Also, more than tenth of them had high total medication adherence regarding cardiac diseases, while this percentage increased to majority post implementation of health literacy intervention. In addition more than one third of the studied patients had satisfactory total practices level toward cardiac disease pre implementation of health literacy intervention while this percentage increased to most of studied patients in post implementation of health literacy intervention.

There were weak positive correlations between the studied patients' total knowledge score and total practices score and between total practices score and total medication adherence scores, while there were strong positive correlations between total knowledge score, total practices score and total medication adherence scores after implementation of health literacy intervention.

## Recommendations

- Continuous health educational programs are recommended to increase older adults' knowledge and practices about medication adherence related to Cardiac disease.
- Enhance awareness of the community regarding medication adherence, healthy diet and exercise.
- Future studies are needed for developing educational program to enhance medication adherence and behavior modification about medication use, diet and exercise among older adults with cardiac diseases.

## References

**Awad, A., Osman, N., and Altayib, S. (2017).** Medication adherence among cardiac patients in Khartoum State, Sudan: a cross-sectional study. Cardiovascular journal of Africa, 28(6), 350-355.

**Berkman, (2020).** Health Literacy and Medication Adherence among Hypertensive Patients: A Cross-Sectional Study. Bahrain Medical Bulletin, 45(3). 115-142.

**Huisman, B., Geijteman, E., Dees, M., Schonewille, N., Wieles, M., van Zuylen, L., and van der Heide, A. (2020).** Role of nurses in medication management at the end of life: a qualitative interview study. BMC palliative care, 19, 1-11

**Hunt, K. (2023).** Utilizing Interactive Digital Media to Impact Patient Knowledge and Medication Adherence in Cardiovascular Disease Patients: A Quality Improvement Project. (Doctoral Project Georgetown University). pp. 1-60.

**Kassaw, A., Sendekie, A., Minyihun, A., and Gebresillassie, B. (2024).** Medication regimen complexity and its impact on medication adherence in patients with multimorbidity at a comprehensive specialized hospital in Ethiopia. Frontiers in Medicine, 11, 1369569

**Kilic, F., Dag, S., and MSc, S. (2020).** The relationship between health literacy and medication adherence in a hypertensive patient population. International Journal of Caring Sciences, 13(1), 101-7.

**Mohsen, M., Abd El-Aal, G., Hassan, S., and Amal, A. (2021).** Effect of health literacy intervention on dietary and exercise knowledge and practice among older adults with chronic diseases. International Journal of Novel Research in Healthcare and Nursing, 8(1), 688-696.

**Morisky, D., Tanaka, M., Kawakami, A., Maeda, S., and Kunisaki, R., (2016).** Validity and reliability of the Japanese version of the morisky medication adherence scale-8 in patients with ulcerative colitis. Gastroenterology Nursing, 44(1), 31-38

**Netala, V., Teertam, S., Li, H., and Zhang, Z. (2024).** A Comprehensive Review of Cardiovascular Disease Management: Cardiac Biomarkers, Imaging Modalities, Pharmacotherapy, Surgical Interventions, and Herbal Remedies. Cells, 13(17), 1471

**Norman, K., Haß, U., and Pirlich, M. (2021).** Malnutrition in older adults—recent advances and remaining challenges. Nutrients, 13(8), 2764

**Ocakoglu, G., Demirci, H., GUCLU, A., and Guclu, Y. (2020).** Association between health literacy and medication adherence in the elderly population with chronic disease. Ethiopian Journal of Health Development, 34(2).

**Oscalices, M., Okuno, M., Lopes, M, Batista, R. and Campanharo, C. (2019).** Health literacy and adherence to treatment of patients with heart failure. Revista da Escola de Enfermagem da USP, 53, e03447.

**Pruette, C., and Amaral, S. (2021).** Empowering patients to adhere to their treatment regimens: a multifaceted approach. Pediatric transplantation, 25(1), e13849, 54-74

**Ramadan, A., Aboeldahab, H., Bashir, N., Belal, M., Wageeh, A., Atia, A., and AK, M. (2024).** Evaluating knowledge, attitude, and physical activity levels related to cardiovascular disease in Egyptian adults with and without cardiovascular disease: a community-based cross-sectional study. BMC Public Health, 24(1), 1107.

**Rezaei, S., Vaezi, F., Afzal, G., Naderi, N., and Mehralian, G. (2022).** Medication Adherence and Health Literacy in Patients with Heart Failure: A Cross-Sectional Survey in Iran. Health literacy research and practice, 6(3), e191–e199.

**Sarhadi, Z., Jahantigh, M., and Yaghoubinia, F. (2023).** Effect of Self-efficacy-Based Training on Treatment Adherence of Patients with Heart Failure. Medical-Surgical Nursing Journal, 12(3).

**Selvakumar, D., Sivanandy, P., Ingle, V., and Theivasigamani, K. (2023).** Relationship between Treatment Burden, Health Literacy, and Medication Adherence in Older Adults Coping with Multiple Chronic Conditions. Medicina, 59(8), 1401.

**Subih, M., Abu Saleh, F., and alak, Z. (2023).** Medication adherence among patients with cardiovascular diseases: a cross-sectional study. Journal of Research in Nursing, 28(4), 272-282.

**Tantoh, N. (2024).** Knowledge, attitude and practices of the modifiable risk factors of cardiovascular diseases amongst the adult population of the Bokova community.

**Teitel, A., Savarese, G., Becher, P., Lund, L., Seferovic, P., Rosano, G., and Coats, A. J. (2022).** Global burden of heart failure: a comprehensive and updated review of epidemiology. Cardiovascular research, 118(17), 3272-3287

**Wangungu, E. (2021).** The Effect of an Educational Intervention on Medication Adherence in Persons with Coronary Artery Disease. (Doctoral thesis-Georgia state university). 1-61.

**Winnige, P., Vysoky, R., Dosbaba, F., and Batalik, L. (2021).** Cardiac rehabilitation and its essential role in the secondary prevention of cardiovascular diseases. World journal of clinical cases, 9(8), 1761

**World Health Organization. (2023).** Basic steps for measures blood pressure and pulse. Available at: https://www.who.int.Accessed on: January ,2024at9:00pm

**Yu, M., Wang, L., Guan, L., Qian, M., and Deng, M. (2022).** Knowledge, attitudes, and barriers related to medication adherence of older patients with coronary heart disease in China. Geriatric Nursing, 43, 235-241.

**تأثير تدخل محو الأمية الصحية على الالتزام بالأدوية بين كبار السن المصابين بأمراض القلب**

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تُعد أمراض القلب السبب الرئيسي للوفيات في جميع أنحاء العالم. ويُعد الالتزام بالأدوية عنصرًا أساسيًا في إدارة المرض لكبار السن المصابين بأمراض القلب. لذا هدفت الدراسة إلى تقييم تأثير تدخل محو الأمية الصحية على الالتزام بالأدوية بين كبار السن المصابين بأمراض القلب. و تم استخدام تصميم بحث شبه تجريبي لإجراء هذه الدراسة. وقد أجريت هذه الدراسة في عيادة القلب الخارجية بمستشفى جامعة بنها بمدينة بنها على عينة ملائمة ١٥٠ من كبار السن المصابين بأمراض القلب. وأظهرت النتائج أن؛ ٤٠,٧٪ من المرضى الذين شملهم البحث والذين تتراوح أعمارهم بين ٦٠ إلى أقل من ٦٥ عامًا بمتوسط عمر ٦٤,٥٢ ± ٦,٤٤ و٢٤,٧٪ منهم أجريت لهم دعامة قلبية مرة واحدة فقط. علاوة على ذلك؛ كان لدى ١٠,٧٪ فقط من المرضى الذين شملهم البحث مستوى جيد من المعلومات الكلية فيما يتعلق بأمراض القلب والالتزام بالأدوية قبل تنفيذ تدخل محو الأمية الصحية. كذلك، كان لدى ٣٥,٣٪ فقط من المرضى المشمولين بالدراسة مستوى ممارسات مرضي تجاه الالتزام بالأدوية وعلاج أمراض القلب قبل تطبيق برنامج التثقيف الصحي. وقد نجح برنامج التثقيف الصحي في تحسين معلومات وممارسات كبار السن تجاه أمراض القلب والأدوية، والتزامهم بالأدوية المتعلقة بأمراض القلب. كما يُوصى باستمرار تنفيذ برنامج التثقيف الصحي لزيادة معلومات وممارسات كبار السن تجاه الالتزام بالأدوية المتعلقة بأمراض القلب.