

ORIGINAL RESEARCH ARTICLE

EFFECTIVENESS OF NURSES-LED CARDIAC REHABILITATION PROGRAM AMONG CORONARY ARTERY DISEASE PATIENTS ATTENDING A TEACHING HOSPITAL, BHARATPUR

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Received: 22 Jan, 2020

Accepted: 9 Mar, 2020

Published: 13 Mar, 2020

**Key words:** Coronary artery disease Patient; Effectiveness; Nurse-led Cardiac Rehabilitation Program.

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DOI: <https://doi.org/10.3126/jcmc.v10i1.28071>

Citation

Shrestha R, Rajbanshi L, Singh JP, Shrestha K, Shrestha S. Effectiveness of nurses-led cardiac rehabilitation program among coronary artery disease patients attending a teaching hospital, Bharatpur. Journal of Chitwan Medical College. 2020;10(31):48-53.



Peer Reviewed

ABSTRACT

**Background:** Cardiac rehabilitation (CR) is a comprehensive secondary prevention program, delivered by multidisciplinary team including nurses. This portion in health care sector is found to be lacking and communication between health care providers and cardiac patients is frequently suboptimal. The aim of this study was to identify the effectiveness of nurse-led cardiac rehabilitation program among coronary artery disease patients attending a teaching hospital in Bharatpur, Nepal.

**Methods:** One group pre-test post-test design was used. Total 85 CAD patients were selected for pre and post-test, baseline information was collected using consecutive sampling technique. The education intervention on CR was developed in Nepali language and distributed to each respondent after pre-test in separate room of OPD of Chitwan medical college and teaching hospital, Bharatpur. After one month of education intervention program, post-test was conducted with same subjects using face to face interview questionnaire using CADE-Q. Data was analyzed using Wilcoxon Rang signed test.

**Results:** Of all 85 respondents, median difference between pre-test was 17 (IQR=14-22) and post-test was 39 (IQR=32-44) which was statistically significant ( $p < 0.001$ ). The percentage of respondents with non-acceptable level ( $< 50%$ ) of knowledge sharply declined from 96.4% to 11.7% whereas those with acceptable knowledge ( $\geq 50%$ ) significantly increased to 3.53% to 88.2% at  $p$  value  $< 0.001$ .

**Conclusion:** The nurse-led educational intervention programme considerably improved the knowledge on Cardiac Rehabilitation among CAD patients. Hence, it is strongly recommended that nurses should be involved in establishing and organizing cardiac rehabilitation programs at each tertiary level hospital in Nepal.

INTRODUCTION

Cardiovascular disease (CVD) is the leading cause of mortality worldwide, with majority of deaths occurring in low to middle income countries including Nepal.<sup>1</sup> Among CVDs, Coronary artery disease (CAD) is the most common diagnosis.<sup>2-3</sup> Nurses ought to play a key role in the prevention of CAD<sup>4</sup> and have the responsibility to educate patients on several aspects of the disease. Self-educational module can be used to raise awareness about cardiac rehabilitation (CR) program. Being aware of the CAD can be considered the first step to reduce the risk of cardiac complications.<sup>5</sup> Nurse-led CR program designed to improve self-care management in patients with CAD showed significant difference in the physical dimension as well as in depression of CAD patients.<sup>6</sup>

An inadequate understanding of the disease may cause non-compliance with medical advice and unnecessary disease progression<sup>7</sup>; hence CAD knowledge is pivotal to the survival of patients.<sup>8</sup> As of yet, patients' knowledge on CR is found to be suboptimal.<sup>9-10</sup> Educational intervention program should be held as an effort to increase level of knowledge about the dis-

ease.<sup>11</sup> In a recent study out of 600000 cardiac patients, 12.2% participated in a CR program. After 1 year, there was a 2.2% mortality rate for cardiac rehabilitation participant's vs 5.3% for non-participants.<sup>12</sup>

Hence, knowledge regarding CR should be considered vital in determining the effectiveness of an educational program. Few studies have addressed this issue therefore this study aims to find-out effectiveness of nurse-led CR program among CAD patients attending a tertiary level hospital at Bharatpur, Nepal.

METHODS

A pre-experimental one group pretest posttest research design was applied for this research to examine effectiveness of nurse-led cardiac rehabilitation with 85 CAD (angina pectoris, myocardial infarction and ischemic heart failure) patients attending outdoor department of Chitwan Medical College and Teaching Hospital (CMC-TH), Bharatpur, Nepal. Non-probability, consecutive sampling technique was chosen for this study.

Inclusion criterias of this study were (1) patients who are clinically diagnosed with coronary Artery disease by cardiologist (2) residing in Chitwan district attending at OPD for follow up treatment at CMC-TH.

Data was collected by using structured tool consisting of four sections such as socio-demographic (total items-9) and disease related characteristics (total items-4), behaviour patterns (total items-6), and CADE-Q (total items-19). CADE-Q questionnaire for education on CAD,<sup>13</sup> which include four areas such as (1) pathophysiology and signs and symptoms of the disease; (2) risk factors and lifestyle; (3) diagnosis, treatment, and medication; and (4) physical exercise. Each item has 4 alternatives or statements that correspond to a knowledge level: a correct statement representing 'full knowledge', a correct statement representing 'incomplete knowledge', an incorrect statement representing 'wrong knowledge', and an 'I do not know' statement representing no knowledge. Each alternative is scored as follows: 3 = complete knowledge; 1 = incomplete knowledge; and 0 = wrong knowledge or "do not know." The sum of the final scores leads to a mean total knowledge (maximum of 57 points), which classifies into five level such as great (90-100%), good (70-89%), acceptable (50-69%), poor (30-49%), and insufficient (<30%) about knowledge about coronary disease and CR<sup>5</sup> The instrument was pretested and internal consistency of this tool was assessed using Cronbach  $\alpha$  ( $r= 0.82$ ).

Data was collected in month of October to December, 2019 by using face to face interview method, it takes around 20 minutes to complete. Prior to data collection, the study was approved by the Institutional Review Committee (IRC) CMC-TH for the protection of human subjects. The participants were informed about the purpose of the study. In addition to this, they were also informed that responses would be kept confidential, and they would have the right to withdraw from the study at any time. Educational Package on cardiac rehabilitation (pamphlet) was developed based on AHA guideline and extensive literature search and distributed to the each respondent after pre-test data collection and after one month post-test was also collected from same sample to evaluate effectiveness of nurse-led cardiac rehabilitation program.

Data was analyzed using statistical package for the social sciences (SPSS) version for window version 16.0. Descriptive (Percentage, frequency, mean and standard deviation) analysis also has been used to test and inferential statistic (Wilcoxon signed rank test) was used to find out effectiveness of educational package as well as pre and post test score difference of the respondents. Study sample of the participant are restricted by the classification level of knowledge in Ghisi et al. (2010) due to study design researchers had chosen. Therefore, to find a p-value the collapsing of range needed to be performed in order to classify the level of knowledge which was an acceptable (50-69%), good (70%-89%) and an excellent knowledge (90%-100%) has to be combined and considered as an acceptable knowledge ( $\geq 50\%$ ). For insufficient (<30%), and poor knowledge (30%-49%), these had been merged together and considered as non-acceptable knowledge with range <50%. The significance value was set at  $p < 0.05$ .

## RESULTS

Table 1 shows that the majority of the respondents were older aged (43.5%), male (52.9%), resided in urban (64.7%), living single (50.6%), Brahmin/Chhetri (52.9%), Hindu (78.8%), nuclear family (57.6), literate (54.1), and housework (42.4).

**Table 1: Socio-demographic Characteristics of the Respondents n=85**

Variables	Number (Percent)
<b>Age group (in years)</b>	
Adulthood(21-40)	13(15.3)
Middle age(41-60)	35(41.2)
Old aged( $\geq 61$ )	37(43.5)
<i>Mean age <math>\pm</math> SD= 56.95<math>\pm</math>15; Min =15 &amp; Max 91 years</i>	
<b>Sex</b>	
Male	45(52.9)
Female	40(47.1)
<b>Place of Residence</b>	
Rural	30(35.3)
Urban	55(64.7)
<b>Living Status</b>	
Living with family	42(49.4)
Living single*	43(50.6)
<b>Ethnicity</b>	
Brahmin/Chhetri	45(52.9)
Janajati	26(30.6)
Dalit	8(9.4)
Others	6(7.1)
<b>Religion</b>	
Hindu	67(78.8)
Non-Hindu	18(21.2)
<b>Type of Family</b>	
Nuclear	49(57.6)
Joint	36(42.4)
<b>Education</b>	
Literate	46(54.1)
Illiterate	39(45.9)
<b>Occupation**</b>	
Agriculture	26(30.6)
Housework	36(42.4)
Service	10(11.8)
Business	13(15.2)

\* Included unmarried, divorced, widower/widow; \*\*Included household activities like cooking, washing, cleaning, etc but do not earn money

Table 2 shows that the disease related characteristics of the respondents. Majority of them had been diagnosed with Angina pectoris (56.5%) and 1 year or above duration of treatment (56.5%). Similarly, common mode of treatment was CMT (52.9%), presence of HTN (68.2%), DM (40.0%) and high cholesterol (58.8%) as common comorbidities among CAD patients.

**Table 2: Disease related Characteristics of the Respondents n=85**

Variables	Number (Percent)
<b>Clinical Diagnosis</b>	
Myocardial Infarction	22(25.9)
Angina Pectoris	48(56.5)
Ischemic heart disease	15(17.6)
<b>Duration of Treatment</b>	
<1 year	37(43.5)
≥1Years	48(56.5)
<b>Mode of Treatment*</b>	
CMT	45(52.9)
CMT+PI	24(28.3)
CMT+CABG	8(9.4)
CMT+PI+CABG	8(9.4)
<b>Presence of Co-morbidities</b>	
High blood pressure	58(68.2)
Diabetes Mellitus	34(40.0)
High Cholesterol	50(58.8)

\*CMT=Continuous Medical Treatment, PI= Percutaneous Intervention and CABG= Coronary Artery Bypass Graft

Table 3 shows that before and after behaviour patterns of respondents. Most of the respondents had smoking habit (before-56.5% and after 44.7%), tobacco use (before 48.2% and after 40.0%), and alcohol consumption (before 52.9% and after 45.9%), eat red meat (before 82.4% and after 69.4%), eat fatty substance (before 82.4% and after 65.9%) and sedentary life style (before 51.8% and 43.5%).

**Table 3: Behaviour Patterns of the Respondents n=85**

Variables	Before diagnosis	After diagnosis
	Number (Percent)	Number (Percent)
Smoking habit	48(56.5)	38(44.7)
Tobacco use	41(48.2)	34(40.0)
Alcohol consumption	45(52.9)	39(45.9)
Eat red meat	70(82.4)	59(69.4)
Eat fatty substance	70(82.4)	56(65.9)
Sedentary life style	44(51.8)	37(43.5)

Table 4 depicts median difference of pre and post-test on overall knowledge score regarding CR. The median difference has rose sharply from 17 (IQR=14-22) to 39(IQR=32-44) after educational intervention. Using Wilcoxon signed rank test signifies the effectiveness of intervention was statistically significant (<0.001).

**Table 4: Median difference between Pre and Post-test Overall Scores Regarding Cardiac Rehabilitation n=85**

Mean Difference between Pre and Post-test Overall Scores		*P-value
Pre-test	Post-test	
Median (IQR)	Median(IQR)	
17 (14-22)	39 (32-44)	<0.001

Possible range 0-57; IQR (Inter Quartile Range) ; \*Using Wilcoxon signed rank test

Table 5 shows the area of knowledge regarding CR among CAD patients. The highest mean percent score of knowledge area was found in A1 (physiopathology, signs and symptoms area) for both pre (50.4%) and post-test (69.4%) and all areas of knowledge (A1-A4) were increased in post-test than pre-test mean score and mean percent. This clearly indicates that educational intervention has positive effects on four areas of knowledge on CR among CAD patients.

**Table 5: Areas of Knowledge regarding Cardiac Rehabilitation of the Respondents n=85**

*Areas	Items	Possible highest score	Obtained range		Mean± SD		Mean%	
			pre	post	Pre	Post	Pre	Post
A1	5	15	0-10	2-15	5.04±2.29	10.41±2.81	50.4	69.4
A2	8	24	0-15	4-24	6.58±3.17	15.81±4.17	43.86	65.87
A3	8	24	0-14	3-24	6.35±2.92	15.86±4.35	45.35	66.08
A4	8	24	0-17	7-24	7.69±3.45	16.02±3.88	45.23	66.75

\*A1-physiopathology, signals and symptoms; A2- risk factors and lifestyle; A3 - diagnostic, treatment and medicines; and, A4- physical exercise; knowledge range=0-100

**Table 6: Mean difference between Pre and Post-test CADE-Q Knowledge Scores Regarding Cardiac Rehabilitation**

n=85

Items no.	Knowledge on CADE-Q	Pre-test	Post-test	P-value*
		Mean± SD	Mean± SD	
Q1	Coronary Artery Disease (CAD) is	0.75±1.02	2.15±1.19	<0.001
Q2	Most influencing risk factors of MI	0.88±1.14	2.39±0.88	<0.001
Q3	Typical symptom of CAD	1.42±1.29	2.25±1.11	<0.001
Q4	Most accurate understanding of CAD	0.96±1.14	1.99±1.20	<0.001
Q5	The best time of the day for exercise	0.74±1.02	1.76±1.27	<0.001
Q6	Diagnosis and prognosis of CAD	1.06±1.19	2.26±1.12	<0.001
Q7	Management of blood cholesterol	1.05±1.31	2.22±1.23	<0.001
Q8	Use of “nitroglycerin”	0.35±0.81	1.85±1.38	<0.001
Q9	Recommended Dietary components	1.09±1.37	2.09±1.32	<0.001
Q10	Values for LDL and HDL cholesterol	0.15±0.52	1.71±1.41	<0.001
Q11	Avoid carrying out usual exercise	0.76±1.05	1.98±1.24	<0.001
Q12	Experiencing angina while walking	1.06±1.19	2.04±1.13	<0.001
Q13	Knowledge about physical exercise	1.15±1.32	2.09±1.24	<0.001
Q14	Physical Activity for CAD patient	1.46±1.37	2.13±1.25	0.004
Q15	Important to long term cardiac health	0.91±1.14	1.99±1.25	<0.001
Q16	Pattern for exercise activity	1.14±1.32	2.39±1.07	<0.001
Q17	Appropriate guidance for HTN patient	0.85±1.12	2.24±1.16	<0.001
Q18	Knowledge on psychological stress	0.87±1.12	1.61±1.36	0.001
Q19	Interventions, which can improve a patient’s quality of life	0.72±1.13	1.46±1.37	<0.001

Possible range 0-3; \*Using Wilcoxon signed rank test

Table 6 reveals mean difference of 19 items of CADE-Q for pre and post-test. As given, pretest mean difference was found to be lower than post-test in each item, which is statistically significant at the level of p-value <0.005 by using Wilcoxon signed rank test.

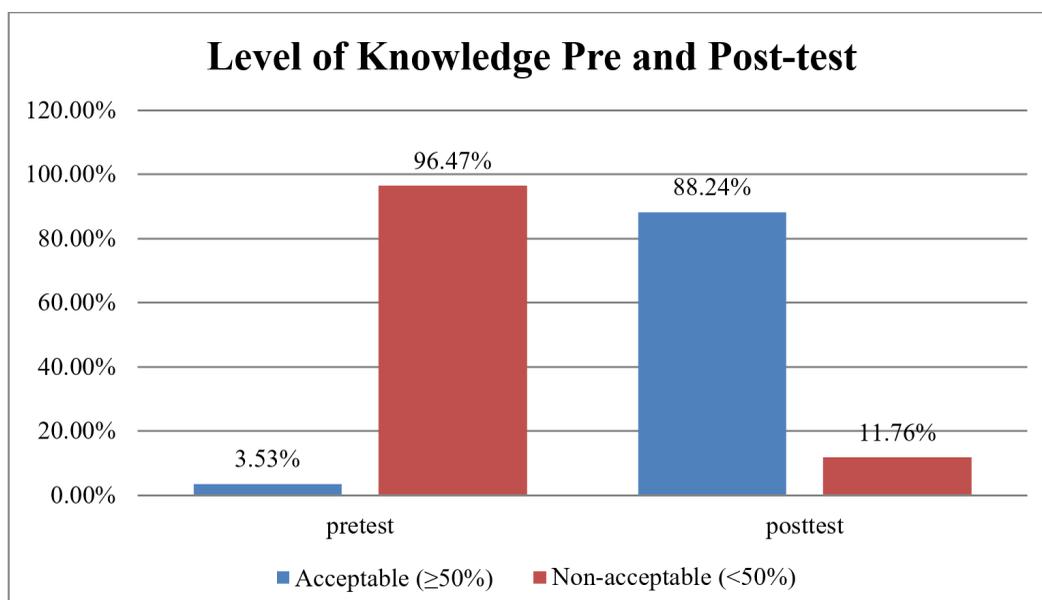
Table 7 shows the level of knowledge regarding CR among CAD patients. The level of knowledge classified into five as shown in table. The pre-test percentage on given knowledge illustrates higher proportion on **Poor** (52.9%) level of knowledge while in post-test higher proportion was on **Good** (45.9%).

**Table 7: Level of Knowledge regarding Cardiac Rehabilitation of the Respondents**

Knowledge Level	Sum of points	Number (Percent)	
		Pre-test	Post-test
Excellent (90-100%)	51-57	0 (0.00)	3 (3.5)
Good (70-89%)	40-50	0(0.00)	39 (45.9)
Acceptable (50-69%)	29-39	3(3.5)	33 (38.8)
Poor (30-49%)	17-28	45(52.9)	10 (11.8)
Insufficient (< 30%)	< 17	37(43.6)	0 (0.00)
Total (0-100%)	0-57	85(100)	85(100.0)

Figure 1 reveals that patients scored 96.47% as non-acceptable (<50%) knowledge score on pre-test and remarkable decline on post-test being 11.76%. Respondents’ score on pre-test was quiet low being 3.53% as acceptable score (≥50%), however

in post-test score upsurge by 88.24%. This designates that the educational intervention on CR is effective for CAD patient.



**Figure1: Level of Knowledge regarding CR according to Pre and Post-test Score**

Table 8 demonstrates the outcomes of comparison of non-acceptable and acceptable level of knowledge with pre and post-test score among study sample (n=85). There was statistically significance difference between pre and post-test score with level of knowledge in this study ( $p < 0.001$ ). The non-acceptable knowledge during pre-test has declined in post-test whereas for an acceptable knowledge there was rise in post-test compared to pre-test score.

**Table 8: Comparison of Level of Knowledge of Cardiac Rehabilitation Pre and Post- Educational Intervention Program n=85**

Knowledge Level	Pre-test Number (Percent)	Post-test Number (Percent)	p-value
Non-acceptable (<50%)	82(96.47%)	10(11.8%)	<0.001
Acceptable (≥50%)	3(3.53%)	75(88.2%)	

## DISCUSSION

Findings of this study suggested that the educational intervention program was successful in bringing significant changes in the knowledge about cardiac rehabilitation in CAD patients. The result from this study was found to be consistent with other interventional studies.<sup>13,19-23</sup> Regarding selected variables, majority were male, literate, continues medical treatment, hypertensive. These findings were similar to the findings of a study done in Brazil.<sup>5</sup> After diagnosis of disease they changed their behaviour patterns which was also consistent with a study done in India.<sup>12</sup>

This study also reported that median score was improved in post-test than pre-test. The non-acceptable knowledge level during pre-test has declined in post-test whereas for an accept-

able knowledge there was rise in post-test compared to pre-test score. This finding was supported by another study done in Malaysia<sup>13</sup> and Nepal.<sup>21</sup>

Similarly, in pretest majority of respondent had poor knowledge on cardiac rehabilitation. However, after receiving educational intervention program their level of knowledge regarding the CR improved. This finding was consistent with various other studies.<sup>13,15</sup> Moreover, a systematic review reported that cardiac rehabilitation program have shown to reduce risk factors, such as clinical and behaviour related intervention including physical, diet, and smoking habit. These core components of CR program intervention lead to improved knowledge score among CAD patient.<sup>22</sup>

Due to use of only one group pre-test and post-test design the result of this study might have been affected by maturation and history effect. Likewise sampling might also have affected the result or conclusion of the study and cannot represent an entire population.

## CONCLUSION

It is concluded that level of knowledge on cardiac rehabilitation among CAD patients in Nepal was found to be non-acceptable in pre-test however in the post test, level of knowledge of the CAD patient raised to an acceptable level after educational intervention. It is also reported that there is an improvement in the level of knowledge after an immediate post-test data from non-acceptable to an acceptable level of knowledge compared to pre-test data. Thus, we can conclude that the health education regarding CR is very crucial to increase the level of knowledge among CAD patients. Hence, every tertiary level hospital should have a nurse-led cardiac rehabilitation unit in their institution for a better prognosis and quality of life of patients suffering from CAD.

## ACKNOWLEDGEMENTS

This study was made possible by support and co-operation of the cardiology team and supporting staffs of the OPD of CMC-TH. We are also thankful to the respondents for their valuable information and time for this study.

**CONFLICT OF INTEREST:** None declared

**FINANCIAL DISCLOSURE:** None

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