



Contents lists available at ScienceDirect

Indian Heart Journal

journal homepage: [www.elsevier.com/locate/ihj](http://www.elsevier.com/locate/ihj)



Original Article

## Frequency and predictors of non-adherence to lifestyle modifications and medications after coronary artery bypass grafting: A cross-sectional study

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### ARTICLE INFO

*Article history:*  
Received 21 January 2017  
Accepted 19 May 2017  
Available online xxx

*Keywords:*  
Coronary heart disease  
Compliance  
Predictors

### ABSTRACT

*Background:* Non-adherence to dietary recommendations, exercise and prescribed drug regimens, in coronary heart disease (CHD) patients following coronary artery bypass grafting (CABG), is a major health care issue worldwide.

*Aims and objectives:* The primary objective of this study was to investigate the frequency and predictors of non-adherence to lifestyle changes and medication among CHD patients after undergoing CABG surgery. *Method:* The sample of this cross sectional descriptive study was 265 patients who underwent isolated primary CABG. Participants who met the eligibility criteria were provided with a pre-coded questionnaire 4 weeks or more after surgery. Adherence was assessed on the basis of patient's self-report. Significance of results was analyzed using Chi square test.

*Results:* Roughly half of the patients were non-adherent to dietary recommendations ( $n = 120, 45.3\%$ ) and exercise ( $n = 109, 41.1\%$ ) while about one third ( $n = 69, 26\%$ ) were non-adherent to prescribed medications. Unwillingness to adopt a new lifestyle and more than one social gathering per week, were found to be statistically significant predictors of non-adherence to diet ( $p$ -values  $< 0.001$ ). Reluctance to follow exercise regimen, busy schedule, and fear that exercise will aggravate heart issues were commonly reported as reasons for non-compliance to exercise. As for non-adherence to medication, forgetfulness, affordability of drugs and too many medications to take were important predictors.

*Conclusion:* Non-adherence to lifestyle modifications and medication is an emerging problem worldwide. It is essential for medical health professionals to discuss these predictors and address them individually. Our findings highlight the need for a healthy physician and patient relationship.

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### 1. Introduction

Coronary heart disease (CHD) is a major cause of morbidity and mortality throughout the world.<sup>1,2</sup> World Health Organization (WHO) predicts 11.1 million deaths will occur from CHD in 2020.<sup>3</sup> Coronary artery bypass grafting (CABG) has been the mainstay of treatment for revascularization in CHD patients, since 1960, in providing symptomatic relief and increasing life expectancy.<sup>4</sup> According to the American and European guidelines CABG has been assigned as Class 1A indication for multi-vessel revascularization.<sup>5</sup> An overall mortality after CABG has been estimated to be 3.4%.<sup>6</sup> Secondary prevention of CHD and rehabilitation of cardiac

patients after revascularization is of utmost importance in reducing the mortality associated with this disease and achieving the best possible physical, mental and social wellbeing.

A growing body of literature has shown that interventions in lifestyle, favorable modification of risk factors and selective use of prophylactic drugs can lessen the risk of non-fatal and fatal events in CHD patients.<sup>7</sup> Recent guidelines clearly define the importance of dietary modification, exercise and treatment with prophylactic drugs.<sup>8</sup> However, the key issue for these recommendations to have benefit in general population remains patient's adherence. Adherence, as defined by WHO is the extent to which a person's behavior (taking medication, following a diet, and/or executing lifestyle changes) corresponds with agreed recommendations from a health care provider.<sup>9</sup> Adherence to lifestyle interventions and prescribed drugs is the most important factor to prevent

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<http://dx.doi.org/10.1016/j.ihj.2017.05.017>

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secondary cardiac events and leads to improved satisfaction and quality of life.<sup>10,11</sup>

Non-adherence after CABG is a complex problem and a major health care issue worldwide. It may result in poor health outcome and places a substantial burden on national economies by increasing health care costs. It serves as an obstacle in the attainment of treatment goals and may actually worsen the disease. Despite the presence of guidelines for many years, several studies have shown that there is a considerable gap between the recommendations and actual clinical practice.<sup>12,13</sup> Several factors have been shown to influence non-compliance. These include living alone, poor patient-physician relationship, lack of knowledge regarding the importance of adherence, busy schedules, beliefs regarding exercise and medication and psychological factors such as anxiety and depression.<sup>14–16</sup> Multiple daily dosing, excessive costs, forgetfulness, and fear of side effects have been reported to be the most important factors leading to non-compliance to medication.<sup>17</sup> Many studies have reported the prevalence of non-compliance among CHD patients after CABG, with respect to lifestyle modification and pharmacological treatment all over the world. However, there is paucity of data with regards to non-adherence after coronary revascularization (post CABG) in our part of the world. Additionally, only a few studies have looked into the possible predictors of non-adherence to diet, exercise, and medication.

Considering the absolute importance of adherence and increasing burden of mortality from CHD in Asia, the primary objective of this study was to investigate the frequency and predictors of non-adherence to lifestyle changes and medications among CHD patients after undergoing CABG surgery.

## 2. Methodology

In this cross-sectional descriptive survey, patients who underwent isolated primary CABG at two tertiary care hospitals in Pakistan were included. Non-randomized convenient sampling was done at two tertiary care hospitals. This study was conducted during a 12-month period from June 2015 to June 2016 after approval from the Institutional Review Board of Dow University of Health Sciences. The eligible patient had to be an adult over 18 years of age who underwent surgery 4 or more weeks prior to the filling of the questionnaire handed out to them on their follow-up visit. Patients who were prescribed one or more targeted drug classes at discharge or prior to the survey were included. Patients who were unable or reluctant to provide informed consent or left the questionnaire incomplete; Patients with unfavorable short term prognosis such as cancer patients or patients with end stage renal disease; subjects with preexisting medical conditions, other than diabetes, hypertension or hyperlipidemia, that required the use of additional medications were excluded. Patients with severe degenerative joint disease and documented mental disorder were also excluded from the study.

A total of 345 CABG surgeries were performed during the study time period, out of which 293 patients were eligible for our study. Of these 293 patients 280 gave informed consent to participate in the study. However, 11 patients were lost for the follow-up and 4 patients left the questionnaire incomplete, which yielded the final sample to be 265 patients. Therefore, the co-operation rate was 94.6%. Participants who met the eligibility criteria were provided detailed information about the study. A pre-coded questionnaire formulated in English as well as the native language was handed out to the patients. For assistance of patients who found it difficult to fill out the questionnaire, two interviewers who remained unaware of the outcome of interest were trained to carry out the task so as to minimize interviewer bias.

The questionnaire was pilot tested and thoroughly reviewed and validated by two cardiologists to ensure relevance of the questions included. The questionnaire was divided into 4 sections. The first section inquired about patient's demographic and baseline characteristics including age, gender, marital status, use of tobacco and number of social gatherings per week. Patient's medical records were reviewed to seek data on co-morbidities such as Diabetes, Hypertension and Hyperlipidaemia, and any prior history of stroke.

In the second section, patient's adherence to dietary modification was assessed. Non-compliance to diet was defined as people not meeting even one of the following dietary recommendations twice or more than twice a week (as reported by themselves): Consumption of less than approximately 300mg of dietary cholesterol per day, cut back on foods and beverages with added sugar, consumption of food with little or no added salt (aim to eat 1500mg to no greater than 2300mg of sodium per day). Furthermore, predictors for non-compliance were assessed through dichotomous questions about willingness to adopt a new lifestyle, having a partner/family member follow along, belief that poor lifestyle can increase risk of future heart attacks, and feeling of excessive restrictions leading to non-adherence. More than 1 social gathering per week was also included as a possible predictor of dietary non-compliance.

Third section of the questionnaire dealt with determining adherence to exercise prescription and possible factors that could affect adherence. Based on recommendations from Coronary Artery Bypass Surgery Safe Exercise Guidelines,<sup>18</sup> Individuals with moderate activity that is, non-stop walking at a comfortable pace for 30–60min a day for at least 3 days per week were considered to be compliant. To determine factors that rendered them noncompliant, respective patients were asked whether they felt reluctant to follow an exercise regimen, had a hectic daily schedule, felt fatigued after exercising or simply believed that exertion might aggravate their heart condition. Additionally, patients were asked if they had a partner/friend accompanying them in their exercise routine. Patient's knowledge about correlation of lack of exercise and risk of future heart attacks was also assessed.

In the following section, adherence toward medication was gauged by the Morisky Scale 8.<sup>19</sup> A patient having score of 3–8 was considered noncompliant. Factors for noncompliance were sought by inquiring patients regarding their inability to follow their medicine prescription. They were asked if they skip doses because they seldom forget to take medicines, have been prescribed a lot of medicines, fear their side effects, or find them expensive. Unavailability of a partner to keep track of the drug regimen was considered a predictor of noncompliance.

Data were entered into an SPSS version 24.0 dataset, and coded for further analysis. The frequencies and significance of factors of noncompliance to dietary modification, exercise and medication were individually calculated through Chi-square test for dichotomous variables with *p* value <0.05 holding significance. Estimates of each predictor (odds ratios and 95% confidence intervals) were calculated. Qualitative variables were expressed as frequencies and percentages. Quantitative variables were expressed as mean ± standard deviation.

## 3. Results

Out of 280, 265 patients (94.6%) filled the questionnaire about adherence to lifestyle modifications and medication after CABG. The mean follow-up time period was  $5.7 \pm 1.3$  weeks. 45.3% (*n* = 120) and 41.1% (*n* = 109) were non-adherent to dietary recommendations and exercise respectively, while only 26%

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