Effect of Iron Deficiency on Health-Related Quality of Life in Chronic Heart Failure Patients Regardless of Anaemia Status

Thesis
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بسم الله الرحمن الرحيم

قالوا

سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم الحكيم

صدق الله العظيم

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List of Abbreviations

Abb.	Full term
ACCF	American College of Cardiology Foundation
ACEI	Angiotensin converting enzyme inhibitor
AF	Atrial fibrillation
AHA	American Heart association
ANP	Atrial natriuretic peptide
ARB	Angiotensin receptor blocker
ARNI	Angiotensin receptor neprilysin inhibitor
BNP	Brain natriuretic peptide
CAD	Coronary artery disease
CHF	Chronic heart failure e
CIBISII	Cardiac insufficiency bisoproble study II
CMIA	Chemiluminescent microparticle immunoassay
CMR	Cardiac magnetic resonance
Consensus	Cooperative North Scandinavian Enulpril study
COPD	Chronic obstructive pulmonary disease
CRT	Cardiac resynchronization therapy
CV	Cardiovascular
DBP	Diastolic blood pressure
DCYTB	Duodenal cytocrone B
DIG	Digitalis investigation group
DM	Diabetes mellitus
DMT1	Divalent metal transporter 4
EF	Ejection fracture
EMA	European medicines agency
ESC	European society of cardiology
FCM	Ferric carboxy maltose
FPG	Fasting plasma glucose

List of Abbreviations (Cont...)

Abb.	Full term
GFR	Glomerular filtration rate
HF mrEF	Heart failure with mid Cong ejection fraction
HF PEF	heart failure with preserved ejection fraction
HF REF	Heart failure with reduced ejection fraction
HF	Heart failure
HRQOL	Health related quality of life
IABP	Intra aortic balloon counter pulsation
ICD	Implantable cardioverter defibrillator
ID	Iron deficiency
KIDOGQI	Kidney/disease outcomes quality initiative
LGE	Late gadolinium enhancement
LV	Left ventricle
MI	Myocardial infarction
MLHFQ	Minnesota living with heart Failure Questionnaire
MRA	Mineralocorticoid receptor antagonists
NP	Natriuretic peptide
NT-proBNP	N-terminal pro BNP
NYHA	New York Heart Association
OSS	Overall summary score
QOL	Quality of life
RAAS	Renin angiotensin aldosterone system
RALES	Randomized aldoctone evaluation study
RCT	Randomized controlled trial
RES	Reticuloendothelial system
RLUS	Relative light units
RRR	Relative risk reduction
SBP	Systolic blood pressure

List of Abbreviations *(Cont...)*

Abb.	Full term
SOLVD	Studies of left ventricular dysfunction
VAD	Ventricular assisted devices
VF	Ventricular fibrillation
VT	Ventricular tachycardia

INTRODUCTION

Heart Failure is a clinical syndrome characterized by a constellation of symptoms & signs that has a wide reaching implications not only in terms of mortality & morbidity of affected individuals only but also for countries to provide care for these patients *(Ponikowski et al., 2016).*

Due to population ageing, there is an increase in the prevalence of chronic diseases. Heart Failure (HF) is an urgent public health need with national and global implications. It is one of the most important causes of morbidity and mortality in the industrialized world *(Fonarow et al., 2005 and Redfield et al., 2003).*

HF causes a major disability & functional limitations of physical activity in the patients. This limitation is closely related to the daily life activities which affects quality of life (QOL) and causes changes in the lifestyle imposed by the disease. Patients with HF have their lives affected by the disease and optimized care should be directed at aiming at decreasing these impacts on their quality of life *(Santos et al., 2009).*

The prevalence of iron deficiency in HF patients is up to 50 %, even in patients without anaemia. Many factors contribute to iron deficiency in HF patients. It is suggested that iron deficiency (ID) in chronic heart failure (CHF) patients

results in reduced functional capacity, more clinical severity of the disease and worse quality of life *(Jankowska et al., 2010 and Jankowska et al., 2011)*.

Several clinical trials among HF patients with ID showed that treatment of these patients with i.v. iron to correct ID can improve Health Related Quality of Life (HRQoL), exercise capacity *(Comin-Colet et al., 2013)* and these effects appear to be independent of anaemia status of the patients *(Anker et al., 2009)*.

Despite data from interventional studies with I.V. iron suggest that ID has a considerable impact in the HRQoL of patients with CHF, few studies have directly evaluated patients with ID focusing on patient-centred outcomes and their daily life activities which is the aim of this study.

AIM OF THE WORK

Assessment of the impact of iron deficiency (ID) on health-related quality of life (HRQoL) in chronic heart failure (CHF) patients using Minnesota Living with Heart Failure questionnaire (MLHFQ).

Chapter 1
HEART FAILURE

Definition of heart failure:

According to European Society of Cardiology (ESC) guidelines HF is a clinical syndrome characterized by typical symptoms (e.g. breathlessness, ankle swelling and fatigue) that may be accompanied by signs (e.g. elevated jugular venous pressure, pulmonary crackles and peripheral oedema) caused by a structural and/or functional cardiac abnormality, resulting in a reduced cardiac output and/ or elevated intracardiac pressures at rest or during stress *(Ponikowski et al., 2016).*

According to the 2013 American Heart Association (AHA) Guidelines for the Management of HF, HF is a complex clinical syndrome that results from any structural or functional impairment of ventricular filling or ejection of blood *(Yancy et al., 2013).*

Incidence of heart failure:

According to ESC, the prevalence of HF is approximately 1–2% and rises to >10% among people over the age of 70 years *(Mosterd and Hoes, 2007)* & according to AHA there are 825 000 new HF cases annually in the USA *(Alan et al., 2014).*

The rise in the incidence and prevalence of HF can be attributed to improved care of acute myocardial infarction together with the ageing of the population and the increasing prevalence of cardiovascular disease in the developing countries *(Schocken et al., 2008).*

Burden of heart failure:

I. Heart failure mortality

The results of the Framingham Heart Study *(Levy et al., 2002)* and a population-based study in Olmsted County, Minnesota *(Roger et al., 2011)* stated decrease in the last decades of mortality rates in patients after the onset of HF.

However, 5-year age-adjusted mortality rates after onset of HF remained high in those two studies, with higher rates in men (50% in men vs. 46% in women for the Olmsted County population based study) *(Roger et al., 2011).*

II. Heart failure hospitalization

Heart failure hospitalization represents 1–2% of all hospital admissions, which makes it one of the most important causes of admission for patients older than 65 years *(Alla et al., 2007).*

Patients admitted with HF are at high risk for all cause re-admission, with a 1 month readmission rate of 25% *(Ardehali et al., 2004).*

ACCF/AHA stages of HF & NYHA functional classifications:

Both the American College of Cardiology Foundation (ACCF)/AHA stages of HF and the NYHA functional classification provide useful information about the presence and severity of HF (table 1).

1. <u>The ACCF/AHA stages of HF:</u>

The stages are progressive and inviolate; which means that once a patient moves to a higher stage, regression to an earlier stage of HF is not observed and Progression is associated with reduced 5- year survival.

Therapeutic interventions are tailored according to the stage of Heart Failure; At (stage 1) modifying risk factors, treatment of structural heart diseases (stage B), and reducing morbidity and mortality (stages C and D) *(Yancy et al., 2013)*.

2. <u>NYHA Functional Classifications:</u>

The NYHA classification focuses mainly on functional capacity and the symptomatic status of the disease in those with structural heart disease, primarily stages C and D *(Yancy et al., 2013)*.

It is a subjective assessment by a clinician and can change markedly over short periods of time. for example, a stable patient with mild symptoms can become suddenly