# Sarcopenia and Risk of Falls in Community Dwelling Elderly Females

#### **Thesis**

Submitted for Partial Fulfillment of Master Degree
On Geriatric Medicine and Gerontology

#### By

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# List of Abbreviations

Abb.	Full term
ADI.	Activities of daily living
	Activities of daily tiving Atrial fibrillation
	Adenosine monophosphate
	Bio impedance analysis
	Body Mass Index
	Blood pressure
	Center for Disease Control
	Congestive Heart Failure
	Chronic liver Disease
	Chronic obstructive pulmonary disease
	Chronic Renal Failure
	Cerebrovascular stroke
	Dual energy X-ray absorptiometry
	Diabetes Mellitus
EPESE	Established Populations for Epidemiologic Studies of Elderly
EWGSOP	The European Working Group on Sarcopenia in Older People
Fig	Figure
FRAT	Falls risk Assessment Tool
<i>GDS</i>	Geriatric Depression scale
<i>GH</i>	$Growth\ Hormone$
<i>GS</i>	Grip Strength
<i>IADL</i>	Instrumental Daily Living
<i>IHD</i>	Ischemic Heart Disease
<i>MMSE</i>	Mini Mental status Examination
<i>MNA</i>	Mini Nutritional Assessment
<i>MRI</i>	Magnetic Resonant Imaging
OH	Orthostatic Hypotension

# List of Abbreviations (Cont)

# Abb. Full term

OTTO	
	.Over The Counter
<i>PBK</i>	.partial body potassium
<i>PD</i>	.Parkinsonism Disease
<i>PEF</i>	.peak expiratory flow
<i>POMA</i>	performance-oriented mobility assessment
$PPAR-\delta$	$. Peroxisome  ext{-}proliferator  ext{-}activated receptor  ext{-}\delta$
<i>SD</i>	Standard Deviation
Sec	. Seconds
<i>SPPB</i>	Short Physical Performance Battery
<i>SSCWD</i>	Society of Sarcopenia, Cachexia and Wasting
	Disorders
<i>TBK</i>	.Total body potassium
<i>TUG</i>	.Timed Up and Go test
<i>WGFOM</i>	.Working Group on Functional Outcome
	Measures for Clinical Trials
<i>WHO</i>	.World Health Organization

## Introduction

arcopenia is "a syndrome characterized by progressive and generalized decrease of skeletal muscle mass and strength with a risk of adverse outcomes such as physical disability, decrease quality of life and death" (Tanimoto et al., 2013).

Muscle is 60% of the human body's protein stores. Muscle mass decrease leads to functional decline with decrease of strength, loss of autonomy and increased risk of falls, respiratory muscle function is also decrease with reduction of vital capacity (Janssen et al., 2004).

Aging is associated with decrease in muscle mass. When you are 80 years old, it is estimated that 40% of the muscle mass at age 20 is lost (Boirie, 2009).

Sarcopenia starts in the 4<sup>th</sup> decade of life and accelerates at the age of 75 years (Baumgartner and Garry, 2000).

The development of sarcopenia is a multifactorial. These factors including physical inactivity, motor-unit remodeling, decreased hormonal levels, sedentary lifestyle, chronic illness decreased protein synthesis, and less optimal diet. (Paddon-Jones and Short, 2008).

Many consequences of sarcopenia are prognostic indicators of public health burden, as the development of physical disability, nursing home admission, depression, hospitalization, and even increase mortality (Walston, 2012).

Falls is one of the most common Geriatric syndromes and also is a common serious medical problem that affects the quality of life of the elderly persons. Falls usually is a misdiagnosed problem in the primary care with a major impact on healthcare costs and affects the independence of older person (*Rao*, 2005).

Falls and fall-related injuries are a common and major problem among older adults. Fall is the leading cause of severe injuries, as hip fractures in older population (*Edwards et al.*, 2013)

Such injuries can result in "disability, chronic pain, loss of independence, poor quality of life, and in severe cases, death" (Scott et al., 2010).

Also the post-fall anxiety syndrome, fear of falling; is another consequence of falls, this in turn lead to deconditioning, weakness and gait problems and may actually increase risk of falls (*Tanimoto et al.*, 2014).

Falls result from mix of biological or medical, behavioral and environmental risk factors. Therefore, it is important to identify risk factors for falls in the community (*Deandrea et al.*, 2010).



Muscle strength, gait, and balance problems were found to be the strongest risk factors for falls among community dwelling elderly (Tinetti and Kumar, 2010).

Sarcopenia, frailty, decrease muscle mass, and loss of muscle strength are well-documented and cardinal indicators of falls (Mühlberg and Sieber, 2004).

Sarcopenia is an important risk factor for falls. Because sarcopenia is associated with loss of muscle mass and decrease physical performance which leads to physical inactivity, slow gait speed, slow protective reflexes and decreased mobility (Fried et al., 2001).

# **AIM OF THE WORK**

The aim of the study to identify the association between sarcopenia and the risk of falls in community dwelling elderly females in Egypt.

### Chapter 1

### **SARCOPENIA**

#### Introduction

Sarcopenia (Greek 'sarx' or flesh + 'penia' or loss) "used to describe this age-related decline of muscle mass" (*Cruz-Jentoft et al.*, 2010).

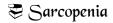
Skeletal muscle is the major reservoir of the body proteins and represents 50% of the total body weight. Their function is to provide the body movement, strength, respiration, balance, posture and to regulate the temperature (*Lenk et al.*, 2010).

Sarcopenia has since been defined as the loss of skeletal muscle mass and strength that occurs with aging (*Cruz-Jentoft et al.*, 2010).

Sarcopenia is considered one of the geriatric syndromes because its prevalence in older populations (*Chien et al.*, 2008).

Sarcopenia may cause functional disabilities, decrease mobility, falls, and fractures, which cause the loss of independence, frailty, and also increased risk of mortality (*Freiberger et al., 2011*).

There are no effective treatments for sarcopenia yet. Pharmacological trials are not effective, these include hormonal



Review of Literature —

as growth hormones, testosterones, estrogens, and tibolone (Sanchis-Gomar et al., 2011).

Only exercise (*Freiberger et al.*, 2011), and proper nutrition (*Volkert*, 2011) found to be the partially effective intervention with the minimal side effects.

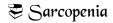
#### **Definition of Sarcopenia**

The European Working Group on Sarcopenia in Older People (EWGSOP) made a practical clinical definition and diagnostic criteria for age-related sarcopenia (Morley & Cruz-Jentoft, 2012).

The EWGSOP recommends using the presence of both low muscle mass and low muscle function (strength or performance) for the diagnosis of sarcopenia (*Cruz-Jentoft et al.*, 2010).

Society of Sarcopenia, Cachexia and Wasting Disorders (SSCWD) in July 2011 defined sarcopenia as "reduced muscle mass, with limited mobility" and that all elderly persons should be screened for it (Morley & Cruz-Jentoft, 2012).

Although the definition of sarcopenia differed in different studies, sarcopenia is always defined as the agerelated progressive decline in muscle mass (Visser & Schaap, 2011).



Review of Literature —

#### Mechanisms of sarcopenia

There are many mechanisms that may be involved in the onset and progression of sarcopenia. These mechanisms are protein synthesis, proteolysis, neuromuscular integrity and muscle fat content (*Narici and Maffulli*, 2010).

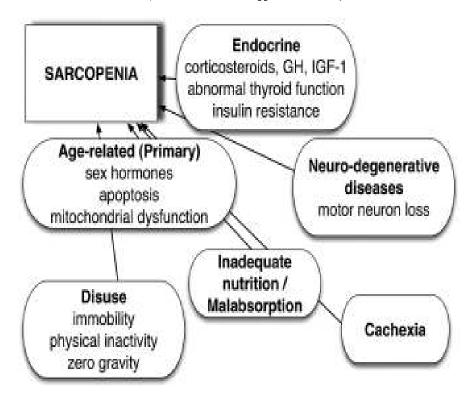


Fig. (1): Mechanisms of sarcopenia (Cruz-Jentoft et al., 2010).

### **Prevalence of Sarcopenia**

The prevalence of sarcopenia depends on age, sex, race (*Tan et al., 2011*), morbidity (*Muscaritoli et al., 2010*), nutrition (*Volkert, 2011*), and physical activity (*Freiberger et al., 2011*).