The Effect of Cardiac Rehabilitation Program on Depression in Patients after Acute Coronary Events

Thesis

Submitted for Fulfillment of the Master Degree in Cardiology

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List of Abbreviations

| Abb. | Full term |
|--------|---|
| AACVPR | Association of Cardiovascular and Pulmonary Rehabilitation |
| ACS | Acute coronary syndrome |
| BDI | Beck Depression Inventory |
| CAD | Coronary artery disease |
| CBT | Cognitive behavioral therapy |
| CCS | Canadian Cardiovascular Society |
| CR | Cardiac rehabilitation |
| CVD | Cardiovascular disease |
| DASS | Depression Anxiety Stress Scale |
| DBP | Diastolic blood pressure |
| DM | Diabetes Mellitus |
| DSM-5 | Diagnostics and Statistical Manual of Mental Disorders, Fifth Edition |
| ECA | Epidemiologic Catchment Area |
| GAD | Generalized anxiety disorder |
| HADS | Hospital Anxiety and Depression Scale |
| HTN | Hypertension |
| НРА | Hypothalamic-pituitary adrenal |
| HR | Heart rate |
| IP | Interpersonal |
| MDD | Major depressive disorder |
| NYHA | New York Heart Association |
| PD | Psychodynamic |

Ist of Abbreviations

| Abb. | Full term | |
|----------|---|--|
| PHQ | Patient Health Questionnaire | |
| PRIME-MD | Primary Care Evaluation of Mental Disorders | |
| RCTs | Randomized controlled trials | |
| SBP | Systolic blood pressure | |
| SD | Standard Deviation | |
| SSRIs | Selective serotonin reuptake inhibitors | |
| WHO | World Health Organization | |

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Introduction

The World Health Organization estimates that cardiovascular disease and depression are currently the two most common causes of disability in high-income countries (*Sipötz et al.*, 2013).

Coronary artery disease continues to be a major focus of clinical and epidemiological research, where non-modifiable cardiovascular risk factors, such as age, gender, family history, and race, as well as modifiable risk factors, such as hypertension, weight, smoking, sedentary lifestyle, abnormal lipid profiles, inflammatory markers, diabetes, metabolic syndrome, and subclinical CAD, are associated with increased cardiovascular risk (*Almdal et al.*, 2004).

Despite these findings, typically measured risk factor do not fully account for all the variation in outcomes .A number of psychological states and traits, such as depression, anxiety, anger, and stress, have also been implicated as potential risk factors for CAD (*Baumeister et al.*, 2015).

One study found that even mild symptoms of depression can predict mortality, morbidity and poorer clinical outcomes in those with myocardial infarction (*Lespérance et al.*, 2007).

Introduction 🕏

Regular exercise training has been associated with significant reductions in cardiovascular disease events, cardiovascular disease mortality, and all-cause mortality (*Lavie et al.*, 2001). There is also substantial evidence to suggest that cardiac rehabilitation exercise training programs result in notable reductions in depressive symptoms, anxiety, hostility, and overall psychological stress (*Milani et al.*, 1996), (*Lavie et al.*, 2004), (*Lavie et al.*, 1999) and improves the mortality risk associated with adverse psychological risk (*Lavie et al.*, 2007).

🕮 Aim of the Work 🕏

Aim of the Work

The aim of this study is to examine the effect of the cardiac rehabilitation on depressive symptoms in patients after acute coronary events.

Chapter (7):

Depression and the Heart

A growing body of evidence supports a relationship between psychosocial stressors and chronic disease progression. The influence of psychosocial stressors on chronic illnesses remains under-recognized when compared with other risk factors. Chronic disease states, which might be affected by psychosocial factors, include cardiovascular disease, diabetes, cancer, rheumatoid arthritis, human immunodeficiency virus. and chronic obstructive pulmonary disease. Psychological factors, which have the potential to affect the onset or progression of chronic diseases, include depression, anxiety, anger/hostility, acute and chronic life stressors, and lack of social support.

Depression, clinical depression or unipolar depression, is a common psychiatric disorder, characterized by a persistent low mood that is accompanied by fatigue and low self-esteem. It has been linked to diminished quality of life, medical morbidity and mortality. Despite this, depression remains under-diagnosed and under-treated in cardiac populations, even with the availability of safe and effective treatments (*O'Neil et al.*, 2013).

Depression and the Heart 📚

The impact of depression on health extends beyond mental health and increases the subsequent risk of cardiovascular disease development. Depressed persons are also at increased risk for peripheral atherosclerosis, e.g., coronary or aortic calcification, impaired endothelial function, and increased arterial stiffness (*Seldenrijk et al.*, 2010; *Seldenrijk et al.*, 2011).

A 2011 study showed a relationship between the severity of depression symptoms and work function. Data was analyzed from 771 depressed patients who were currently employed. The data showed that for every 1-point increase in the Patient Health Questionnaire 9 (PHQ-9) score, patients experienced an additional mean productivity loss of 1.65%. And, even minor levels of depression symptoms were associated with decrements in work function (*Beck et al.*, 2011).

It is common among patients with coronary heart disease and recent acute coronary syndromes. Depression symptoms appear to worsen in-hospital and long term cardiac outcomes in patients with myocardial infarction, independent of traditional cardiovascular risk factors and the symptoms appear to persist for months and beyond. Despite the high prevalence and adverse outcomes,

Depression and the Heart 🕏

psychological symptoms are often neglected and left untreated (*Roest et al.*, 2010).

Depression is an independent risk factor for incident cardiovascular disease and patients with established cardiovascular disease, including heart failure and, particularly, coronary heart disease who are moderately or severely depressed have markedly higher risk of dying compared to those who are not depressed (*Moraska et al.*, 2013).

An interesting example of the effect of acute emotional stress on the heart is Takotsubo or transient left ventricular apical ballooning syndrome. Patients present after acute emotional distress with symptoms electrocardiographic consistent changes with acute myocardial infarction. Left ventriculogram reveals apical ballooning and a hypercontractile basal segment, a shape reminiscent of the pot (tsubo) that Japanese fishermen use to catch octopus (tako). Recent data implicate massive catecholamine release causing stress-induced myocardial stunning. In a study of 22 patients with takotsubo syndrome, (Sharkey et al., 2005) psychological stressors included death of relative, domestic abuse, arguments, catastrophic medical diagnosis, and devastating financial or gambling losses.

Depression and the Heart 🕏

In addition to severe emotional upset, catastrophic events have been found to trigger myocardial infarction, earthquakes, missile attacks, and a person's favorite team losing a World Cup football game in a penalty shootout. Carroll et al studied myocardial infarction admissions in London after England lost to Argentina in a penalty shootout during the 1998 World Cup. On the day of the match, there was a 25% increase in myocardial infarction admissions compared with the same day in previous years (*Carroll et al.*, 2002).

Cardiovascular disease (CVD) and depression are significant public health concerns that affect one another in a bidirectional manner (*Baumeisteret al.*, 2015). They are among the most prevalent and most disabling diseases. Both are causes for the frequent contacts with ambulatory and hospital services and for long-term utilization of health care (*Mathers and Loncar*, 2006). The World Health Organization currently estimates that cardiovascular disease and depression are the two most common causes of disability in developing countries (*Yingling et al.*, 2015).

Around 15–20 % of cardiac patients suffer from clinical depression (*Tully and Baker*, 2012). Medical caregivers monitoring patients right after suffering from ST elevation myocardial infarctions need to be alert to the