

▪ **Basic Research**

Effect of Multimodal Cardiac Rehabilitation Program on Patients after Acute Myocardial Infarction: Nursing Sensitive Outcomes.

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ABSTRACT

Introduction: Multimodal cardiac rehabilitation (CR) is a combined variety of activities required to influence favorably the causal cause of the disease, aimed at providing patients after acute myocardial infarction with the optimal social, psychological, and physical conditions, so that they can avert their disease from continuing by their personal efforts.

Aim: The aim of this study was to evaluate the effect of multimodal cardiac rehabilitation program on Patients after Acute Myocardial Infarction: Nursing Sensitive Outcomes.

Design: A quasi-experimental design was utilized to achieve the aim. The study was carried out from the beginning of February 2020 to January 2021. **Setting:** This study was conducted at Cardiac Outpatient Clinic affiliated to Ain Shams University Hospital, Cairo.

Subject: A purposive non-probability/nonrandomized sample of sixty patients after myocardial infarction. **Methods:** Four tools were used: 1- Structured Interview Patient Questionnaire, 2- Patients' Knowledge questionnaire, 3- Health care practices level assessment tool and 4- Nursing Sensitive Patient Outcomes Measuring Scales. **Results:**

this study exposes a statistically significant differences between study and control groups regarding the nursing sensitive patient outcomes post-implementation of multimodal cardiac rehabilitation program at $p (<0.05)$, compared to pre. There was statistically significant positive correlation between patients' total Nursing Sensitive outcomes and total health care practices level in the study and control groups pre/post-implementation of multimodal cardiac rehabilitation program at ($P<0.001$). **Conclusion:** This study showed that multimodal rehabilitative measures are effective for decline of risk factors such as physical exercise, nicotine abstinence, weight loss, and cholesterol lowering by multimodal CR can improve all dimensions of nursing sensitive patient outcomes, also health care practices behavioral level post-implementation of program. **Recommendation:** promote health care providers especially nurses to incorporate multimodal CR program in the care protocols of patients with cardiovascular problems in different health care settings to progress patient outcomes.

Key words: Multimodal Cardiac Rehabilitation, Myocardial Infarction, Nursing Sensitive Outcomes

Introduction:

Cardiovascular diseases (CVDs) are the number one source of death worldwide, captivating an estimated 17.9 million survives each year. CVDs are a group of illnesses of the heart and blood vessels and include coronary heart disease, cerebrovascular disease, rheumatic heart disease and other conditions. Four out of five CVD deaths are owing to heart attacks and strokes, one third of these deaths happen precipitately in people under 70 years of age (*WHO, 2020*). People at risk of CVD may reveal elevated blood pressure, glucose, and lipids in addition to overweight and obesity. These may all be simply measured in primary care services. Recognizing those at maximum risk of CVDs and confirming they obtain suitable management can avert precocious deaths.

Coronary artery disease CAD is the foremost cause of morbidity and mortality throughout the world. The most popular form of CAD is myocardial infarction it is in charge of over 15% of mortality each year. Patients with predictable coronary artery disease are susceptible to frequent coronary events and other comorbidities interrelated to cardiovascular disease. Cardiac rehabilitation (CR) is a secondary prevention most operative manner to decline repeated cardiac events, directing to restore the patient to normal functioning in a harmless and nominal routine by curtailment risk factors and promoting healthy activities after acute myocardial infarction (AMI) to improve cardiovascular health, psychosocial and vocational state of the patient (*Peretti, et al 2020*).

Millions of people worldwide fight to dominant the risk factors that cause cardiovascular disease, several others remain ignorant that they are at high risk. The risk factors for CVD include behavioral factors, such as tobacco use, an unwholesome diet, hurtful use of alcohol and insufficient physical activity, and physiological factors, comprising high blood pressure (hypertension), high blood cholesterol and high blood sugar or glucose which are accompanying with essential social factors, such as ageing, revenue and suburbanization (*Chindhy, et al 2020*).

Multimodal cardiac rehabilitation program is a suggested treatment protocol for the treatment of CVD and has progressed from a simple patient observing process to a multidisciplinary method converging on patient education, tailored exercise programs, modification of patient risk factors, and general well-being of the patient. The patient profits linked to a CR program include abridged mortality, symptom relief, smoking termination, heightened physical ability, developed psychological well-being and permit him or her reclaim greatest functional capability in the society (*Khorshid, et al. 2019*).

Multimodal rehabilitative interventions have valuable influences on encouraging healthy behaviors, reduce mortality, re hospitalization and coronary revascularization interventions. Multimodal cardiac rehabilitation is a manner to attain essential lifestyle adjustments after AMI to diminish recurrent cardiovascular attacks contains all actions commenced to deliver optimal physical, mental and social environment for the cardiac patient to regain best functional capacity as, physical activity allowed /restricted, job modification, healthy eating, smoking cessation, stress management, screening for anxiety/depression, weight monitoring, risk factors modification, and patient's change of behavior (*Shaheen, et al 2020*).

Nursing-sensitive patient outcomes denote a group of broad standardized language of multidimensional outcome actions that are sensitive to nursing interventions. Outcomes that are recognized as sensitive to nursing are those that are pertinent, based on nurses' range and field of practice that connect nursing efforts and interventions to the patient's outcome. Health outcomes include using NSO in direction to offer optimum care causing a best outcome in significances of nursing care (*Barrientos-Trigo, et al. 2019*).

The Nursing Outcomes Classification (NOC) is established to appraise the alterations in the patient's health as a result of nursing interventions. The changes in the patient's condition replicate symptoms, functional state, knowledge condition, accommodating approaches and health care practices. Standardized outcomes are crucial for documentation in electronic records, for usage in clinical information systems, for the improvement of nursing knowledge and the education of professional nurses to evaluate patient status following nursing interventions (*Moorhead, et al. 2018*).

Multimodal cardiac rehabilitation program based on nursing-sensitive patient outcomes discourses daily problems management for patients with coronary heart disease. It highlights three self-management responsibilities to recover control over daily life: caution of the medical phases of the disease (medical management); perform normal activities to persist socially active (role management); and accomplish emotional changes on account of being chronically ill (emotional management). So, patients are educated to deal with the physical, social and emotional concerns of presence chronically ill and take accountability in dealing their chronic illness (*Bellmann, et al 2020*).

Significance of the study:

Worldwide, each year more than seven million people experience myocardial infarction, in which one-year mortality rates are today in the range of 10% but differ with patient features. The significances are even more spectacular among patients who live, 20% hurt a second cardiovascular incident in the first year and around 50% of major coronary events happen in those with a prior hospital discharge diagnosis of ischemic heart disease (*Chindhy, et al 2020*). In developing countries, cardiovascular diseases (CVD) are appraised to consider for seven out of 10 deaths. Mortality owing to CVD in Egypt is one of the maximum associated to other countries in the region and worldwide (*Shaheen, et al 2020*). The people backwards these numbers stimulate this call for action. Prevention after myocardial infarction is vital to decrease risk and distress.

About 75% of CVD can be accredited to the majority risks: high cholesterol, high blood pressure, low fruit and vegetable intake, sedentary lifestyle, and tobacco. Constant behavioral interventions have been exposed to be active in decreasing population risk factors (*Choo, et al. 2018*). Multimodal cardiac rehabilitation ensuing myocardial infarction has revealed to advance various significant patient outcomes, containing exercise capability, control of cardiovascular risk factors, quality of life, hospital readmission rates, and mortality rates. So, our study to evaluate the effect of multimodal cardiac rehabilitation program on patients after acute myocardial infarction: nursing sensitive outcomes.

Operational Definitions

Multimodal Cardiac Rehabilitation Program: it is a nursing supervised program planned to progress cardiovascular health for patients after MI. it include, exercise counselling and training, education for heart-healthy living, lifestyle modification, psychological intervention and counselling to decrease stress.

Nursing-Sensitive Patients Outcomes: is devoted to patient outcomes that are sensitive to nursing interventions containing biopsychosocial and educational scopes of patient care.

Aim of the Study:

The aim of the current study was to evaluate the effect of multimodal cardiac rehabilitation program on patients after acute myocardial infarction: nursing sensitive outcomes.

Research Hypotheses

H 1. Patients after acute myocardial infarction who implement multimodal cardiac rehabilitation program will have improvement in health care practices level post program implementation.

H 2. Patients after acute myocardial infarction who implement multimodal cardiac rehabilitation program will have improvement in all levels of nursing sensitive patient outcomes post program implementation.

Subjects and Methods

Design: A quasi-experimental design pre/post-test study and control group design was used in this study. It is used to estimate the effect of an intervention in the lack of randomization. In the pre-test/post-test research plan, the research contains assessing significant outcomes both before demonstrating the sample to a stimulant of about gentle and after disclosure to the stimulant. By creating an experiment in this direction, a researcher can value modification in directed outcomes to be exposed to the stimulant (*Braddock, 2019*). The post-test licenses the researchers to resolve the immediate effects of the treatment on the outcome variable(s). In addition to the pre-test and immediate post-test, a hindered post-test or post-tests are often encompassed to survey the treatment effects over the longer-term (*Miller et al., 2020*).

Setting: The study was conducted at Cardiac Outpatient Clinic affiliated to Ain Shams University Hospital, Cairo.

Subject: A purposive non-probability/nonrandomized sample of sixty patients after myocardial infarction was nominated according to certain inclusion criteria. The study subjects were distributed into two groups, study group who had the multimodal cardiac rehabilitation program & routine hospital care after discharging and control group who had only the routine hospital care after discharging. Based on data from literature (*Lee et al., 2019*), considering level of significance = 5%, Power = 80%, Type of test = two-sided

Formula of calculating sample size is

$$n = [2(Z\alpha/2 + Z\beta)^2 \times p(1-p)] / (p1 - p2)^2 \quad \text{Where:}$$

n = sample size required in each group,

p = pooled proportion (proportion of event in group 1 + proportion of event in group 2)/2

p1-p2 = difference in proportion of events in two groups

Z α /2: This depends on level of significance, for 5% this is 1.96

Z β : This depends on power, for 80% this is 0.84

$$n = [2(1.96 + 0.84)^2 \times 0.155(1-0.155)] / (0.265)^2 = 29.2$$

Based on above formula the sample size required per group is 30 patients.

Inclusion criteria: The study sample was selected according to the following criteria: Adult patients, from both genders, first time MI, discharged without surgical intervention for one month, able to understand instructions and who agree to participate in the study.

Exclusion criteria: Serious co-morbidity or psychotic disorders used narcotic analgesic for pain and not previously involved in any educational or learning experience.

Tools of data collection:

I. **Structured Interview Patient Questionnaire:** It was designed by the researchers; it involved the following parts:

Part 1: demographic data sheet, it was used to collect demographic data from the patients' medical records regarding age, gender, marital status, educational level, living area and job.

Part 2: clinical data sheet, it was used to assess patients' clinical data as risk factors, smoking, Fagerstrom test, General health (PHQ-9) score (used in assessment phase only to obtain baseline data about the patient).

- Fagerstrom Test for Nicotine Dependence (FTND) is a standard tool for evaluating the intensity of physical dependence to nicotine. The test was adopted from *Heatherton, et al (1991)*, planned to deliver a systematic measure of nicotine dependence associated to cigarette smoking. It encompasses six items that assess the number of cigarettes consuming, the obligation to use, and dependency. In scoring FTND, yes/no items are scored from zero to one and various-choice items are scored from zero to three.

The total score of 0-10 as,

| Score | Interpretation |
|-------|-----------------------|
| 1- 2 | low dependence |
| 3-4 | low to mod dependence |
| 5 - 7 | moderate dependence |
| 8 + | high dependence |

- PHQ-9 Patient Health Depression Questionnaire, a 9-item Quick depression scale self-administered by the patient adopted from *Kroenke, et al (2001)* to support in build up a treatment goal, defining degree of reaction, in addition to directing treatment intervention. Patients may complete questionnaires at reference point and at regular rests (e.g., every 2 weeks) by adding up√ by column. For every √: Several days = 1 More than half the days = 2 Nearly every day = 3. Add together column scores to acquire a total score.

Interpretation of Total Score

| Total Score | Depression Severity |
|-------------|------------------------------|
| 1- 4 | Minimal depression |
| 5-9 | Mild depression |
| 10-14 | Moderate depression |
| 15-19 | Moderately severe depression |
| 20-27 | Severe depression |

II. Patients' Knowledge questionnaire:

It was designed by the researchers after reviewing related literatures (*Michelsen, et al 2018 & Huriani, & Campuss, 2019*). It was collected of 32 items, used to evaluate patients' level of knowledge about scopes of multimodal cardiac rehabilitation program as, physical activity/restrictions, job adjustment, healthy eating, follow up visits, distressing symptoms of MI, when to pursue medical help, stress management and risk factors modifications. the correct answer for each item was (1) and incorrect answer was (0) with total score (32) grades.

III. Health Care practices level assessment tool:

It was designed by the researchers after reviewing related literatures (*Doimo, et al 2019 & Zakeri, et al 2020*). It was used to consider patients' level of health care practices as reported by the patient, involved performing physical exercise, following recommended diet, taking recommended medication frequently, attendance follow up visits, smoking termination, weight observing and modified risk factors. Each item has three responses as follow:

All the time was given (2) scores

Sometimes was given (1) score

Never was given (0) score

- The total scores were ranging between 0 to 100, the patient's health care practices level considered unsatisfactory at less than 80% (0 - < 80) while considered satisfactory, at equal or more than 80% (80-100).

IV. Nursing Sensitive Patient Outcomes Measuring Scales:

it was adapted from *Moorhead, et al (2008)*. It was modified by the researcher. It was in English language (guided by Nursing Outcome Classification System developed by Iowa University Project). It was used to measure nursing sensitive outcomes correlated to diverse parts of patient care covering bio-psycho-socio-educational scopes The scale collected of (95) items as following:

- Physiological health outcomes (17 items) involved cardiac pump effectiveness (6 pointers), peripheral tissue perfusion (4 pointers), circulation status (3 pointers) & vital signs status (4 pointers).
- Functional health outcomes (11 items) involved activity tolerance (4 pointers) & self-care ADLs (7 pointers).
- Psychosocial outcomes (19 items) involved body image and self-esteem (6 pointers), anxiety control (3 pointers), coping (6 pointers) & social interaction (4 pointers).
- Health knowledge and behaviors outcomes (43 items) involved compliance behavior (7 pointers), symptom control (1 pointer), health beliefs and perception (4 pointers), illness care (22 pointers), cardiovascular risk control (3 pointers) & risk detection (6 pointers).
- Family health outcomes (5 items) involved family adaptation (5 pointers).

Scoring system

A three- point Likert scale is used with all outcomes and indicator to measure patient status. Each item had three responses extremely compromised, moderately compromised, and mildly compromised ranging from 1-3; a rating of a '3' is always the greatest possible score and '1' is all the time the poorest possible score.

The score was considered as the following:

Total score of the scale were ranging from 95 to 285 grades,

| | |
|-----------------|-------------------------------|
| 95- 158 grades | Mildly satisfied outcomes |
| 156- 221 grades | Moderately satisfied outcomes |
| 222- 285 grades | Extremely satisfied outcomes |

Cardiac rehabilitation program booklet

Developed by the researchers written in Arabic language directed by images, based on the results gained from assessment of the patients, as well as revising the recent and related literature (**Hinde, et al. 2019 & Zakeri, et al. 2020**). The booklet was handed out for every patient; it was composed of 3 parts as follow:

Part (1): Introduction about cardiovascular diseases, causes, complication & treatment.

Part (2): Myocardial infarction and risk factor management.

Part (3): cardiac rehabilitation program dimensions as, follow up schedule, cardio-protective medication adherence, Healthy dietary principles, importance of maintain ideal body weight (Dietary management), exercise training & physical activity, smoking cessation, stress management (relaxation techniques) and psychosocial management

The multimodal cardiac rehabilitation program booklet was revised by five experts 4 professors of Medical Surgical Nursing as well as 1 professor of internal medicine, at Ain Shams University for content validity. Based on the opinion of a panel of expertise some modifications were done, and then the final form was developed.

Tools' validity and reliability

Validity: assessing face and content validity of the suggested tools through a jury of seven experts 4 professors of Medical Surgical Nursing in addition to 3 assistant professors from Faculty of Nursing, Ain Shams University, who reviewed the instrument, for clarity, relevance, comprehensiveness, understanding, and easiness for administration, no modifications were required.

Reliability: Alpha Cronbach test was used to measure the internal consistency of the study tools. In which Fagerstrom Test for Nicotine Dependence was reliable at (0.92), PHQ-9 was reliable at (0.892), Patients' Knowledge questionnaire was reliable at (0.845), Reported health care practices level assessment tool was reliable at (0.845) and nursing sensitive patient outcomes measuring scale was reliable at (0.826).

Preparatory phase:

Administrative design: The required official approvals were gotten from the administrators of the Ain Shams University Hospital.

Ethical considerations:

To guard patients' rights in scope of the study, before the primary interview, a verbal consent was protected from each patient after being conversant about the nature, purpose and benefits of the study. Patients were also, aware of that participation is completely voluntary and could withdraw at any time without giving reasons. Confidentiality and anonymity of the data was guaranteed by testifying that the personal information will be kept private after being unified with the researchers

and reassured patients that the data would be used only for the research objective. Moreover, the intervention used in the current study is safe and harmless to participants.

Pilot Study:

Once permission was approved to continue with the proposed study, a pilot study was carried out before starting data collection on 6 of targeted patients from the formerly mentioned setting according to the inclusion criteria and excluded from the main sample to assess feasibility, the clarity, applicability of the tools, and calculate the time needed to collect data to detect any potential interferences that might meet the researchers and limit with data collection.

I- Implementation phase

Field work: The study was carried out from the beginning of February 2020 to January 2021 (the data collection time take more time due to covid 19 pandemic), including development of the tools. It was based on reviewing recent and relevant literatures regarding multimodal cardiac rehabilitation program, myocardial infarction, and Nursing Sensitive Outcomes. The researchers were visiting Cardiac Outpatient Clinic over two days/week. Aim of the study was innocently clarified to patients who accepted to participate in the study previous data collection. Data collection was done by the researchers using the same tools for the same patient who fulfilled inclusion criteria; before and after the intervention (performing multimodal cardiac rehabilitation program).

The baseline assessment: The first time; individualized interview session was showed to each participant by the researchers to collect demographic data, patient's clinical data, Patients' Knowledge questionnaire, health care practices level assessment tool and Nursing Sensitive Patient Outcomes Measuring Scales. Based on patients' learning needs, the researchers developed a multimodal cardiac rehabilitation program in Arabic language using the relevant literatures (*Ji, et al 2019; Kumar & Pina, 2020 and Peretti, et al 2020*).

The multimodal cardiac rehabilitation program was carried out at Cardiac Outpatient Clinic affiliated to Ain Shams University Hospital over two days for every one to two patients together conferring to their level of education and understanding taking into consideration application of preventive measures against corona virus. The health care practices related to multimodal CR program were conducted through small group discussion, role play, and demonstration, supported by using posters and booklet.

II. Evaluation phase:

This phase started three months after the planned intervention was applied for each patient, the researchers evaluated effect of multimodal cardiac rehabilitation program on patients after acute myocardial infarction Outcomes, by comparing the results pre and post the implementation of multimodal CR program by using the same data collection tools (Patients' Knowledge questionnaire, Health Care practices level assessment and Nursing Sensitive Patient Outcomes Measuring Scale) which were done to control and study groups after 3 months.

Statistical Design:

The data was encrypted and entered using a personal computer. Statistical Package for Social Science (SPSS) version 20 was utilized. Data were obtainable using descriptive statistics in the form of frequencies and percentages. The chi-square test was used to recognize the relationship between qualitative variables and Mean \pm SD also was used. Statistical significance was considered at p-value ≤ 0.05 , and < 0.001 was considered highly significant. r-test was utilized as an inferential statistic was used to explore the correlation between patients' Nursing Sensitive Outcomes and health care practices level in the study and control groups pre- and post-implementation of multimodal cardiac rehabilitation program.

Results:**Table 1. Comparison of the demographic characteristics between the study and control groups of studied patients (n=60)**

| Demographic characteristics | Control group (n=30) | | Study group (n=30) | | Chi square test | |
|-----------------------------|----------------------|------|--------------------|------|-----------------|-------|
| | n | % | N | % | χ^2 | p |
| Age (years) | | | | | | |
| < 40 | 8 | 26.7 | 15 | 50.0 | 3.665 | 0.160 |
| 40 – 50 | 13 | 43.3 | 10 | 33.3 | | |
| >50 | 9 | 30.0 | 5 | 16.7 | | |
| Mean \pm SD | 43.9 \pm 10.9 | | 41.2 \pm 9.9 | | 0.993 | 0.325 |
| Gender | | | | | | |
| Male | 14 | 46.7 | 11 | 36.7 | 0.617 | 0.432 |
| Female | 16 | 53.3 | 19 | 63.3 | | |
| Marital status | | | | | | |
| Single | 11 | 36.7 | 10 | 33.3 | 0.073 | 0.787 |
| Married | 19 | 63.3 | 20 | 66.7 | | |
| Education Level | | | | | | |
| can't read/write | 5 | 16.7 | 3 | 10.0 | 3.638 | 0.303 |
| read & write | 9 | 30.0 | 9 | 30.0 | | |
| Moderate education | 14 | 46.7 | 11 | 36.7 | | |
| High education | 2 | 6.7 | 7 | 23.3 | | |
| living area | | | | | | |
| Rural | 20 | 66.7 | 21 | 70.0 | 0.077 | 0.781 |
| Urban | 10 | 33.3 | 9 | 30.0 | | |
| living alone | | | | | | |
| yes | 7 | 23.3 | 11 | 36.7 | 1.270 | 0.260 |
| no | 23 | 76.7 | 19 | 63.3 | | |
| Job | | | | | | |
| Usual housing work | 11 | 36.7 | 6 | 20.0 | 3.535 | 0.171 |
| Require mental effort | 9 | 30.0 | 7 | 23.3 | | |
| Require muscular effort | 10 | 33.3 | 17 | 56.7 | | |

Concerning demographic characteristics of the study and control groups, **table 1** shows that mean age of the studied patients was 43.9 ± 10.9 and 41.2 ± 9.9 for the control and study groups, respectively. About patients' gender, the table reveals that, 53.3% of patients in the control group were females, compared to 63.3% of the study. In relation to marital status, 63.3% & 66.7 of control and study groups respectively were married. Regarding their level of education, the table indicates that 46.7% and 36.7% of the control and study groups respectively had moderate education. In addition to 66.7% and 70.0% of the control and study group were from the rural area, with a non-significant statistical difference between both groups regarding all demographic characteristics.

Table 2. Comparison of the clinical data between the study and control groups of studied patients (n=60)

| Patient's clinical data | Control group (n=30) | | Study group (n=30) | | Chi square test | |
|---|----------------------|------|--------------------|------|-----------------|-------|
| | n | % | n | % | χ^2 | p |
| Smoking | | | | | | |
| None | 7 | 23.3 | 11 | 36.7 | 1.414 | 0.493 |
| Ex-smoking | 6 | 20.0 | 4 | 13.3 | | |
| Current smoking | 17 | 56.7 | 15 | 50.0 | | |
| Fagerstrom score | | | | | | |
| Independent | 7 | 23.3 | 11 | 36.7 | 1.822 | 0.768 |
| Low dependence | 3 | 10.0 | 2 | 6.7 | | |
| low to moderate dependence | 3 | 10.0 | 2 | 6.7 | | |
| Moderate dependence | 2 | 6.7 | 3 | 10.0 | | |
| High dependence | 15 | 50.0 | 12 | 40.0 | | |
| Risk Factors: More than one answer which reflects the no. & % | | | | | | |
| Hypertension | 24 | 80.0 | 22 | 73.3 | 0.373 | 0.542 |
| Diabetes Mellitus | 15 | 50.0 | 14 | 46.7 | 0.067 | 0.796 |
| Dyslipidemia | 6 | 20.0 | 7 | 23.3 | 0.098 | 0.754 |
| Overweight | 12 | 40.0 | 11 | 36.7 | 0.071 | 0.791 |
| Family history of CVD | 7 | 23.3 | 11 | 36.7 | 1.270 | 0.260 |
| General health | | | | | | |
| Poor | 15 | 50.0 | 12 | 40.0 | 0.644 | 0.725 |
| Fair | 13 | 43.3 | 16 | 53.3 | | |
| Good | 2 | 6.7 | 2 | 6.7 | | |
| (PHQ-9) score | | | | | | |
| Moderate depression | 9 | 30.0 | 11 | 36.7 | 0.601 | 0.740 |
| Moderately severe depression | 5 | 16.7 | 6 | 20.0 | | |
| Severe depression | 16 | 53.3 | 13 | 43.3 | | |

Not Significant (NS) $P > 0.05$, Highly Significant $P < 0.001$, Significant (S), $P \leq 0.05$
(PHQ-9) means patient health questionnaire.

Regarding the patient clinical data of the control and study groups, table 2 shows that 56.7% & 50.0% respectively of the patients in the control and study groups were current smokers. According to firestorm score, 50.0 % & 40.0% of patients in the control and study group respectively were highly dependent. Regarding risk factors 80.0% & 73.3% respectively of the patients in the control and study groups had hypertension, while 50.0% & 46.7% respectively of the control and study groups had diabetes mellitus. Concerning general health 50.0% & 40.0% of patients in the control and study groups respectively reported poor health. According to patient health questionnaire (PHQ-9) score, 53.3% & 43.3% respectively of the patients in the control and study groups had Severe depression. there was no statistically Significant difference between the two groups.

Table 3. Comparison between the study and control groups regarding their satisfactory level of knowledge about Multimodal cardiac rehabilitation pre- and post-implementation of program (n=60)

| Items of knowledge | Satisfactory level of knowledge | | | | | | | | | |
|---|---------------------------------|------|--------------------|------|-------------------|---------------------------|------|--------------------|------|--------------------|
| | Pre-implementation $X21$ | | | | | post-implementation $X22$ | | | | |
| | Control group (n=30) | | Study group (n=30) | | $\chi^2 1$ | Control group (n=30) | | Study group (n=30) | | $\chi^2 2$ |
| | n | % | n | % | [p-value] | n | % | n | % | [p-value] |
| 1. Physical activity/restrictions /job modification | 17 | 56.7 | 13 | 43.3 | 1.067 [0.302] | 10 | 33.3 | 22 | 73.3 | 9.643 [0.002] |
| 2. Healthy eating | 7 | 23.3 | 6 | 20.0 | 0.098 [0.754] | 10 | 33.3 | 27 | 90.0 | 20.376 [<0.001] |
| 3. Medications | 12 | 40.0 | 11 | 36.7 | 0.071 [0.791] | 15 | 50.0 | 23 | 76.7 | 4.593 [0.032] |
| 4. Follow up visits | 14 | 46.7 | 10 | 33.3 | 1.111 [0.291] | 18 | 60.0 | 27 | 90.0 | 7.200 [0.007] |
| 5. Alarming symptoms of MI, when to seek medical help | 4 | 13.3 | 8 | 26.7 | 1.67 [0.197] | 5 | 16.7 | 22 | 73.3 | 19.461 [<0.001] |
| 6. Stress management | 2 | 6.7 | 4 | 13.3 | 0.741 [0.0389] | 0 | 0.0 | 23 | 76.7 | 37.297 [<0.001] |
| 7. Risk factors modifications | 5 | 16.7 | 4 | 13.3 | 0.131 [0.718] | 5 | 16.7 | 22 | 73.3 | 19.461 [<0.001] |

Not Significant (NS) $P > 0.05$, Highly Significant $P < 0.001$, Significant (S), $P \leq 0.05$

$X21$ denotes to the comparison between study and control group pre implementation of cardiac rehabilitation program. $X22$ denotes to the comparison between study and control group post implementation of cardiac rehabilitation program.

Table 3 indicates that there was no statistically significant difference between the patients' satisfactory knowledge level regarding multimodal cardiac rehabilitation pre-implementation of program. In contrast, post implementation of the program, there was a highly statistically significant difference between the patients' satisfactory level of knowledge in study and control groups regarding, healthy eating, alarming symptoms of MI, when to seek medical help, stress management and risk factors modifications. As well as there was a statistically significant difference between them regarding physical activity, restrictions, job modification, medications, and follow up visits post multimodal cardiac rehabilitation program implementation.

Table 4. Comparison between study and control groups regarding their satisfactory level of health care practices pre- and post-implementation of Multimodal cardiac rehabilitation program(n=60)

| Items of health care practices | Level of health care practices | | | | | | | | | |
|--|--------------------------------|------|--------------------|------|------------------|-------------------------|------|--------------------|------|--------------------|
| | Pre-implementation X21 | | | | | post-implementation X22 | | | | |
| | Control group (n=30) | | Study group (n=30) | | χ^2 1 | Control group (n=30) | | Study group (n=30) | | χ^2 2 |
| | n | % | n | % | | [p-value] | n | % | n | |
| Doing physical exercise | | | | | | | | | | |
| Never | 15 | 50.0 | 14 | 46.7 | 0.234 [0.889] | 7 | 23.3 | 4 | 13.3 | 23.879 [<0.001] |
| Sometimes | 13 | 43.3 | 13 | 43.3 | | 21 | 70.0 | 6 | 20.0 | |
| Always | 2 | 6.7 | 3 | 10.0 | | 2 | 6.7 | 20 | 66.7 | |
| Following prescribed diet | | | | | | | | | | |
| Never | 4 | 13.3 | 2 | 6.7 | 1.969 [0.374] | 4 | 13.3 | 3 | 10.0 | 16.310 [<0.001] |
| Sometimes | 18 | 60.0 | 23 | 76.7 | | 18 | 60.0 | 4 | 13.3 | |
| Always | 8 | 26.7 | 5 | 16.7 | | 8 | 26.7 | 23 | 76.7 | |
| Taking prescribed medication regularly | | | | | | | | | | |
| Never | 9 | 30.0 | 9 | 30.0 | 0.618 [0.734] | 5 | 16.7 | 3 | 10.0 | 28.738 [<0.001] |
| Sometimes | 18 | 60.0 | 16 | 53.3 | | 23 | 76.7 | 5 | 16.7 | |
| Always | 3 | 10.0 | 5 | 16.7 | | 2 | 6.7 | 22 | 73.3 | |
| Attending follow up visits | | | | | | | | | | |
| Never | 3 | 10.0 | 4 | 13.3 | 2.466 [0.291] | 3 | 10.0 | 0 | 0.0 | 15.818 [<0.001] |
| Sometimes | 18 | 60.0 | 22 | 73.3 | | 18 | 60.0 | 6 | 20.0 | |
| Always | 9 | 30.0 | 4 | 13.3 | | 9 | 30.0 | 24 | 80.0 | |
| Smoking cessation | | | | | | | | | | |
| Never | 7 | 23.3 | 8 | 26.7 | 0.351 [0.839] | 5 | 16.7 | 3 | 10.0 | 6.738 [0.034] |
| Sometimes | 14 | 46.7 | 15 | 50.0 | | 16 | 53.3 | 8 | 26.7 | |
| Always | 9 | 30.0 | 7 | 23.3 | | 9 | 30.0 | 19 | 63.3 | |
| Weight monitoring | | | | | | | | | | |
| Never | 4 | 13.3 | 4 | 13.3 | 0.078 [0.962] | 6 | 20.0 | 0 | 0.0 | 14.074 [<0.001] |
| Sometimes | 15 | 50.0 | 14 | 46.7 | | 17 | 56.7 | 10 | 33.3 | |
| Always | 11 | 36.7 | 12 | 40.0 | | 7 | 23.3 | 20 | 66.7 | |
| Modified risk factors | | | | | | | | | | |
| Never | 5 | 16.7 | 6 | 20.0 | 0.634 [0.728] | 9 | 30.0 | 0 | 0.0 | 32.178 [<0.001] |
| Sometimes | 19 | 63.3 | 16 | 53.3 | | 19 | 63.3 | 7 | 23.3 | |
| Always | 6 | 20.0 | 8 | 26.7 | | 2 | 6.7 | 23 | 76.7 | |

Not Significant (NS) $P > 0.05$, Highly Significant $P < 0.001$, Significant (S), $P \leq 0.05$

X21 denotes to the comparison between study and control group pre implementation of cardiac rehabilitation program. X22 denotes to the comparison between study and control group post implementation of cardiac rehabilitation program.

Table 4 reveals that there was no statistically significant difference between the patients' satisfactory health care practices level regarding multimodal cardiac rehabilitation pre-implementation of program. In contrast, post implementation of the program, there was a highly statistically significant difference between the patients' satisfactory level of health care practices in study and control groups regarding, doing physical exercise, following prescribed diet, taking prescribed medication regularly, attending follow up visits, weight monitoring and modified risk factors. As well as there was a statistically significant difference between them regarding Smoking cessation post multimodal rehabilitation program implementation.

Table 5. Comparison between study and control groups regarding the Nursing Sensitive Patient Outcomes pre- and post-implementation of multimodal cardiac rehabilitation program(n=60)

| Items of nursing sensitive patient outcomes | Nursing Sensitive Patient Outcomes level | | | | | | | | | |
|---|--|------|--------------------|------|------------------|----------------------|------|--------------------|------|--------------------|
| | Pre-implementation | | | | | post-implementation | | | | |
| | Control group (n=30) | | Study group (n=30) | | χ^21 | Control group (n=30) | | Study group (n=30) | | χ^22 |
| | N | % | n | % | [p-value] | n | % | n | % | [p-value] |
| Physiological health outcomes | | | | | | | | | | |
| Extremely compromised | 11 | 36.7 | 12 | 40.0 | 2.234 [0.327] | 11 | 36.7 | 8 | 26.7 | 8.160 [0.017] |
| Moderately compromised | 13 | 43.3 | 8 | 26.7 | | 15 | 50.0 | 8 | 26.7 | |
| Mildly compromised | 6 | 20.0 | 10 | 33.3 | | 4 | 13.3 | 14 | 46.7 | |
| Functional health outcomes | | | | | | | | | | |
| Extremely compromised | 5 | 16.7 | 5 | 16.7 | 0.089 [0.956] | 10 | 33.3 | 3 | 10.0 | 7.191 [0.027] |
| Moderately compromised | 17 | 56.7 | 16 | 53.3 | | 12 | 40.0 | 10 | 33.3 | |
| Mildly compromised | 8 | 26.7 | 9 | 30.0 | | 8 | 26.7 | 17 | 56.7 | |
| Psychosocial outcomes | | | | | | | | | | |
| Extremely compromised | 7 | 23.3 | 5 | 16.7 | 1.359 [0.507] | 10 | 33.3 | 5 | 16.7 | 12.381 [0.002] |
| Moderately compromised | 20 | 66.7 | 19 | 63.3 | | 16 | 53.3 | 8 | 26.7 | |
| Mildly compromised | 3 | 10.0 | 6 | 20.0 | | 4 | 13.3 | 17 | 56.7 | |
| Health knowledge and behaviors | | | | | | | | | | |
| Extremely compromised | 4 | 13.3 | 3 | 10.0 | 0.501 [0.779] | 13 | 43.3 | 4 | 13.3 | 30.026 [<0.001] |
| Moderately compromised | 21 | 70.0 | 20 | 66.7 | | 17 | 56.7 | 6 | 20.0 | |

| | | | | | | | | | | |
|-------------------------------|----|------|----|------|------------------|----|------|----|------|------------------|
| Mildly compromised | 5 | 16.7 | 7 | 23.3 | | 0 | 0.0 | 20 | 66.7 | |
| Family health outcomes | | | | | | | | | | |
| Extremely compromised | 4 | 13.3 | 6 | 20.0 | 0.543 [0.762] | 9 | 30.0 | 3 | 10.0 | 7.833 [0.020] |
| Moderately compromised | 15 | 50.0 | 13 | 43.3 | | 14 | 46.7 | 10 | 33.3 | |
| Mildly compromised | 11 | 36.7 | 11 | 36.7 | | 7 | 23.3 | 17 | 56.7 | |

Not Significant (NS) $P > 0.05$, Highly Significant $P < 0.001$, Significant (S), $P \leq 0.05$

X21 denotes to the comparison between study and control group pre implementation of cardiac rehabilitation program. X22 denotes to the comparison between study and control group post implementation of cardiac rehabilitation program.

Table 5. compares different levels of nursing-sensitive patient outcomes among study and control groups' subjects before and after implementation of the multimodal cardiac rehabilitation program, it reveals a statistically significant differences between study and control groups regarding the nursing sensitive patient outcomes post-implementation of multimodal cardiac rehabilitation program at p (< 0.05), compared to pre. It was clear that there was a relationship between implementation of multimodal cardiac rehabilitation program and improvement of all levels of nursing sensitive patient outcomes.

Table 6. Comparison between study and control groups regarding their total health care practices level, knowledge, and Nursing Sensitive Patient Outcomes pre- and post-implementation of multimodal cardiac rehabilitation program(n=60)

| | Pre-implementation | | | | | post-implementation | | | | |
|-----------------------------|----------------------|------|--------------------|------|------------------|----------------------|------|--------------------|------|------------------|
| | Control group (n=30) | | Study group (n=30) | | χ^2 1 | Control group (n=30) | | Study group (n=30) | | χ^2 2 |
| | n | % | n | % | [p-value] | n | % | n | % | [p-value] |
| Total Knowledge | | | | | | | | | | |
| Unsatisfactory | 23 | 76.7 | 22 | 73.3 | 0.089 | 21 | 70.0 | 6 | 20.0 | 15.152 |
| Satisfactory | 7 | 23.3 | 8 | 26.7 | [0.765] | 9 | 30.0 | 24 | 80.0 | [<0.001] |
| Total health care practices | | | | | | | | | | |
| Unsatisfactory | 22 | 73.3 | 23 | 76.7 | 0.089 | 24 | 80.0 | 8 | 26.7 | 17.143 |
| Satisfactory | 8 | 26.7 | 7 | 23.3 | [0.765] | 6 | 20.0 | 22 | 73.3 | [<0.001] |
| Total health outcomes | | | | | | | | | | |
| Extremely compromised | 6 | 20.0 | 6 | 20.0 | 0.375 [0.829] | 10 | 33.3 | 6 | 20.0 | 8.892 [0.012] |
| Moderately compromised | 17 | 56.7 | 15 | 50.0 | | 15 | 50.0 | 8 | 26.7 | |
| Mildly compromised | 7 | 23.3 | 9 | 30.0 | | 5 | 16.7 | 16 | 53.3 | |

Not Significant (NS) $P > 0.05$, Highly Significant $P < 0.001$, Significant (S), $P \leq 0.05$

X21 denotes to the comparison between study and control group pre implementation of cardiac rehabilitation program. X22 denotes to the comparison between study and control group post implementation of cardiac rehabilitation program.

Table 6. shows that there were statistically significant differences between study and control groups regarding their total health care practices level, knowledge, and nursing sensitive patient outcomes post-implementation of multimodal cardiac rehabilitation program at ($P < 0.001 \& 0.012$). While there were no statistically significant differences between them pre implementation of the program. This indicates a relationship between implementation of multimodal cardiac rehabilitation program and studied patients' total health care practices level, knowledge, and Nursing Sensitive Patient Outcomes.

Table 7. Correlation between patients' total Nursing Sensitive Outcomes and total health care practices level in the study and control groups post-implementation of multimodal cardiac rehabilitation program(n=60)

| | Total nursing sensitive patients' outcomes | | | |
|-----------------------------|--|-------|-------------|--------|
| | Control group | | Study group | |
| Total health care practices | r | p | r | p |
| Post-implementation | 0.361 | 0.005 | 0.480 | <0.001 |

Not Significant (NS) $P > 0.05$, Highly Significant $P < 0.001$, Significant (S), $P \leq 0.05$

Table 7. reveals a statistically significant positive correlation between patients' total Nursing Sensitive patient outcomes and total health care practices level in the study and control groups post-implementation of multimodal cardiac rehabilitation program at ($P < 0.001$).

Discussion

Multimodal cardiac rehabilitation has long been reflected integral to the management of cardiac diseases. It includes exercise training in aggregation with cardiovascular risk factor management, psychosocial sustenance and behaviour change which are the central components of an intricate health and lifestyle intervention (*NICE, 2018*)

Involvement in multimodal cardiac rehabilitation program is helpful for patients with myocardial infarction. Physical activity guidelines are established for the patient, and staff keeps ongoing contact with the patient. Anticipatory guidance contains arranging the patient and caregiver for what to suppose during recovery and rehabilitation, so that, the patient profits a sense of control over his or her life, reducing the psychologic and physiologic fatalities after MI and modifying the risk factors, he will be healthier (*Kumar & Pina, 2020*).

Concerning demographic characteristics of the study and control groups, two matched groups were enrolled in this study with no-significant difference between both groups regarding all demographic characteristics, this is an indicator for bias prevention. The current study results showed that mean age of the studied patients was 43.9 ± 10.9 and 41.2 ± 9.9 for the control and study groups, respectively. About patients' gender, this study results exposed that, more than half of patients in the control group, and about two thirds of the study group were females. This result could be because of increased risk of coronary heart diseases after age of forty and of both genders, and from point of view, females might be the maximum percent because

they had more stress nowadays and in Egypt as they work outside the house added to the usual house activities and children care. This finding was supported by *Elderiny; et al. (2017)* in a study entitled “Effect of Educational Guidelines on Therapeutic Regimen Compliance and Self-Efficacy among patients with Myocardial Infraction” who found that the plurality of the studied patients their ages were less than fifty years, and more than half of them were females.

In relation to marital status, around two thirds of control and study groups were married. It could be illustrative its association with age, as the ages more than forty is usually married in Egyptian culture. This finding in the same line with *Zakeri; et al. (2020)* in a study titled “The effect of the Continuous Care Model on treatment adherence in patients with myocardial infarction: a randomized controlled trial” who found that utmost of the study sample was married.

Regarding level of education, the findings of this study showed that more than one third of the control and study groups had moderate education, that might be owing to the low social standard which is seeming from the result indicating that peak percent of them had not enough income. This result is reliable with *Elderiny; et al. (2017)* when defined his study subjects’ educational level, that, the highest percentage was secondary level. And opposite to *Ek et al. (2019)* who stated in a study titled “Physical inactivity and smoking after myocardial infarction as predictors for readmission and survival” that about half of study subjects had high education. In addition, the highest percent of the control and study groups were from rural area, this result is contrary to *Kim, et al. (2015)* who informed that most of the subjects in a study entitled “Health-related quality of life in symptomatic post myocardial infarction patients with left ventricular dysfunction” were from urban area.

Regarding the patient clinical data of the control and study groups, the current study results indicated that around half of the patients in the control and study groups were current smokers. Which point out a predisposing risk factor for MI and a critical indicator for cardiac diseases generally. According to Fagerstrom score, around half of patients in the control and study groups were highly dependent. This may signpost their inability to stop smoking even with MI occurrence, it might be associated with continual exposure to life stressors and the smokers’ insight that smoking cause stress reduction. This finding is discordant with *Doimo et al. (2019)* in a study titled “Impact of ambulatory cardiac rehabilitation on cardiovascular outcomes: a long-term follow-up study” who reported that around one quarter of the study and control groups were smokers.

Regarding risk factors, there was no significant difference between the two groups. Most of the patients in both groups had hypertension, while around half of them had diabetes mellitus, and reported poor general health. These findings are similar to those of *Ter Hoeve et al. (2018)* who found that about one quarter of the study subjects had history of diabetes and more than two thirds of them had hypertension mellitus in a study entitled “Effects of two behavioral cardiac rehabilitation interventions on physical activity: A randomized controlled trial”.

According to (PHQ-9) score, around half of the patients in both groups had Severe depression. Which could be because of their activity restriction and its effect on all aspects of their life. As mentioned by *Herlian, et al. (2017)*, More than half of cardiac rehabilitation patients in a study entitled “Assessment of Myocardial Infarction Patients Needs on Nursing Care in Cardiac Rehabilitation of Hasan Sadikin Hospital Indonesia” who stated that the psychosocial management such as recognizing depression and anxiety is wanted from nurses.

The current study results shown that there was no statistically significant difference between the patients in study and control groups regarding satisfactory knowledge level of multimodal cardiac rehabilitation pre-implementation of program. In contrast, post implementation of the program, there was a highly statistically significant difference between the patients’ satisfactory level of knowledge in study and control groups regarding, healthy eating, alarming symptoms of MI, when to seek medical help, stress management, risk factors and modifications.

In addition to there was a statistically significant difference between them regarding physical activity, restrictions, job modification, medications, and follow up visits post implementation. In this point *Abdelhameed, et al. (2013)* in a study entitled “Impact of a Designed Nursing Intervention protocol on Myocardial Infarction Patient's Outcome at a selected University Hospital in Egypt” found the same results representing higher total knowledge scores among the studied subjects post implementation of designed nursing intervention protocol on patients with myocardial infarction. In addition to, *Huriani, (2019)* in a study entitled “Myocardial infarction patients' learning needs: Perceptions of patients, family members and nurses” who concluded the importance of education for patients with M I.

The findings of this study displayed that there was no statistically significant difference between the patients’ satisfactory health care practices level regarding multimodal cardiac rehabilitation pre-implementation of program. In contrast, post implementation of the program, there was a highly statistically significant difference between the patients’ satisfactory level of health care practices in study and control groups regarding, doing physical exercise, following prescribed diet, taking

prescribed medication regularly, attending follow up visits and modified risk factors. As well as there was a statistically significant difference between them regarding smoking cessation post rehabilitation program implementation. These results could be clarified by health care practices taught to the patients, follow up and persistent explanations, strengthening and feedback. Similar to the results of this study, another study by *Abdelhameed, et al. (2013)* who found that the plurality of study subjects had higher practice scores post implementation of a designed protocol for patients with M I.

Regarding different levels of nursing-sensitive patient outcomes among study and control groups' before and after implementation of the multimodal cardiac rehabilitation program, the current results exposed a relationship between implementation of multimodal cardiac rehabilitation program and the nursing sensitive patient outcomes improvement. It was clear that implementation of multimodal cardiac rehabilitation program is concomitant with better outcome level with a statistically significant difference between study and control groups regarding all levels post-implementation.

This finding might be attributed to the effect of the multimodal cardiac rehabilitation program implementation, which dealt with doing physical exercise, following prescribed diet, taking prescribed medication regularly, attending follow up visits, smoking cessation, weight monitoring and risk factors modification which improve nursing sensitive outcomes for patients with M I. This result asserts the assumption by the current study that the implementation of multimodal cardiac rehabilitation program will improve nursing sensitive outcomes for patients with M I. In the same situation, this finding is sustained by *Bellmann, et al. (2020)* in a study entitled "Beneficial Effects of Cardiac Rehabilitation." who mention that cardiac rehabilitation improves clinical outcome of patients with cardiac disease and should be obtained at any time possible.

Moreover, *Doimo, et al. (2019)* showed that, there are positive effects of ambulatory cardiac rehabilitation program in beneficent clinical outcomes and highpoints its importance to reduce cardiovascular hospitalizations and mortality during a long-term follow-up. This result is consistent with *Choo, et al. (2018)* who study the effect of cardiac rehabilitation on physical and mental quality of life, in a study entitled "Effect of Cardiac Rehabilitation on Quality of Life, Depression and Anxiety in Asian Patients" and found that cardiac rehabilitation can expand patients physically, mentally, and reduce depression and anxiety levels. Moreover, *Wita, et al. (2019)* in a study entitled "Managed Care after Acute Myocardial Infarction (KOS-zawał) reduces major adverse cardiovascular events by 45% in 3-month follow-up - single-center results of Poland's National Health Fund program of

comprehensive post-myocardial infarction care” found that rehabilitation program for patents with M I included physical training, group therapy and relaxation sessions, educational sessions on lifestyle modification and coronary risk factors control was active in decreasing long-term adverse events and improve patients’ exercise capability and quality of life.

These study results showed that there was statistically significant difference between study and control groups regarding their total health care practices level, knowledge, and nursing sensitive patient outcomes post-implementation of multimodal cardiac rehabilitation program. While there were no statistically significant differences between them pre implementation of the program. This directs a relationship between implementation of multimodal cardiac rehabilitation program and studied patients’ total health care practices level, knowledge, and Nursing Sensitive Patient Outcomes. This could be interpreted by the effect of the educational experience of the cardiac rehabilitation program. These results are reinforced with *Abdelhameed, et al. (2013)* who found a significant improvement in patients’ knowledge and health practices post implementation of the intervention.

The current study results revealed a statistically significant positive correlation between patients' total nursing sensitive patient outcomes and total health care practices level in the study and control groups post-implementation of multimodal cardiac rehabilitation program. This finding could be accredited to the effect of getting knowledge and healthy practices on adherence to healthy behaviors that subsequently improve physiological and psychological outcomes associated with M I. *Doimo, et al. (2019)* found that there was a relationship between health practices and outcomes of patients with MI. This finding supports the current study hypotheses that Patients after acute myocardial infarction who implement multimodal cardiac rehabilitation program will have improvement in health care practices level and all levels of nursing sensitive patient outcomes post program implementation.

Conclusion

This study indicated that multimodal rehabilitative interventions are effective for reduction of risk factors through physical exercise, nicotine abstinence, weight loss, and cholesterol lowering measures by implementing CR can improve all dimensions of nursing sensitive patient outcomes as physiological health outcomes, functional health outcomes, psychosocial outcomes, health knowledge and behaviors and family health outcomes, also health care practices behavioral level post-implementation of multimodal cardiac rehabilitation program.

Recommendations

- Encourage health care providers especially nurses to integrate multimodal CR program in the care protocols of patients with cardiovascular problems in different health care settings to improve patient outcomes.
- Implementation of exaggerated follow up programs to improve clinical outcome of patients with cardiac disease and should be offered whenever possible.
- The study can be replicated by using a large sample there by findings can be generalized.

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الملخص العربي

تأثير برنامج إعادة التأهيل القلبي متعدد الاساليب على المرضى بعد الإصابة باحتشاء عضلة القلب الحاد: النواتج الحساسة للتمريض

المقدمة: إعادة التأهيل القلبي متعدد الاساليب هي مجموعة متنوعة من الأنشطة المطلوبة للتأثير بشكل إيجابي على السبب المسبب للمرض، وتهدف إلى تزويد المرضى بعد احتشاء عضلة القلب الحاد بالظروف الاجتماعية والنفسية والبدنية المثلى، حتى يتمكنوا من تجنب استمرار مرضهم بجهودهم الشخصية.

الهدف من الدراسة: هدفت الدراسة الحالية الى تقييم تأثير برنامج إعادة التأهيل القلبي متعدد الاساليب على المرضى بعد احتشاء عضلة القلب الحاد: النواتج الحساسة للتمريض. **فرضية البحث:** افترضت الدراسة

الحالية أن:

فرضية 1: المرضى بعد احتشاء عضلة القلب الحاد الذين ينفذون برنامج إعادة تأهيل القلب متعدد الاساليب سوف يتحسنون في مستوى ممارسات الرعاية الصحية بعد تنفيذ البرنامج. **فرضية 2:** المرضى بعد احتشاء عضلة القلب الحاد الذين ينفذون برنامج إعادة تأهيل القلب متعدد الاساليب سوف يتحسنون في جميع مستويات نواتج المرضى الحساسة للتمريض بعد تنفيذ البرنامج. **تصميم الدراسة:** تم استخدام تصميم شبه تجريبي للدراسة على مجموعتين من المرضى.

مكان البحث: أجريت هذه الدراسة في عيادة القلب الخارجية التابعة لمستشفى جامعة عين شمس بالقاهرة. **عينة البحث:** عينة هادفة مكونة من 60 مريض ومريضة. **الأدوات:** تم جمع البيانات باستخدام اربع أدوات: (1) استبيان مقابلة شخصية مع المريض. (2) استبيان معلومات المرضى. (3) أداة تقييم مستوى ممارسات الرعاية الصحية

4. **مقاييس قياس نواتج المرضى الحساسة للتمريض. النتائج:** اشارت نتائج الدراسة الحالية الى انه يوجد فروق ذات دلالة إحصائية بين مجموعته الدراسة والمجموعة الضابطة فيما يتعلق بنواتج المرضى الحساسة للتمريض بعد تنفيذ برنامج إعادة تأهيل القلب متعدد الاساليب، مقارنةً بقبل التنفيذ. كانت هناك علاقة ارتباط ايجابية ذات دلالة إحصائية بين إجمالي نواتج المرضى الحساسة للتمريض و إجمالي ممارسات الرعاية الصحية في مجموعته الدراسة والمجموعة الضابطة قبل / بعد تنفيذ برنامج إعادة تأهيل القلب متعدد الاساليب. **الخلاصة:** استخلصت هذه الدراسة إلى أن تدابير إعادة التأهيل متعددة الاساليب فعالة لتقليل عوامل الخطر مثل التمارين البدنية ، والامتناع عن النيكوتين ، وفقدان الوزن ، وخفض الكوليسترول من خلال برنامج إعادة تأهيل القلب متعدد الاساليب يمكن أن يحسن جميع أبعاد نواتج المرضى الحساسة للتمريض ، وكذلك ممارسات الرعاية الصحية على المستوى السلوكي بعد تنفيذ البرنامج. **التوصيات:** اوصى الباحثون بما يلي: تعزيز مقدمي الرعاية الصحية وخاصة الممرضات لدمج برنامج إعادة تأهيل القلب متعدد الاساليب في بروتوكولات رعاية المرضى الذين يعانون من مشاكل في القلب والأوعية الدموية في أماكن الرعاية الصحية المختلفة لتحقيق تقدم في نواتج المرضى.