Association Between Hand Grip Strength and Functional Status and Health Related Quality of Life Among Elderly Population

Thesis

Submitted for partial fulfillment of M.Sc ***degree in geriatric medicine and gerontology***

By

Rana Mohammed Taha
(M.B.,B.Ch)

Supervised by

Prof. Dr. Ahmad Kamel Mortagy
Professor of Geriatric and Gerontology
Faculty of Medicine
Ain Shams University

Dr. Manar Mostafa Adel Maamoun
Assistant Professor of Geriatric and Gerontology
Faculty of Medicine
Ain Shams University

Dr. Salma Mohammed Samir El-said
Lecturer of Geriatric and Gerontology
Faculty of Medicine
Ain Shams University

Faculty of Medicine
Ain Shams University
2013

دراسة العلاقة بين قوة قبضة اليد والقدرة الوظيفية والحركية بين كبار السن و مدى تأثيره على جودة الحياة

رسالة

توطئة للحصول على درجة الماجستير فى **طب وصحة المسنين وعلوم الاعمار**

مقدمة من

الطبيبة/رنا محمد طه

تحت إشراف

الأستاذ الدكتور/ احمد كامل مرتجي

أستاذ طب وصحة المسنين وعلوم الإعمار

كلية الطب – جامعة عين شمس

الدكتور/ منار مصطفى عادل مأمون

أستاذ مساعد طب وصحة المسنين وعلوم الإعمار

كلية الطب– جامعة عين شمس

الدكتور/ سلمى محمد سمير السعيد

مدرس طب وصحة المسنين وعلوم الإعمار

كلية الطب– جامعة عين شمس

كلية الطب

جامعة عين شمس

2013

Acknowledgement

First and for most, thanks to ***Allah*** *"The MostMerciful"*

In all gratitude, I extend my most sincere thanks to ***Prof. Dr. Ahmad KamelMortagy,*** *Professor of Geriatric Medicine and gerontology,Ain Shams University, for honoring me with his supervision of this thesis. His help, guidance, and valuable advices were a great encouragement throughout the work.*

Profound thanks and Sincere appreciation to ***Dr. ManarMostafa Adel Maamoun*** *Assistant Professor of Geriatric and Gerontology, Faculty of Medicine, Ain Shams University, for his valuable encouragement and advice.*

Profound thanks to ***Dr. Salma Mohammed Samir El-said*** *Lecturer of Geriatric Medicine, Faculty of Medicine, Ain Shams University, for his generous help, expert advice and great assistance throughout this work.*

I would also like to record my thanks and sincere gratitude to my family and my colleagues who supported and encouraged me throughout this work.

My sincere thanks to all contributors whose names I have not mentioned but they all deserve my gratitude.

Finally yet importantly, I would like to thank all the subjects of my study without whom this task would not have been possible.

RanaMohammedTaha

List of abbreviations

AD **……** Alzheimer's disease.

ADL **…....** Activities of daily living.

ANOVA ……Analysis of variance.

BA **……** bronchial asthma

BMI …… Body mass index

BP **…….** Bodily pain

CKD **…….** Chronic kidney disease

CLD ……. Chronic liver disease

COPD …….Chronic obstructive pulmonary disease

CVS **…….** Cerebrovascular stroke

DM ……. Diabetes mellitus

GDS **…….** Geriatrics depression scale

GH **…….** General health

GS **…….** Grip strength

HF **…….** Heart failure

HRQol **…….** Health related quality of life

HTN **…….** Hypertension

IADL **…….** Instrumental activities of daily living

ISHD ……. Ischemic heart disease

List of abbreviations (cont.)

MCS ……. Mental component summary

MH ……. Mental health

MHS ……. Mental health status

MMSE ……. Mini mental status examination

MOS ……. Medical outcome study

OA ……. Osteoarthritis

PCS ……. Physical component summary

PHS ……. Physical health status

PF ……. Physical function

PN ……. Peripheral neuropathy

Qol ……. Quality of life

RA ……. Rheumatoid arthritis

RAND ……. Research and development

RE ……. Role emotional

RP ……. Role physical

SD ……. Standard deviation

SF ……. Social function

SF-12 ……. 12 items short form questionnaire

SF-36 ……. 36 items short form questionnaire

List of abbreviations (cont.)

SPSS ……. Statistical package for social sciences

VT ……. vitality

WHO ……. World health organization

List of contents

Title	Page

- **Introduction** 1
- **Aim of the work** 5
- **Review of Literature:**
  - Chapter one: Hand grip strength 6
  - Chapter Two: Quality of Life (QoL) 29
  - Chapter Three: QoL and hand grip strength 50
- **Subjects and Methods** 57
- **Results** 66
- **Discussion** 92
- **Summary** 108
- **Conclusion** 111
- **Recommendations** 112
- **References** 113
- **Appendices** 136
- **Arabic Summary** ..... --

List of Figures

Fig. No	Title	Page

Figure (1): frequency of co-morbidities in study group

Figure (2): The association between chronic diseases and hand grip strength

Figure (3): relation between subdomains of PHS domain of Qol and hand grip strength

Figure (4): relation between subdomains of MHS domain of Qol and hand grip strength

List of tables

Tab. No	title	Page

- Table (1): clinical characteristics of the study sample:
- Table (2): The grip strength of the studied group:
- Table (3): quality of life assessment in studied group using SF 12:
- Table (4): The relation between clinical characteristics of studied group and hand grip strength.
- Table (5): correlation between clinical characteristics of study sample and hand grip strength
- Table (6): The association between hand grip strength and ADL:
- Table (7): The association between hand grip strength and IADL:
- Table (8): correlation between hand grip strength, ADL and IADL scores:
- Table (9): association between hand grip strength and PHS domains of QOL:
- Table (10): The association between hand grip strength and MHS domains of QOL
- Table (11): relation between ADL and physical health status domain of Qol:
- Table (12): relation between ADL and MHS domain of Qol:
- Table (13): relation between IADL and PHS domain of Qol:
- Table (14): relation between IADL and MHS domain of Qol:
- Table (15): correlations with physical health status domain of QOL among female subjects:
- Table (16): correlations with physical health status domain of QOL among male subjects:
- Table (17): correlations with mental health status domain of QOL among male subjects:

- Table (18): linear multi-regression analysis for PHS domain of QOL among female subjects:
- Table (19): linear multi-regression analysis PHS domain of QOL among male subjects:
- Table (20) linear multi-regression analysis MHS domain of QOL among female subjects:

Introduction

Functional status, an important domain of quality of life (QOL) refers to the ability to perform daily activities required to meet basic self-care needs and to maintain health and well-being. Functional status reflects both functional capacity, what an individual is capable of doing, and functional performance, what an individual actually does in daily life. Functional status may be affected by impairments in physical, cognitive, sensory, or social function. For example, impairments in physical function (e.g., muscle strength) or in sensory function (e.g., balance) may both result in difficulty in walking ***(Chang et al., 2009).***

As people live longer, often coping with chronic illness and disability, it is important to make HRQOL a major factor driving health care decision-making. HRQOL may be used as a clinical indicator of how a person's health impacts his or her ability to function ***(Koch, 2000).***

An important aim of research into HRQOL in this age group is to enable older people to maintain their mobility, independence, their active contribution to society, and to respond effectively to the challenges of older age and in general bring an active aging for them ***(Bowling, 2005).***

HRQOL is considered a subset of quality of life (QOL), which is defined as "the absence of sickness and disease, and a state of physical, mental, and social well-being (WHO, 1999). HRQOL is defined more narrowly and typically focuses on how physical and mental health affects a person's ability to function in the world. However, health related quality of life for the elderly people might be described in terms of functional status,

independence and ability to engage in life activities ***(Imberly et al, 2006).***

Many daily activities involve interaction with objects that are grasped in the hand. The manipulative ability of the human hand requires effective force and dexterity. Power grip is a forceful act resulting in flexion of all finger joints. When thumb is used, it acts as a stabilizer to the object held between the fingers and the palm ***(Shectman et al., 2004).***

Power grip is the result of following sequence:

- Opening of the hand.
- Positioning of fingers.
- Approaching the fingers to the object.
- Maintaining a static phase that actually constitutes the grip

(Pamela et al., 2001)

Aging produces a decline in physical conditions and capacities, including muscle strength. Muscle weakening is directly related with impairments in muscle flexibility, in balance, and particularly in speed, and is responsible for frequent falls. People with little strength in their hands generally also present weakness in the other muscle groups ***(Rantanen et al, 2003).***

The grip strength test measures the muscular strength of our upper extremities. Grip strength is often different for each hand and the preferred hand was usually the strongest.There is a strong correlation between grip strength and overall upper body strength. ***(Mathiowetz et al.,1985; Petersen et al., 1989; Kamarul et al., 2006)***