



000000

تم رفع هذه الرسالة بواسطة / سنوي محمود عقل

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى

مسئولية عن محتوى هذه الرسالة.

ملاحظات:





The Effect of Cardiac Rehabilitation on Quality of Life and 6-minute Walk Test in Breast Cancer Survivors

Thesis

*Submitted in Partial Fulfilment of the M.Sc. Degree in
Cardiology*

By

Mohammed Malek Haddad

M.B., B.Ch., Tishreen University

Supervised by

Prof. Dr. Ramy Raymond

Professor of Cardiology

Faculty of Medicine, Ain Shams University

Dr. Ahmed Kadry

Lecturer of Cardiology

Faculty of Medicine, Ain Shams University

Dr. Khaled Abdel Aziz Kamal

Lecturer of Oncology

Faculty of Medicine, Ain Shams University

*Faculty of Medicine
Ain Shams University*

2021

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

لَسْبَدَّانِكَ لَا نَعْلَمُ لَنَا
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْعَظِيمُ

صدق الله العظيم

سورة البقرة الآية: ٣٢

Acknowledgment

*First and foremost, I feel always indebted to **ALLAH**, the Most Kind and Most Merciful.*

*I'd like to express my respectful thanks and profound gratitude to **Prof. Dr. Ramy Raymond**, Professor of Cardiology Faculty of Medicine, Ain Shams University for his keen guidance, kind supervision, valuable advice and continuous encouragement, which made the completion of this work possible.*

*I am also delighted to express my deepest gratitude and thanks to **Dr. Ahmed Kadry**, Lecturer of Cardiology Faculty of Medicine, Ain Shams University, for his kind care, continuous supervision, valuable instructions, constant help and great assistance throughout this work.*

*I am deeply thankful to **Dr. Khaled Abdel Aziz Kamal**, Lecturer of Oncology Faculty of Medicine, Ain Shams University, for his great help, active participation and guidance.*

I would like to express my hearty thanks to all my family, wife, and friends for their support till this work was completed.

Last but not least my sincere thanks and appreciation to all patients participated in this study.

Mohammed Malek Haddad

List of Contents

Title	Page No.
List of Tables	i
List of Figures.....	iv
List of Abbreviations	v
Introduction	1
Aim of the Work.....	3
Review of Literature	
Chemotherapeutic Cardiotoxicity	4
The role of Cardiac Rehabilitation in Breast Cancer Survivors	23
Patients and Methods.....	27
Results	41
Discussion	57
Summary	62
Conclusion	63
Recommendations	64
References	65
Appendix.....	82
Arabic Summary	—

List of Tables

Table No.	Title	Page No.
Table (1):	Proposed definitions for cancer therapy-related cardiac dysfunction (CTRCD)	5
Table (2):	Incidence of left ventricular dysfunction associated with anthracyclines	6
Table (3):	Incidence (%) of left ventricular dysfunction associated with monoclonal antibodies	6
Table (4):	Mechanism of action of anthracyclines and trastuzumab.....	7
Table (5):	Classification of cardiotoxicity based on the mechanism and reversibility.....	8
Table (6):	Classification of anthracycline-induced cardiotoxicity	10
Table (7):	Factors associated with increased risk of anthracycline-induced cardiotoxicity	10
Table (8):	Factors associated with risk of cardiotoxicity following anti-HER2 compounds.....	11
Table (9):	Potential benefits of exercise during and/or after cancer treatment.....	12
Table (10):	Strategies to reduce chemotherapy-induced cardiotoxicity.	13
Table (11):	Modified Borg scale	33
Table (12):	Comparison between two groups regarding age distribution, BMI, Hb level, and medical history.....	42
Table (13):	Comparison between two groups regarding post-intervention BMI.	43

List of Tables *(Cont...)*

Fig. No.	Title	Page No.
Table (14):	Comparison between pre and post-intervention BMI in control group.....	43
Table (15):	Comparison between pre and post-intervention BMI in intervention group.....	43
Table (16):	Comparison between two groups regarding baseline functional capacity (6 min walk test).....	44
Table (17):	Comparison between two groups regarding post-intervention functional capacity (6 min walk test).....	45
Table (18):	Comparison between pre and post-intervention functional capacity in intervention group.....	48
Table (19):	Comparison between pre and post-intervention functional capacity in control group.....	49
Table (20):	Comparison between two groups regarding baseline quality of life scores.	50
Table (21):	Comparison between two groups regarding post-intervention quality of life scores.	51
Table (22):	Comparison between pre and post-intervention quality of life scores in intervention group.....	52
Table (23):	Comparison between pre and post-intervention quality of life scores in control group.....	53
Table (24):	Rehabilitation sessions.....	54

List of Tables *(Cont...)*

Fig. No.	Title	Page No.
Table (25):	Effect of rehabilitation program in intervention group (comparison between different measures before and after rehabilitation program).....	54
Table (26):	Comparison between two groups regarding baseline echo results.....	55
Table (27):	Comparison between pre and post-intervention echo results in intervention group (a).....	56
Table (28):	Comparison between pre and post-intervention echo results in intervention group (b).....	56
Table (29):	First page of the Arabic validated version of FACT-B questionnaire.	82
Table (30):	Second page of the Arabic validated version of FACT-B questionnaire.....	83
Table (31):	Third page of the Arabic validated version of FACT-B questionnaire.....	84
Table (32):	First page of the English validated version of FACT-B questionnaire.....	85
Table (33):	Second page of the English validated version of FACT-B questionnaire.....	86
Table (34):	Third page of the English validated version of FACT-B questionnaire.....	87

List of Figures

Fig. No.	Title	Page No.
Figure (1):	Possible strategies for cancer drug-induced cardiotoxicity detection, prevention, and treatment.	20
Figure (2):	Continuum of anthracycline cardiotoxicity.	21
Figure (3):	Potential benefits that exercise training may confer to patients with cancer at heightened risk for cardiovascular (CV) disease	24
Figure (4):	Mean post-intervention speed (m/min).....	46
Figure (5):	Mean Pre-test RPP (post-intervention).	46
Figure (6):	Mean post-test RPP (post-intervention).....	47
Figure (7):	Mean FACT-B score post-intervention.	51
Figure (8):	Estimated marginal means of total FACT-B score.	53

List of Abbreviations

Abb.	Full term
AC.....	<i>Anthracyclines</i>
ACEi	<i>Angiotensin converting enzyme inhibitors</i>
ARBs.....	<i>Angiotensin II receptor blockers</i>
ATP.....	<i>Adenosine triphosphate</i>
BBs	<i>Beta blockers</i>
BC.....	<i>Breast cancer</i>
BCS.....	<i>Breast cancer subscale</i>
BMI.....	<i>Body-mass index</i>
CHF	<i>Congestive heart failure</i>
COPD.....	<i>Chronic obstructive pulmonary disease</i>
CR.....	<i>Cardiac rehabilitation</i>
CRF.....	<i>Cardiorespiratory fitness</i>
CRT	<i>Cardiac resynchronization therapy</i>
CTRCD	<i>Cancer therapy-related cardiac dysfunction</i>
CV.....	<i>Cardiovascular</i>
CVD	<i>Cardiovascular disease</i>
DBP	<i>Diastolic blood pressure</i>
DD.....	<i>Diastolic dysfunction</i>
DM.....	<i>Diabetes mellitus</i>
EACVI.....	<i>European association of cardiovascular imaging</i>
ECG	<i>Electrocardiography</i>
EF	<i>Ejection fraction</i>
ESC.....	<i>European society of cardiology</i>
ET.....	<i>Exercise time</i>

List of Abbreviations (Cont...)

Abb.	Full term
<i>EWB</i>	<i>Emotional well being</i>
<i>FLIC</i>	<i>Functional Living Index-Cancer</i>
<i>FPG</i>	<i>Fasting plasma glucose</i>
<i>FWB</i>	<i>Functional well being</i>
<i>GLS</i>	<i>Global longitudinal strain</i>
<i>HBA1C</i>	<i>Hemoglobin A1C</i>
<i>HF</i>	<i>Heart failure</i>
<i>HR</i>	<i>Heart rate</i>
<i>HRmax</i>	<i>Maximum heart rate</i>
<i>HRQOL</i>	<i>Health-related quality of life</i>
<i>HRR</i>	<i>Heart rate reserve</i>
<i>HRrest</i>	<i>Resting heart rate</i>
<i>HTN</i>	<i>Hypertension</i>
<i>ICD</i>	<i>Implantable cardioverter defibrillator</i>
<i>LAD</i>	<i>Left atrium dimension</i>
<i>LVAD</i>	<i>Left ventricular assist devices</i>
<i>LVD</i>	<i>Left ventricular dysfunction</i>
<i>LVEF</i>	<i>Left ventricular ejection fraction</i>
<i>METs</i>	<i>Metabolic equivalents</i>
<i>NYHA</i>	<i>New York heart association</i>
<i>PAD</i>	<i>Peripheral arterial disease</i>
<i>PSR</i>	<i>Performance status rating</i>
<i>PWB</i>	<i>Physical well being</i>

List of Abbreviations *(Cont...)*

Abb.	Full term
<i>QoL</i>	<i>Quality of life</i>
<i>RAS</i>	<i>Renin-angiotensin system</i>
<i>RCT</i>	<i>Randomized controlled trial</i>
<i>RPP</i>	<i>Rate-pressure product</i>
<i>RT</i>	<i>Radiation therapy</i>
<i>SBP</i>	<i>Systolic blood pressure</i>

INTRODUCTION

Background

Breast cancer (BC) is the most diagnosed cancer in women, contributing to 24.6% of malignancies in females and responsible for 15% of all cancer-related deaths among women worldwide.^[1]

Over the last 20 years, owing to noticeable improvements in screening, early detection, and advances in anticancer treatment, BC survival rates have significantly improved.^[1] However, this survivorship is often marked by fatigue, poor quality of life (QoL), reduced functional capacity along with treatment-related adverse effects.^[2]

Significance AND Scope

Anthracycline (the cornerstone of BC therapy) and trastuzumab (the standard treatment for HER2 positive BC patients) induced cardiotoxicity has been recognized as one of the most adverse effects of conventional therapy restricting treatment options and increasing morbidity and mortality rates.^[3]

Physical exercise is a demonstrated strategy to reduce fatigue and treatment-related adverse effects in cancer survivors. Nonetheless, structured programs that combine both exercise and education are not yet incorporated within standard

cancer care. The implementation of a model similar to cardiac rehabilitation (CR) program as a preventive strategy may provide a potential solution to improve functional capacity, quality of life and reduce cardiovascular disease (CVD) risk in cancer survivors.^[4]

Further research is needed to evaluate the possible cardioprotective effect of CR at mitigating cardiotoxicity in BC survivors especially in Egypt where such studies are yet to be done.

AIM OF THE WORK

To evaluate the effect of 12-week completed cardiac rehabilitation program on quality of life (using FACT-B questionnaire) and 6-minute walk test in breast cancer survivors.