



Effect of structured health education on knowledge of lifestyle modifications among patients after coronary angioplasty: A pre-experimental study

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Abstract

Background: Coronary angioplasty is one of the most commonly performed procedures for the treatment of coronary artery disease. Although the procedure improves coronary blood flow, long-term outcomes depend largely on patients' adherence to recommended lifestyle modifications. Lack of knowledge regarding dietary management, physical activity, medication adherence, smoking cessation, and stress reduction may increase the risk of recurrent cardiovascular events.

Aim: To assess the effectiveness of a Structured Teaching Programme (STP) on knowledge regarding lifestyle modifications after coronary angioplasty among patients and to determine the association between knowledge scores and selected socio-demographic variables.

Methods: A quantitative pre-experimental one-group pre-test post-test design was adopted. The study was conducted among 50 coronary angioplasty patients admitted to Capital Hospital, Bhubaneswar, Odisha. Participants were selected using purposive sampling. Data were collected using a socio-demographic questionnaire and a structured knowledge questionnaire consisting of 42 items. Following the pre-test, a Structured Teaching Programme was administered. Post-test assessment was conducted after seven days. Descriptive and inferential statistics were used for data analysis.

Results: The findings revealed a significant improvement in post-test knowledge scores compared to pre-test scores following the administration of the Structured Teaching Programme. The intervention effectively enhanced patients' knowledge regarding diet, exercise, smoking cessation, stress management, medication adherence, and follow-up care after coronary angioplasty.

Conclusion: The Structured Teaching Programme was effective in improving patients' knowledge regarding lifestyle modifications after coronary angioplasty. Incorporating structured educational interventions into routine cardiac care may improve patient outcomes and reduce future cardiovascular complications.

Keywords: Structured teaching programme, coronary angioplasty, lifestyle modification, knowledge, patient education, cardiac rehabilitation

Introduction

Coronary artery disease (CAD) is a leading cause of morbidity and mortality worldwide. Coronary angioplasty, also known as Percutaneous Coronary Intervention (PCI), is an effective procedure used to restore blood flow through narrowed or blocked coronary arteries. Despite technological advances and improved procedural outcomes, the long-term success of angioplasty depends greatly on patients' adherence to lifestyle modifications^[1].

Lifestyle modifications such as maintaining a heart-healthy diet, engaging in regular physical activity, controlling body weight, adhering to prescribed medications, avoiding tobacco and alcohol, and managing stress are essential components of secondary prevention following angioplasty. These measures significantly reduce the risk of restenosis, recurrent myocardial infarction, hospitalization, and mortality^[2].

Cardiovascular diseases (CVDs) remain the leading cause of mortality worldwide, accounting for a significant proportion of premature deaths and disability. Among these conditions, coronary artery disease (CAD) is one of the most prevalent forms of cardiovascular illness, resulting from the narrowing or blockage of coronary arteries due to atherosclerotic plaque formation. CAD imposes a substantial burden on healthcare systems and adversely affects the quality of life of affected individuals^[3]. Coronary angioplasty, also known as percutaneous coronary intervention (PCI), is a commonly performed therapeutic procedure used to restore blood flow in narrowed or blocked coronary arteries. Advances in interventional cardiology have significantly improved the success rates of angioplasty, reducing symptoms, improving cardiac function, and decreasing mortality among patients with CAD. Despite these benefits, angioplasty does not eliminate the underlying

atherosclerotic disease process. Patients remain at risk for recurrent cardiovascular events, restenosis, and progression of coronary artery disease if appropriate preventive measures are not adopted [4].

Lifestyle modification is a cornerstone of secondary prevention following coronary angioplasty. Evidence suggests that healthy lifestyle behaviors, including adherence to a balanced diet, regular physical activity, smoking cessation, weight management, stress reduction, medication compliance, and routine follow-up care, play a crucial role in preventing disease progression and improving long-term outcomes. Patients who adopt recommended lifestyle changes are more likely to experience reduced cardiovascular risk, improved functional status, and enhanced quality of life [5].

However, many patients encounter challenges in understanding and implementing these lifestyle recommendations after discharge. Factors such as inadequate knowledge, low health literacy, misconceptions regarding disease management, and insufficient counseling may hinder adherence to healthy behaviors. Studies have demonstrated that a lack of awareness regarding lifestyle modifications contributes significantly to recurrent cardiac complications and hospital readmissions [6].

Health education is recognized as an effective strategy for empowering patients with the knowledge and skills necessary to manage their health conditions. Structured health education programs provide systematic, organized, and evidence-based information that enhances patient understanding and promotes positive behavioral changes. Such educational interventions have been shown to improve knowledge, self-care practices, treatment adherence, and

cardiovascular outcomes among patients with coronary artery disease [7].

Nurses play a vital role in delivering health education and facilitating lifestyle modification among cardiac patients. Through individualized teaching and counseling, nurses can assist patients in recognizing risk factors, adopting healthier lifestyles, and maintaining long-term behavioral changes. Structured educational interventions conducted by nurses have the potential to bridge knowledge gaps and support effective self-management following coronary angioplasty [8, 9].

Although coronary angioplasty is frequently performed in healthcare settings, there is limited evidence regarding the effectiveness of structured health education programs on patients' knowledge of lifestyle modifications in many clinical settings. Assessing the impact of educational interventions is essential for developing evidence-based nursing strategies that promote secondary prevention and improve patient outcomes [10].

A systematic review commissioned by AHRQ found public reporting about a health care structure, process, or outcome was associated with a small decline in mortality after controlling for trends in reductions in mortality, but at the same time they also noted that heterogeneity of the outcomes and moderate strength of evidence for most outcomes made it difficult to draw definitive conclusions [11].

Therefore, the present study was undertaken to evaluate the effect of a structured health education programme on knowledge regarding lifestyle modifications among patients after coronary angioplasty. The findings of this study may contribute to strengthening patient education practices and enhancing the quality of cardiac rehabilitation services.

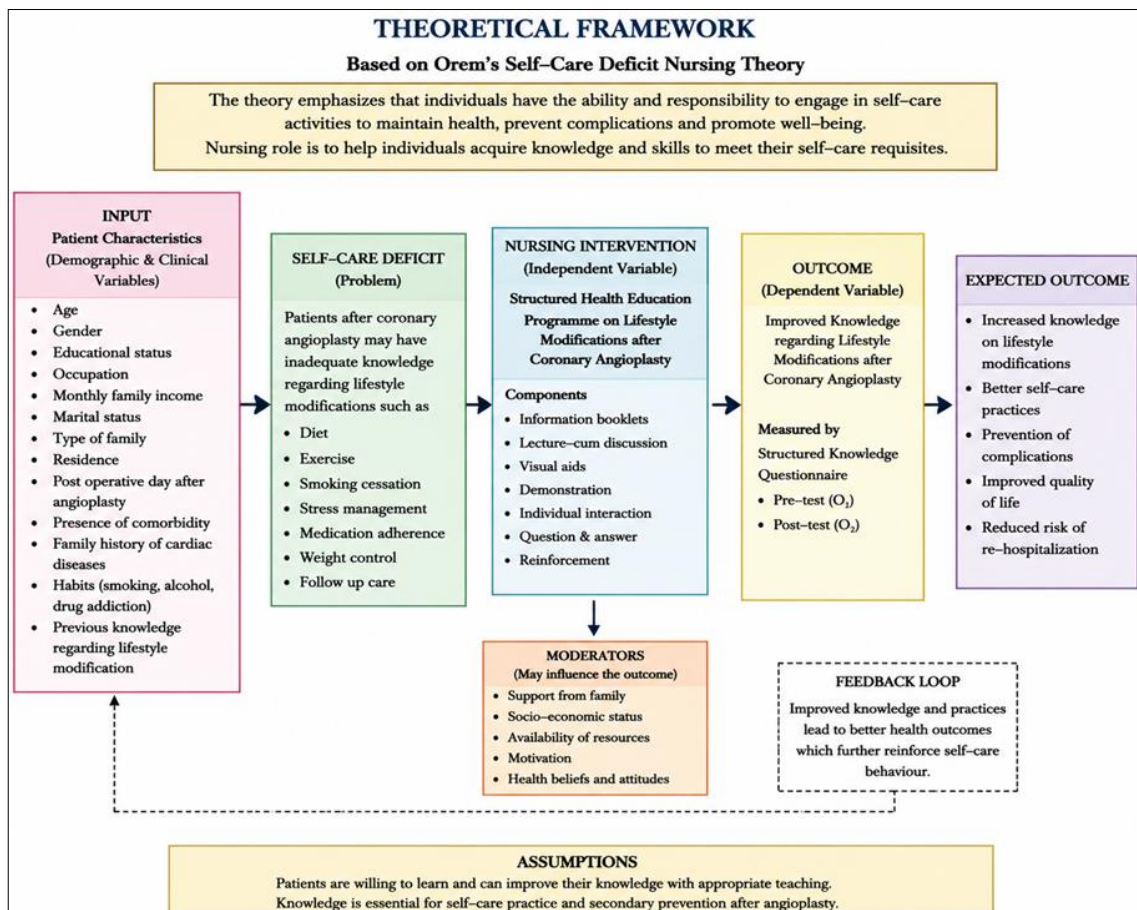


Fig 1: Dorothea Orem's Self-Care Deficit Nursing Theory

According to Orem's Self-Care Deficit Nursing Theory, patients are responsible for maintaining their health through self-care activities. After coronary angioplasty, many patients may lack knowledge regarding lifestyle modifications such as healthy diet, exercise, smoking cessation, stress management, medication adherence, and follow-up care. The Structured Health Education Programme helps address this knowledge deficit by providing systematic education. Improved knowledge promotes better self-care practices, reduces complications, and enhances recovery and quality of life after coronary angioplasty.

Materials and Methods

Research Design and Setting

A quantitative pre-experimental one-group pretest–posttest design was adopted to evaluate the effect of structured health education on knowledge regarding lifestyle modifications among patients after coronary angioplasty. The study was conducted in the cardiology department and cardiac wards of a selected tertiary care hospital in Bhubaneswar, Odisha. The setting was chosen due to the availability of post-coronary angioplasty patients, accessibility of participants, and feasibility of conducting the educational intervention and follow-up assessment.

Design Representation

$O_1 \rightarrow X \rightarrow O_2$

Where:

- O_1 = Pretest assessment of knowledge regarding lifestyle modifications after coronary angioplasty
- X = Structured Health Education Programme
- O_2 = Posttest assessment of knowledge regarding lifestyle modifications after coronary angioplasty

Population, Sample and Sampling Technique

The population of the study comprised all patients who had undergone coronary angioplasty and were admitted to the cardiac wards of selected hospitals in Bhubaneswar, Odisha. A sample of 50 post-coronary angioplasty patients was selected for the study. A non-probability purposive sampling technique was used to recruit participants who met the inclusion criteria and were available during the data collection period. This sampling method facilitated the selection of participants who were appropriate for evaluating the effectiveness of the structured health education programme on knowledge regarding lifestyle modifications after coronary angioplasty.

Sample Size

A total of 50 coronary angioplasty patients were included in the study. The sample size was calculated using Yamane's formula.

Inclusion Criteria

- Participants were included if they:
- Patients aged 18 years and above.
- Patients who underwent coronary angioplasty within the previous week.
- Medically stable patients.
- Patients able to understand Odia, Hindi, or English.
- Patients willing to participate and provide written informed consent.

Exclusion Criteria

Participants were excluded if they:

- Critically ill patients requiring intensive care.
- Patients with severe psychiatric illness or cognitive impairment.
- Patients who had previously undergone structured cardiac rehabilitation training.
- Patients unwilling to participate.

Variables

Independent Variable: Structured Health Education Programme on Lifestyle Modifications After Coronary Angioplasty

Dependent Variable: Knowledge Regarding Lifestyle Modifications Among Patients After Coronary Angioplasty

Demographic Variables: age, gender, educational status, occupation, monthly family income, marital status, type of family, residence, comorbidities, family history of cardiac disease, and health-related habits were considered as extraneous variables and were analyzed for their association with knowledge scores.

Tool for Data Collection

The research instrument was developed after an extensive review of literature and expert consultation. The tool consisted of two sections:

Tool I: Socio-Demographic Proforma

The socio-demographic tool consisted of variables such as age, gender, educational status, occupation, monthly family income, marital status, type of family, residence, post-operative duration, comorbidities, family history of cardiac disease, habits, dietary pattern, and previous knowledge.

Tool II: Structured Knowledge Questionnaire

The structured questionnaire consisted of 42 multiple-choice questions assessing knowledge regarding:

- Coronary angioplasty
- Coronary artery disease
- Risk factors
- Dietary modification
- Physical activity and exercise
- Smoking and alcohol cessation
- Stress management
- Medication adherence
- Follow-up care

Each correct response carried one mark and incorrect responses received zero marks.

Validity and Reliability

Content validity of the instrument was established through review by five nursing experts:

- Medical-Surgical Nursing (3 experts)
- Nursing Education (2 expert)

Necessary modifications were made according to expert recommendations.

The reliability of the structured knowledge questionnaire was established using the test–retest method among patients with characteristics similar to those of the study population. The questionnaire was administered twice with a seven-day

interval, and the scores were correlated using Karl Pearson's correlation coefficient formula. The reliability coefficient obtained was $r = 0.78$, indicating that the tool was reliable and appropriate for data collection in the present study.

Data Collection Procedure

Administrative Permission and Ethical Clearance

Prior to data collection, formal permission was obtained from the concerned authorities of the selected hospital. Ethical approval was secured from the Institutional Ethics Committee (IEC) to ensure that the study complied with ethical principles and protected the rights of the participants.

Selection of Participants

Patients who had undergone coronary angioplasty and met the inclusion criteria were identified from the cardiac wards of the selected hospital. A non-probability purposive sampling technique was used to recruit eligible participants.

Informed Consent

The purpose and objectives of the study were explained to the participants. Confidentiality and anonymity were assured, and written informed consent was obtained from each participant before data collection.

Pretest Assessment

Baseline data were collected using a structured interview schedule consisting of socio-demographic variables and a structured knowledge questionnaire on lifestyle modifications after coronary angioplasty. The pretest was conducted individually and required approximately 20–30 minutes to complete.

Implementation of Structured Health Education Programme

Following the pretest, the Structured Health Education Programme was administered to the participants. The programme included information regarding coronary artery disease, dietary modifications, physical activity, smoking and alcohol cessation, medication adherence, stress

management, weight control, and regular follow-up care. Teaching was delivered using lecture-cum-discussion, visual aids, and informational pamphlets in a language understandable to the participants. Each session lasted approximately 45–60 minutes.

Posttest Assessment

Seven days after the educational intervention, a posttest was conducted using the same structured knowledge questionnaire to assess the effectiveness of the Structured Health Education Programme. The posttest scores were compared with the pretest scores to determine knowledge gain among the participants.

Data Organization and Analysis

The collected data were coded, tabulated, and entered into a master data sheet for statistical analysis. Descriptive and inferential statistics were used to analyze the findings according to the objectives of the study.

Ethical Considerations

Ethical principles were strictly maintained throughout the study:

Ethical clearance was obtained from the Institutional Ethics Committee. Administrative permission was obtained from the Superintendent of Capital Hospital, Bhubaneswar. Written informed consent was obtained from all participants, and confidentiality of collected information was maintained throughout the study.

Data Analysis

Data was carried out using SPSS version 21. Descriptive statistics: frequency, percentage, mean, Standard deviation. Inferential: Paired t-test was used to compare pre-test and post-test knowledge scores. Chi-square test was used to determine the association between post-test knowledge scores and selected demographic variables. A p-value less than 0.05 was considered statistically significant.

Results

Table 1: Frequency (f) and percentage (%) distribution of patients according to socio demographic variables in group. (N= 50)

| Sl. No | Socio demographic Variables | Frequency (f) | Percentage (%) |
|--------|-----------------------------|---------------|----------------|
| 1. | Age in years | 6 | 12 |
| | 20- 24 years | 10 | 20 |
| | 25- 29 years | 14 | 28 |
| | 30- 34 years | 20 | 40 |
| 2. | Above 35 years | | |
| | Gender | 34 | 68 |
| | Male | 15 | 30 |
| 3. | Female | 1 | 2 |
| | Transgender | | |
| | Educational status | 6 | 12 |
| | a. No formal education | 14 | 28 |
| 4. | b. Primary | 18 | 36 |
| | c. Secondary | 12 | 24 |
| | d. Graduate or above | | |
| | Occupational status | 15 | 30 |
| 5. | a. Unemployed | 10 | 20 |
| | b. Laborer | 12 | 24 |
| | c. Private employee | 8 | 16 |
| | d. Government employee | | |
| 6. | Monthly family income | 4 | 8 |
| | a. Upper class | 10 | 20 |
| | b. Upper middle class | 16 | 32 |
| 7. | c. Lower middle class | 12 | 24 |

| | | | |
|-----|---|---------------------|----------------------|
| | d. Upper lower class e. lower class | 8 | 16 |
| 6. | Marital status Married Unmarried Single widowed | 34 9 5 2 | 68 18 10 4 |
| 7. | Types of family Nuclear Joint Extended | 26 18 6 | 52 36 12 |
| 8. | Residence a. Urban b. Rural c. Slum | 21 23 6 | 42 46 12 |
| 9. | Post operative day after angioplasty a. 1 day b. 2-day c. above 2 days | 18 17- | 36 34- |
| 10. | Presence of co morbidity a. No b. Yes, [If yes then specify] | 31 19 | 62 38 |
| 11. | Family history of cardiac diseases Yes No | 29 21 | 58 42 |
| 11. | Family history of cardiac diseases Yes No | 29 21 | 58 42 |
| 12. | Habits Smoking Alcoholism Drug addiction None of the above | 22 12 10 6 | 44 24 20 12 |
| 13. | Diet pattern Vegetarian Non-vegetarian Others | 21 25 4 | 42 50 8 |
| 14. | Previous knowledge regarding lifestyle modification after angioplasty? No b. Yes [If yes then specify] | 32 18 | 64 36 |

The above table shows that the frequency and percentage value of sociodemographic variables.

Table 2: Mean, Standard deviation and 't' value of pretest and posttest level of STP. (N= 50)

| Sl. No | Variable | Mean | Mean Difference | Standard Deviation | Paired 't' test |
|--------|-----------|-------|-----------------|--------------------|-----------------|
| 1 | Pre-test | 14.20 | 10.40 | 3.15 | 18.72 |
| 2 | Post test | 24.60 | | 2.85 | |

The findings revealed that the mean post-test knowledge score (24.60 ± 2.85) was higher than the mean pre-test knowledge score (14.20 ± 3.15), with a mean difference of 10.40. The calculated paired *t* value was 18.72, indicating a

statistically significant improvement in knowledge following the intervention. This suggests that the structured teaching programme was effective in enhancing the participants' knowledge regarding the subject under study.

Table 3: Chi square analysis showing the association between level of knowledge with selected socio demographic variables. (N= 50)

| Socio demographic characteristics | Df | Chi Square | p value |
|---|----|------------|---------|
| Age (in yrs) | 3 | 7.84 | 0.049* |
| Gender | 2 | 1.92 | 0.38 |
| Educational status of coronary angioplasty patient | 4 | 12.56 | 0.014* |
| Occupational status of coronary angioplasty patient | 4 | 6.42 | 0.17 |
| Monthly income of the family | 3 | 9.18 | 0.027* |
| Marital status | 2 | 0.84 | 0.65 |
| Types of family | 2 | 1.36 | 0.50 |
| Residence | 1 | 4.32 | 0.038* |
| Duration since angioplasty | 2 | 5.94 | 0.051 |
| Presence of co morbidity | 3 | 8.26 | 0.041* |
| Family history of cardiac disease | 1 | 3.96 | 0.047* |
| Source of information regulation of lifestyle modification | 3 | 10.72 | 0.013 |
| Diet pattern | 2 | 2.14 | 0.34 |
| Previous knowledge regarding lifestyle modification after angioplasty | 1 | 14.28 | 0.001* |

$p \leq 0.05$ * (Statistically significant)

The chi-square test was applied to determine the association between selected demographic variables and pre-test knowledge regarding lifestyle modification after angioplasty. The findings revealed that age, educational status, monthly income, residence, presence of comorbidities, family history of cardiac disease, source of information, and previous knowledge showed a statistically significant association with pre-test knowledge at $p < 0.05$ level. However, gender, occupation, marital status, type of family, duration since angioplasty, and diet pattern did not show a significant association with pre-test knowledge. Hence, the null hypothesis was rejected for selected demographic variables and accepted for others.

Discussion

The present study evaluated the effectiveness of a Structured Teaching Programme (STP) on knowledge regarding lifestyle modifications among patients after coronary angioplasty. The findings demonstrated a significant increase in knowledge scores following the intervention. The mean post-test knowledge score (24.60 ± 2.85) was considerably higher than the mean pre-test score (14.20 ± 3.15), with a mean difference of 10.40 and a paired t value of 18.72, indicating that the Structured Teaching Programme was highly effective in improving patients' knowledge.

These findings are consistent with the study conducted by Arthur *et al.*, who evaluated an educational intervention among patients with cardiovascular risk factors and reported significant improvements in participants' knowledge and self-management behaviors following structured education [12]. Similarly, the present study confirms that systematic educational interventions can effectively enhance patient understanding of disease management and lifestyle modification.

The results are also supported by the study of Aghakhani *et al.*, which found that structured patient education significantly improved knowledge and adherence to healthy lifestyle behaviors among cardiac patients after hospital discharge. The authors emphasized that education plays a critical role in secondary prevention of cardiovascular disease, which aligns with the findings of the current study.

Furthermore, the findings agree with the study conducted by Sivarajan Froelicher *et al.*, who reported that educational and counseling interventions improved awareness regarding diet, exercise, smoking cessation, and medication adherence among patients with coronary artery disease [13]. Increased knowledge subsequently contributed to better health-related behaviors and reduced risk of recurrent cardiac events.

The present study also revealed significant associations between knowledge scores and selected demographic variables such as age, educational status, monthly income, residence, co-morbidities, family history of cardiac disease, and previous knowledge. Similar findings were reported by Poreddi *et al.*, who observed that educational level and previous exposure to health information significantly influenced patients' knowledge regarding cardiovascular disease prevention and management [14].

The improvement in knowledge observed in this study may be explained by the structured and systematic nature of the educational programme, which included information on diet modification, physical activity, smoking cessation, stress management, medication adherence, and follow-up care. These findings support Dorothea Orem's Self-Care Deficit

Nursing Theory, which emphasizes that enhancing patients' knowledge enables them to perform self-care activities effectively and maintain optimal health outcomes [15]

Overall, the findings of the present study and previous research indicate that structured educational interventions are effective strategies for improving knowledge and promoting lifestyle modifications among patients after coronary angioplasty. Therefore, integrating structured teaching programmes into routine cardiac care and discharge planning may contribute to improved patient outcomes and prevention of future cardiovascular complications.

Implications of the Study

Enhances nurses' role in patient education. Improves quality of cardiac rehabilitation services. Promotes evidence-based patient teaching practices. Provides learning material for nursing students. Strengthens educational competencies in cardiovascular nursing. Supports development of standardized discharge teaching protocols. Improves quality assurance in patient education programmes. Serves as baseline evidence for future interventional studies. Encourages further research on long-term behavioral outcomes among cardiac patients.

Limitation

- Small sample size.
- Conducted in a single hospital setting.
- Absence of a control group.
- Short follow-up period.
- Findings may not be generalized to all coronary angioplasty patients.

Conclusion

The study concluded that the Structured Teaching Programme was effective in improving knowledge regarding lifestyle modifications among coronary angioplasty patients. Educational interventions play a crucial role in promoting healthy lifestyle behaviors, enhancing recovery, preventing recurrent cardiac events, and improving quality of life. Structured patient education should be integrated into routine cardiac care and discharge planning.

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Declaration of Generative AI and AI Assisted Technologies in the Writing Process

The authors declare that generative artificial intelligence (AI) and AI-assisted technologies were used only to improve the language, grammar, and readability of the manuscript. The authors reviewed and edited the content carefully and take full responsibility for the accuracy, originality, and integrity of the final manuscript. No AI tools were used for data analysis, interpretation of results, or generation of scientific conclusions.

Ethics Approval

Permission obtained from concerned authorities. Informed consent taken from participants. Confidentiality maintained.

Data availability

The data are available and may be obtained upon reasonable request.

Abbreviation

CAD – Coronary Artery Disease

PCI – Percutaneous Coronary Intervention

PTCA – Percutaneous Transluminal Coronary Angioplasty

STP – Structured Teaching Programme

IEC – Institutional Ethics Committee

MI – Myocardial Infarction

BP – Blood Pressure

LDL – Low Density Lipoprotein

HDL – High Density Lipoprotein

CR – Cardiac Rehabilitation

SPSS – Statistical Package for Social Science

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