THE IMPACT OF AN INTEGRATED COACHING PROGRAM FOR SURVIVORS OF ACUTE CORONARY SYNDROMES ON THEIR CARDIOVSCULAR RISK PROFILE

THESIS

Submitted for Partial Fulfillment of MD Degree in Cardiology

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Abstract

Objective:

This study was conducted to determine the effect of an integrated cardiac rehabilitation program on the traditional cardiovascular risk factors in Egyptian and Saudi patients**.**

Material & Methods:

The study registered 41 Egyptian patients and 35 Saudi patients with known CAD who were enrolled in 12 months duration lifestyle intervention program during which they were instructed and encouraged to follow healthy lifestyle changes (Smoking cessation, regular physical activity, healthy diet, compliance to treatment and weight loss).Assessable risk factors parameters (Blood pressure, body mass index, and smoking, LDL, HDL and HbA1C) were obtained at end of the study and compared to that obtained at entry to determine the efficacy of the intervention program.

Results:

The intervention program was associated with significant reduction in T.chol. (188.71mg/dl vs. 174 mg/dl, p=0.05), LDL (119.07 mg/dl vs. 100.05 mg/dl, p=0.021) and DBP (78.7 mmHg vs. 74.6 mmHg, p=0.03) in Egyptian patients. Also, the Saudi patients showed significant reduction in T.chol. (190.4 mg/dl vs. 173 mg/dl, p=0.02), LDL (121.2 mg/dl vs. 108.3 mg/dl, p=0.04) and HbA1C (8.7 vs. 8 , p=0.005) at the end of the program. There was no statistically significant difference between Egyptian and Saudi Patients regarding final parameters and final Framingham risk score.

Conclusion:

This study demonstrated that cardiac rehabilitation program is associated with significant improvement of cardiac risk factors specifically T. Chol., LDL-C , DBP and HBA1C. Both the Egyptian and Saudi patients show significant improvement in their cardiac risk factors and Framingham risk score.

Keywords: Cardiac rehabilitation, Coronary artery disease

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LIST OF ABBREVIATIONS

1-RM	: Repeatiton maximim
ACS	: Acute Coronary Syndromes
BP	: Blood Pressure
BW	: Body Weight .
CAD	: Coronary Artery Disease
CHD	: Coronary Heart Disease.
CI	: Confidence Interval
CR	: Cardiac Rehabilatation
CVD	: Cardiovascular Diasease.
DBP	: Diastolic Blood Pressure
Dev E	: Developing Economies.
DHA	: Docosahexanoic Acid
DM	: Diabetes Mellitus.
DRR	: Death Rate Ratio
Em ME	: Emerging Market Economies. .
EPA	: Eicosapentanoic Acid
Est ME	: Established Market Economies.
GI	: Glycemic Index
HbA1C	: Glycated Haemoglobin
HDL-C	: High Density Lipoprotein -Cholesterol
HM G-CoA	: 3-hydroxy-3-methylglutaryl-coenzyme A
HRV	: Heart Rate Variability
hsCRP	: High sensitivity C-Reactive protein
HTN	: Hypertension.
ICAM -1	: Intercellular Adhesion Molecule-1
IHD	: Ishemic Heart Disease
Kcal	: Kilo Calories.
LDL	: Low Density Lipoprotein
LDL-C	: Low Density Lipoprotein-Cholesterol.
MAP	: Mean Arterial Pressure
MCP-1	: Monocyte Chemoattractant Protein-1.
METs	: Metabolic Equivelant
MI	: Myocardial Infarction.
MUFA	: Mono-Unsaturated Fatty Acids

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NCEP	: National Cholesterol Education Program.
NNT	: Number Needed to Treat.
NO	: Nitric Oxide.
NRT	: Nicotine Replacement Therapy
NSTEMI	: Non-ST Elevation Myocardial Infarcion
OR	: Odd Ratio
PCI	: Percutaneous coronary intervention
PTCA	: Percutaneous transluminal coronary angioplasty.
PUFA	: Poly-Unsaturated Fatty Acids
QALY	: Quality-Adjust life-Year.
RR	: Relative Risk
SBP	: Systolic Blood Pressure
SHS	: Secondhand Smoke
STEMI	: ST Elevation Myocardial Infarcion
TC	: Total Cholesterol.
TG	: Triglyceride.
VCAM -1	: Vascular Cell Adhesion Molecule-1
VLDL-C	: Very Low Density Lipoprotein-Cholesterol
Vo2 max	: Maximal oxygen uptake
VSMCs	: Vascular Smoot Muscle Cells

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INTRODUCTION

Coronary Artery Disease (CAD) is the most important public health problem in developed societies. Although the cardiovascular mortality rate has declined in recent decades, CAD remains the leading cause of death in these societies (1)**. CAD is also a major cause of physical disability, particularly in the rapidly growing population of elderly** (2)**. Maintenance of physical functioning in patients with CAD and prevention of subsequent cardiac events are major challenges in recent medicine.**

Cardiac rehabilitation programs were first developed in the 1960s, once the benefits of ambulation during prolonged hospitalization for coronary events had been recognized (3). **Cardiac rehabilitation can be defined as** (The sum of activity required to ensure cardiac patients the best possible physical, mental and social conditions so that they may by their own efforts regain as normal as possible a place in community and lead an active life). **Major objectives of cardiac rehabilitation include not only an improved functional capacity and quality of life but also a reduction in mortality and morbidity** (4)**.**

American Heart Association (AHA) has stated that (compelling scientific evidence, including data from recent studies in patients with CAD demonstrated that comprehensive cardiac rehabilitation and secondary prevention including risk factor interventions extend overall survival, improve the quality of life, decrease the need for interventional

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procedures such as angioplasty and bypass grafting and reduce the incidence of subsequent cardiac events).(5,6). **Both genders benefit** (7). **However, evidence from all over the world has shown that cardiac rehabilitation and secondary prevention are only being partially applied in the clinical practice** (8).**This may be the result of decreased referral of patients to cardiac rehabilitation ,possibly because some clinicians consider that the overall benefits are not worth the costs and the patients efforts** (4)**.**

The impact of life style (diet counseling, body weight management, smoking cessation efforts and physical activity programs) modification on the cardiovascular risk status of survivors of acute coronary syndromes have been previously reported (9) **but not in third world countries. The western instruments of intervention to modify risk factors and increase physical activity have not been tested in developing societies, where low socioeconomic status and a higher level of stress created by poverty & job insecurity among other environmental factors may limit the response to these interventions**

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OBJECTIVE OF THE STUDY

To develop and study the impact of an integrated cardiac rehabilitation program targeting the main measurable parameters of cardiovascular risk factors in Egyptian and Saudi patients presenting with acute coronary syndromes (unstable angina, myocardial Infarction) and/or underwent coronary revascularization.

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CHAPTER 1

Epidemiology of Cardiovascular Disease

Over the past two centuries , the industrial , technological revolutions and their associated economic and social transformations have resulted in dramatic shifts in the diseases responsible for illness and death **(10)**. Before 1900, infectious diseases and malnutrition were the most common causes of death. Chiefly, in developed countries and spreading to developing countries, this has gradually been replaced by chronic diseases as cancer and cardiovascular disesae (CVD) , attributed largely to improved nutrition and public health

CVD has emerged as the dominant chronic disease in many parts of the world. At the beginning of the 20th century , CVD accounted for less than 10% of all deaths worldwide. At the beginning of the 21st century , CVD accounted for nearly half of all deaths in the developed world and 25% in developing world **(11)** . By 2020, it is predicted that CVD will claim 25 million lives annually and that coronary heart disease (CHD) will surpass infectious disease as the world's number one cause of death and disability **(10)**.

The Epidemiological Transitions:

Epidemiological transitions are acknowledged as the shift in the diseases that account for the lion's share of mortality and morbidity. The epidemiological transition takes place at different rates around the world as it is tightly related to changes in personal and collective wealth (economic

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transition), social structure (social transition) and demographics (demographic transition) **(12).**

According to the social and economic forces , the world is divided into three broad economic and geographical sectors with vast differences in diseases burden across these sectors **(10) (Table 1) :**

1- **The Established Market Economies (EstME):** Western Europe, North America, Australia , New Zealand and Japan.

2- **The Emerging Market Economies (EmgME):** Former socialist states of Eastern Europe**.**

3- **The Developing Economies (DevE):** which is subdivided into six geographical regions (China, India, other Asian countries, sub-Saharan africa, Middle Eastern Crescent and Latin America and the Carribbean).

	Population (Millions) (% of Total World Population)		Cardiovascular Disease (%)		Other Noncommunicable Diseases (%)		Communicable Maternal, Perinatal and Nutritional Conditions(%)		Injuries (%)	
	1990	2010	1990	2010	1990	2020	1990	2020	1990	2020
EstME	798 (15.2)	874 (14.6)	44.6	43.1	42.8	45.1	6.4	6.2	6.2	5.5
EmgME	346 (6.6)	363 (5.2	54.6	55	29.5	32.2	5.6	3.5	10.3	8.3
DevE	4124 (78.3)	5764 (82.3)	23	31	17	31.2	41.9	24.7	18.7	12

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