In memory of Abdel Moneim Ashour a forgotten pioneer of Geriatrics and Psycho geriatrics in Arab world

By

Ahmed Shawky Mohammedin
Lecturer of Geriatrics & Gerontology, Ain Shams University

ashashyou@yahoo.com

Abstract: Professor Abdel Moneim Mahmoud Ashour started his brilliant career after graduating in 1957 from Kasr al-Aini faculty of Medicine, as a Physician officer in the Egyptian Medical Corps in 1958 to start an 18 year military medical carrier. In 1977, he left the Egyptian Medical Corps as a Colonel to join Ain Shams faculty of Medicine as a lecturer of neuropsychiatry and continued his academic carrier for another 20 years. He kept working after retirement as an Emeritus Professor and joining the voluntary community work for another 21 years till he passed away on the 6th of April 2015. He was a living example of active ageing.

No one can write adequately about the unique personality of Professor Abdel Moneim Ashour. He was active in multidisciplinary frontiers of knowledge and services that are all related to elderly care. He has left us a huge legacy to the extent that wherever you dig, you still find treasures of success stories or trails that were not completed to promote elderly care in Egypt. Luckily, in 2011 he has written a diary – but not a classic diary – aiming to set examples for the youth and to inspire the Egyptian revolution of 2011[1]

Personal growth and Family life of Professor Ashour:

He was born in 1934 to an Egyptian family. His father was a Railway Engineer and his mother was a house wife. He was the eldest son of 8 brothers and sisters. During his early childhood he witnessed the World War II, the 1948 Arab-Israeli war, last years of the Kingdom of Egypt with all rich life experiences gained during this period.

His father's job in the Egyptian railway authority dictated the continuous travel and change of residence every few years. No doubt this has enriched the life experience of Ashour as he lived in different rural and urban cities. He was able to interact since early childhood with all social classes in the Egyptian society plus meeting all social components in Egypt in that time including the Copts, Jews, Non-Egyptian Arabic residents, Greeks in Egypt. He shared his experience in his "Diaries" [1].

Education and scientific background of Professor Ashour:

He was a smart student. He was exempted from first year of primary education due his high preparedness for school then he finished his primary school by ranking the first. He continued his excellence and graduated from high school of Assuit in 1950 ranking the first on his school and on upper Egypt [1].

His excellence granted him qualifying for the scholarship exam of the Egyptian universities where he ranked the 2nd among the 20 candidates. So he was exempted from University costs. As many Egyptians in last century he wished to be a lawyer. Perhaps this is why he kept advocating for elderly. He also mentions he has dreamed of being a Physician while a child. So he chose to enter the school of medicine [1].

His Medical carrier:

He has graduated from Cairo University (Kasr al-Aini) faculty of medicine in 1957. Although he was not obliged to take military career but he volunteered to join the Military Academy in 1958. After which
he started an 18 years of service in the Egyptian Medical Corps. During his military service, he joined military units in the field armies and worked in several Military Hospitals. He has witnessed the Yemeni war 1963, 1967 Arab-Israeli war, Attrition war and 1973 Arab-Israeli war. One of the impressive watersheds in Ashour life was witnessing the retreat of the Egyptian Army and his coming near death in Mitla mountain pass in the 6th of June 1967. He remarks this moment by referring to it as his "Second birth". After which he decided to work harder and to ask no one but Allah for help [1].

During his military medical career he has finished two diplomas in internal medicine and Psychiatry. Then finished his Medical doctorate thesis on November 1967 and earned his Medical Doctorate in Psychiatry from Ain Shams University in 1971. Due to his excellence he became part of Dr Herbert Olivecrona (father of Neurosurgery) team (1) during his stay in Egypt in the 1960s [2]. He succeeded in becoming a member of the Royal College of Psychiatrists in 1973 and later on in 1991 became a Fellow of the Royal College of Psychiatrists [1,3].

Professor Ashour Leaving Militaria and joining Academia:

After the 1973 Arab-Israeli war and starting of peace negotiations he left the military service in 1976 to join Ain Shams University as a Lecturer of Neurology and Psychiatry at the Faculty of Medicine [1]. One year later in 1977 he traveled on a Postdoctoral Scholarship in Geriatrics in Birmingham University in UK for one year [3]. He described UK as the pioneer citadel of seniors care in the whole world [1]. He chose to break into the field of elderly care including Geriatric medicine and old age Psychiatry. The choice was to fill in a gap of knowledge, services and academic interest in Egypt during that time [1]. During his scholarship, he had the opportunity to gain knowledge directly from the original sources and also to interact with other international colleagues. The interaction with his colleagues produced later on the International Psychogeriatrics association.

Achievements in Ain Shams University:

a) Establishing the International Psychogeriatrics Association:

After return to Egypt he started his struggle to introduce geriatric medicine into Egypt. He was promoted to Assistant Professor in 1981. He then adopted the organization of the first conference of the International Psychogeriatrics association (IPA) in 1982[4]. Despite the fact that the conference had some difficulties but Sanford Finkel (the former president of American Association for Geriatric Psychiatry and first president of IPA) quotes: "It was clear that the infrastructure for an organization had been created; thanks to the work of Imre, Hans and Abdel Ashour" [5].

So IPA was born and Prof Ashour mentioned that he was the one that suggested adding the ancient Egyptian sun to its logo as it symbolizes the rise of mental health and wisdom. He was recognized as one of the World Five Fathers of Geriatric Psychiatry in Sweden 1985 [6]. In 1986 he was promoted to a Professor of Neurology and Psychiatry at Ain Shams University.

b) Establishing the Geriatric unit:

He has established with others the Geriatric medicine unit in Ain Shams University in 1984 to provide clinical service for Egyptian elderly. In order to pave the road for establishing an academic program for Geriatrics and Gerontology in Ain Shams University, he has started an exchange program with Minnesota University under the Fulbright Commission in 1992. This cooperation helped execution of at least 6 courses in Egypt during the period (1992-1999) [7] plus the repeated travel of at least 4 Professors from Minnesota university to Ain Shams university and vice verse [1].

c) Establishing Postgraduate degrees in Geriatrics and Gerontology:

He has established the first national and regional Geriatric Medicine degrees in Egypt and Arab world: Master of Science (MSc) and Medical Doctorate (MD)
academic programs in Ain Shams University in 1994 [1].

Geriatric medicine in Egypt started by individual initiatives from pioneers in different disciplines: Prof Ashour is one of the Pioneers of introducing Geriatric medicine to Egypt and the Arabic region; He is accredited for establishing the first outpatient Geriatric medicine unit, along with Prof Mohammed Essam Fekry (Alexandria faculty of Medicine) who is accredited for introducing the Geriatric medicine into undergraduate medical curricula and authoring several books in Geriatric medicine (Also Alexandria University had the first inpatient department in Egypt); Prof Mohammed Sabbour (Ain Shams faculty of Medicine) is accredited for authoring the first book on Geriatric medicine in 1978 [8]; And Dr Abdo Mahmoud Sallam was the first president of the ESG after establishing it in 26th of January 1988 [9,10]. Prof Ashour was the one that gave a major push and surge to the Geriatric medicine and old age psychiatry in Egypt so he was nominated for the State Excellence Prize by the Neuropsychiatry department in 1995 [3]. But he received no prizes. He comments on this by saying: "My prize is seeing the continuous growth of my projects and the progress of my students" [1]. But Ain Shams faculty of Medicine later on has honored him in 2013 by giving him the honoree of the Pioneers in medicine during the annual conference.

d) Establishing other Geriatrics academic units:

For many years (1984-2007) Ain Shams Geriatric medicine and Gerontology unit and department along with Alexandria Geriatric medicine unit remained the only academic units in the Egyptian universities and the whole Arabic region. In 2007 Mansoura University faculty of Medicine started establishing its Geriatric medicine and Gerontology department with help of Ain Shams University.

The Ain Shams Geriatrics and Gerontology unit has metamorphosed starting from 1996 [1] into an academic department which continued its growth until today. Nowadays it has its own undergraduate academic medical curricula (and contributing to undergraduate nursing education), postgraduate academic degrees, Geriatrics & gerontology residency program (including a 12 months Geriatric intensive care rotation), subspecialty units (Osteoporosis management unit and Geriatric intensive care unit), plus expanding its inpatient and outpatient services. This would not have been accomplished if it not has been for the efforts of Prof Ashour and his successors.

e) Retirement and Psychogeriatrics efforts:

After retirement in 1995 he continued his academic mission as a Professor Emeritus. Due to several reasons he chose to leave his offspring in Geriatric medicine unit, but he kept an eye on it from a distance. He "retreated" to the Psychiatry department. He has transferred the "know how" to Helwan university and established the Centre for Social and Health Care of elderly in 1997. He also founded the Geriatric Psychiatry Research Unit at Institute of Psychiatry of Ain Shams University in 1998. During which he concentrated more on voluntary work in NGOs, as he established the Alzheimer Egypt Society in 1998 [1].

He has also established the Psychogeriatrics unit in Abbasyia mental health hospital in 2006 [11] which set the first model for establishing other Psychogeriatrics units in the Egyptian Ministry of Health later on.

f) Voluntary efforts with Non Governmental associations (NGOs):

He had a philanthropic personality and was active on the NGOs sector. He was a member of several national and international societies. He was an establishing member of the Egyptian Society for Elderly care, the Egyptian society for elderly health in 1982, and Egypt Alzheimer society in 1998 [12]. He insisted and persisted on having a monthly meeting of "Alzheimer café" regardless of his obligations or health status. In the meeting there would be open discussions, consultations, workshops and presentations.
on caring for persons with dementia and caring for carers (caregivers). He also was bearing the burden of organizing the World Alzheimer day in Egypt through the Alzheimer Egypt society yearly.

g) Contribution to scientific literature:
He was peer reviewer in several scientific journals. He had many scientific articles published in peer reviewed international journals (See appendix). Ashour was a “polymath” academic with an expertise that spans a significant number of different subject areas, all dedicated to Seniors’ care. This is reflected in his supervision of several Master and Doctorate theses (both in Science and in Arts) on the fields of Geriatric medicine, Psychiatry, Psychology, Fine arts, Physical exercise, nutrition and nursing in Egypt and in the Arab world (See appendix).

He has written and coauthored several books (See appendix) and book chapters both in Arabic and English. Perhaps his last book that contained his diaries is very inspiring to other people.

He also was very interested in raising the awareness by issuing bulletins about elderly care, geriatric medicine (Sawt al-Zaman) in 1995 [13], dementia care (Alzheimer Egypt bulletin) in 1999 [14]. He also triggered and supervised the foundation of the Alzheimer Egypt website [15].

As an Expert and developer of elderly care service he was member of the team that made the National strategy and action plan of elderly care in Egypt in 2007 [16].

h) Ashour and Elderly care promotion:
Ashour was very interested on disseminating the culture of caring knowledge, attitudes and skills to the Egyptian and Arabic society. One mean to help this was by organizing Caregivers (for both elderly or Dementia caregivers) training courses by the help of Ain Shams Geriatrics unit, Alzheimer Egypt society, Helwan university Center for elderly care, and several other NGOs [1].

He was keen in networking, raising awareness, lobbying, spreading knowledge, advocating, and marketing for elderly care through conferences. He has organized many conferences as the First international conference of IPA in 1982; Ain Shams conference of Geriatrics & Gerontology 1988; several conferences in collaboration with Minnesota university, Egyptian Medical society, Ain Shams Geriatrics unit; and in 2012 the Middle East and North Africa Conference of Alzheimer's disease international conference [17].

Ashour was a knight fighting all his life for promoting elderly care. Despite having several drawbacks in his health status since 2009, he insisted on finalizing his last project by establishing the professional learning certificate of psychogeriatrics in Ain Shams Institute of Psychiatry (18). It was established as a "super-specialty" that crystallizes his development of a unique psychogeriatrics methods and principles, bringing about gerontology, geriatric medicine, psychology, sociology and old age Psychiatry in to a single interface. This was his last accomplishment [1].

i) Ashour and active ageing:
He was an excellent example of active Ageing. Despite having some health drawbacks, he kept actively fighting for the cause of elderly care in Egypt until the last day of his life. He is remembered as a philanthropic, good and generous man. He has left an established academic legacy in a well established department with great number of students and faculty of Geriatric medicine and old age psychiatry disseminating knowledge and services all over Egypt and the Arab world. He continued his efforts of advocacy for Persons with Dementia and elderly until the end of his life in 6th of April 2015.

Conclusion

Professor Abdel Moneim Ashour was a polymath, brilliant academic, and dedicated fighter for promoting elderly care services in an under serviced country as Egypt inside and underprivileged areas (Arab world). He is considered the true pioneer of Geriatric medicine and Psychogeriatrics in Egypt and the Adult world.
References:


4- IPA’s First International Congress - Cairo, Egypt - 22-25 November 1982 Theme: International Conference for the Mental Health of the Elderly http://www.ipa-online.org/wordpress/meetings-and-education/annual-congress/


15- Alzheimer Egypt (2012) الموقع الرسمي لجمعية ألزهيرم مصر Official
website of Alzheimer Egypt society

http://www.adicairo2012.org/

Appendix:

**Articles, Thesis and Books**

**Articles**

1978


1979


1981

1983

1984


1985


1986


1986 Bishry Z, Khalil AH, Youssef NM and Ashour A (1986): Children’s reaction to hospitalization. The Ninth Annual Conference of Ain Shams, Faculty of Medicine, 1-6 March.

1990


1993


2000


2001


2003


2006


2007


Theses

Seniors' Fine arts

- دراسة لصدق سلسلة الرسوم التشخيصية كأداة للتقديم النفسي من خلال الفن لعينة من المسنين = Validity Study of Diagnostic Drawing Series (DDS) as a Tool for Art - Based Assessment for a Sample of Egyptian Elderly Depression and Alzheimer Patients / 2007-

Geriatric Physical exercise

الرياضة البديلة والمسنين
Psychogeriatrics


The psychiatric and Quality of life Profile of Users of a Psychogeriatric Service in Cairo - Thesis 2006. - Abdel-Moneim Mahmoud Abido, Rasha - thesis (MD) - Faculty of Medicine, Ain Shams University, Psychiatry

Assessment of Knowledge, Attitude and Behavior of Family Members living with a Geriatric Relative in Relation to His Physical and Psychosocial Needs - Osman, Omayma Abou Baker - 1989

Prevalence of Dementia and depression in population 60 years old and over in a village in Menoufiya governorate - Thesis 2006 - Diab, Mohammed Fawzy Gabr - Menoufiya University, Medicine, Neuropsychiatry


Effect of Educational Intervention on Caregiver Burden & Quality of Life in Dementia in an Egyptian Sample by By Ahmad Talaat Ibrahim Waly MD Thesis degree in psychiatry - Abd El Moneim Mahmoud Ashour, Alaa El-Din Mohamed Ali Soliman, Nahla El Sayed Nagy, Doaa Hamed Hewedi, 2008

Psychiatry


Okasha A, Abu-Zied M, Sadek A, Ashour A. Psychiatric morbidity among prisoners. MD Thesis, Institute of Psychiatry, Faculty of Medicine, Ain Shams

Geriatric Psychology

Geriatric Medicine

Books

- صحة المسنين - كيف يمكن رعايتها (كتاب)
  عبد المنعم عاشور (2001/01/01) مركز الأهرام للترجمة والنشر

- صحة المسنين - كيف يمكن رعايتها (كتاب)
  عبد المنعم عاشور (2009) الهيئة العامة للكتاب

- برنامج إرشادي لمرضى الغنف - وحدة طب
  صحة المسنين - العيادات الخارجية - مستشفيات جامعة عين شمس

- كتاب يوميات طبيب نفسي بعد ثورة 25 يناير 2011 دار أ בחير اليوم

- كتاب "الزهير" دار أ خير اليوم 2012


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The 2nd International Geriatrics & Gerontology Conference

"Future of Active Aging"

By

D. Sherine Moussa

Department of Geriatrics and Gerontology- Faculty of Medicine-Ain Shams University

The 2nd International Geriatrics & Gerontology Conference of the Geriatrics and Gerontology Department, Ain Shams University, Cairo, Egypt, "Future of Active Aging" was held on 5-6 March 2015, in collaboration with the Egyptian Society of Geriatrics and Gerontology.

Population ageing worldwide raises many questions, above most, are those people living longer going to remain independent and active as they age? The word “active” refers to continuing participation in social, economic, cultural, and spiritual affairs, not just the ability to be physically active or to participate in the labor force. Older people who retire from work, ill or live with disabilities can remain active contributors to their families, peers, communities, and nations. Active ageing aims to extend healthy life expectancy and quality of life for all people as they age.

This conference was aiming to address the possibilities of achieving active ageing and better quality of life of older individuals.

The conference included a number of professionals with recognized expertise in the wide field of elderly care.

Summaries and Recommendations

The invited lectures, topical discussions, and posters presented at the conference and the invited manuscripts served as the basis for the following summary and recommendations.

Suffering with Alzheimer's disease

“Man fools himself; He prays for a long life, yet he fears an old age.” This was the opening quotation of Prof Ahmed Okasha lecture. As we grow, we dream of enjoying the harvest of our sacrifices, and perpetuating the successes that we created or we were granted. Nevertheless, we fear many dreadful conditions that graphically chop our hopes, and instead of successes they cast agonizing disability. One of the most dreadful dangers is Alzheimer’s disease. The most feared part of this disease is not cognitive decline, rather it is the lack of proper understanding and handling of this decline! With the current rate of population greying, disability due to Alzheimer’s disease must be given the proper attention, and training of health professionals must address relevant changes in personal lives of patients and their families as well.

Recommendations for the future and future research:

Both health care professionals and patient’s care givers must be well trained for proper dealing with behavioral and psychotic symptoms of Alzheimer’s disease together with the biological changes and clinical progression. Guidelines must be laid down for proper management and control of symptoms.

Health promotion: Across ages:

The challenges of an ageing population are the double burden of disease, the increased risk of disability, providing care for ageing populations, the feminization of ageing, ethics and inequities, and the economics of an ageing population. Health promotion is a process which empowers families and communities to improve their quality of life, and achieve and maintain health and wellness. The ideal model of health promotion is by adopting health education,
prevention, and health protection. Yet the public health agenda on population ageing is poorly developed.

Recommendations for the future and future research:
Forcing effort to shift strategic planning away from a “needs-based” approach (which assumes that older people are passive targets) to a “rights-based” approach that recognizes the rights of people to equality of opportunity and treatment to all other age groups in all aspects of life as they grow older.

- Empower primary health care approaches for the elderly and lifestyle modification.

Chronic disease burden:
Cardiovascular diseases (CVD), diabetes mellitus, and degenerative joint disease are three major chronic diseases that affect elderly population and hinder their aging successfully.

Preclinical diagnosis of osteoarthritis can be established within the first month after joint injury. Biochemical markers for diagnosis are serum Hyaluronic acid, Osteocalcin, Cartilage glycoprotein 39 (YKL-40), Cartilage Oligomeric Matrix Protein (COMP), C-Telopeptide of type 1 collagen (CTx-1), and C-Telopeptide of type 2 collagen (CTx-2). MRI also is able to detect pathologic changes at earlier stage of the disease.

Recommendations for the future and future research:
- Adherence to the general rules and guidelines for managing CVD in elderly as they are the same for younger patients yet elderly patients are at high risk for both thrombotic and bleeding complications.
- Care should be given to drug dosing, drug interactions and more risky drugs.
- Every diabetic elderly should be assessed comprehensively due to the vast major geriatric syndromes that accompany diabetes (i.e dementia, depression, frailty, falls, urinary incontinence, osteoporosis, and sarcopenia) for the sake of early intervention and better quality of life.
- Early diagnosis and early intervention for early stages of osteoarthritis makes it more amenable to modification, including halting or slowing the disease process to prevent recalcitrant, disabling, and more costly late stages of the disease.

Mental and psychological wellbeing:
Mental health is defined as a state of well-being whereby individuals recognize their abilities, are able to cope with normal stresses of life, work productively and fruitfully, and make a contribution to their communities.

There is a trend in Western societies to expect the right to feel happiness, and a need to restrict the range of negative emotions that are considered “acceptable and normal”.

Recommendations for the future and future research:
- Inforce focusing on positive mental health
- Reorient psychiatric practice to expand individual’s boundaries to articulate with the living environment, not only to focus on not only on the understanding or development of psychiatric or mental diseases.

Critically ill elderly:
In recent years, there has been a global increase in the incidence of elderly patients admitted to intensive care units (ICUs). Early recognition of patients at high risk of mortality and other negative health outcomes is therefore needed.

Recommendations for the future and future research:
- ICU outcome indices are available, and should be used to predict patients’ risk level to develop various complications.
- Comprehensive research is recommended for each condition separately to have more insight for improving ICU outcomes.
**Social aging:**
Retirement is a major life event that leads to major changes in elderly life especially the social one. Achieving successful retirement is crucial for active and healthy aging.

**Recommendations for the future and future research:**
Retirement programs are like hobbies projects; they should be planned by elderly not planned for them. Elderly need to be aware with retirement preparatory program and their attitude towards retirement need to be addressed on a large base.

**Sensory impairment: A major barrier:**
Sensory impairment is a major barrier for achieving active and healthy aging. The world exists all around us, but we only know it as good as our five senses can tell us about it. Olfactory sensory affection gain a little attention compared to other sensations like vision and hearing yet it has been linked to neurodegenerative diseases that are common in elderly. Parkinson’s disease may start in the olfactory system before the damage in the basal ganglia. Olfactory detection losses in Parkinson disease are independent of cognitive status. Hyposmic relatives of Parkinson’s disease patients are more likely to develop PD than normosmic relatives.

In Alzheimer’s disease degeneration occurs in the entorhinal-hippocampal-subicular complex. Olfactory affection can proceed the cognitive decline in an Alzheimer patient. Persons with mild cognitive impairment who don’t suffer olfactory dysfunction are less likely to progress to Alzheimer’s diseases and olfactory dysfunction in Alzheimer’s disease correlates with disease progression.

**Recommendations for the future and future research:**
More researches are needed to confirm the association between olfactory dysfunction and neurodegenerative diseases especially Alzheimer’s.

Assessing olfaction while performing comprehensive geriatric assessment should be generalized.

**Therapeutics in elderly:**
Significant proportions of patients with liver cirrhosis due to HCV infection develop hepatocellular carcinoma, and have to undergo hepatic resection. The compromised cirrhotic liver cannot withstand further removal of hepatic tissue, thus, leading to postoperative complication and death. Preoperative autologous bone marrow stem cell transplant proved a favorable outcome of liver resection in cirrhotic patients. When patients with liver cirrhosis at Child’s stages A and early B receive autologous bone marrow stem cell transplant before liver transplantation, they showed postoperative improvement in different parameters as liver function tests and hepatic volume. The majority of cirrhotic patients with HCC are elderly, and this procedure is almost their only key to limited resection.

**Recommendations for the future and future research:**
Starting an intense research on the outcome of such procedure on elderly, as they are one of the most vulnerable populations for hepatocellular carcinoma.

**Healthy eating:**
Geriatric general and oral health are in a bidirectional relationship. Oral health is not only utilized for mastication and speech, but it is also a window to the outer world and a self reminder of body condition that engraves our self-image., social (intimacy and communication), and physiologic (appearance and self-esteem). The common oral problems in elderly are oral squamous cell carcinoma, reactive benign oral lesions, oral lesions secondary to xerostomia, osteomyelitis, and potentially malignant lesions. The most common geriatric problems that affects oral health in elderly are dementia, respiratory infection, osteoporosis, stroke, heart disease, and uncontrolled diabetes.
Recommendations for the future and future research:

Oral health and wellness’s should be included in the screening index of active ageing, that measures the health status of several biological and social functions for elderly. Elderly people need to be aware of the importance of checking the health of their oral cavity regularly.

Frailty and physical fitness: integrated approach:

Frailty is a geriatric syndrome that combines sarcopenia, malnutrition, chronic inflammation, low physical activity and exhaustion. It has its major impact on aging successfully. Frailty is not a single disorder, but rather a functional state rendered by depletion of the physiological reserve of multiple biological systems, which explains its importance as a marker for increased risk to mortality and all complications in elderly, and translated practically as the closing note, played to close the final chapter of individual’s life. And as such, it may represent the last chance for interventions to prevent (or delay) death!

Recommendations for the future and future research:

Research programs are needed to detect the biological pathways of frailty and sarcopenia, and elicit potential portals for interventions to halt these syndromes (nutrition, vit. D deficiency, exercise, chronic inflammaging) as they are major obstacle in achieving successful aging.

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Director of WHO Collaborating Center for Training and Research, Ain Shams University.
President of the Egyptian Psychiatric Association and WPA Past President.
Anti-Aging Medicine
Walaa W. Aly *
*Department of Geriatrics & Gerontology – Faculty of Medicine – Ain Shams University

Anti-aging medicine is a medical specialty founded on the application of advanced scientific and medical technologies for the early detection, prevention, treatment, and reversal of age-related dysfunction, disorders, and diseases. It is a healthcare model promoting innovative science and research to prolong the healthy human lifespan.

The anti-aging medical model aims to both extend lifespan as well as prolong health span - the length of time that we are able to live productively and independently.

Hundreds of scientific research studies clearly prove that modest interventions in diet, exercise, nutrition and single-gene modulation in the laboratory setting beneficially and significantly impact healthy function in old-age.

It was found that the longest-living Americans are Asian-American women residing in Bergen County, New Jersey USA. They live longer than any other ethnic group in the United States to an average lifespan of 91.1 years. In contrast, the Harvard team found that the shortest-living Americans are Native American populations in South Dakota, despite receiving free or low-cost government provided medical care, living an average lifespan of 66.5 years. A distinguishing characteristic of the Bergen County women's longevity is that they are availing themselves of the armament of state-of-the-art biomedical technologies in advanced preventive care, including preventive screenings, early disease detection, aggressive intervention, and optimal nutrition - all of which are cornerstones of the anti-aging medical model [1].

Kaplan and his colleagues, (2008) utilized the Health Utilities Index Mark 3 (HUI3), a multidimensional measure of health status, to examine the maintenance of exceptionally good health among 2,432 elder Canadians enrolled in the Canadian National Population Health Survey from 1994 to 2004. The researchers found that the most important predictors of excellent health over the entire decade were; absence of chronic illness, income over US $30,000, having never smoked, drinking alcohol in moderation, maintaining a positive outlook, and managing stress levels. Many of these factors can be modified when young or middle-aged [2].

Anti-Aging Medicine
A number of products, including diets, drugs and supplements, are promoted to have anti-aging properties. Presently, there is no proven way to delay, even if slightly, the human aging process.

Caloric Restriction
Caloric restriction (CR) is one of the ways that might be able to delay human aging. Given the large body of research on CR, there are many products trying to emulate its effects.

In humans, there are no conclusive studies but some results suggested that CR might be beneficial, at least in some groups of people. Fontana et al., (2004) found that CR has a protective effect against atherosclerosis in people [3]. Another study reported beneficial effects on cardiac function [4]. Racette et al., (2006) found some benefits of CR in reducing weight and adiposity, though the benefits were similar to those obtained by exercising [5]. CR may also improve memory in the elderly [6]. Finally, CR appears to have beneficial effects on some biomarkers of longevity in overweight individuals [7], though the observation that reducing calories is beneficial to overweight patients is not surprising.

Side-effects of CR includes, the mental stress for being hungry all the time, which can lead to depression. Even in food restricted rats, depression- and anxiety-like behaviors have been observed [8]. CR makes exercise impossible and makes people feel less energetic, less alive. Finally there are sexual problems:
diminished libido is a common side-effect in people under CR.

**Hormonal Therapies**

The levels of many hormones go down with age. Growth hormone (HGH) has a long history as an anti-aging treatment and some evidence suggests HGH has beneficial effects in elderly people: HGH supplements might increase muscle mass, strengthen the immune system and increase libido.

A review on the use of human growth hormone as an anti-aging treatment in healthy elderly people published in the Annals of Internal Medicine concluded the risks of HGH significantly outweigh the benefits, noted soft tissue edema as a common side effect and found no evidence that the hormone prolongs life [9], also because HGH stimulates growth, concerns have also been raised as to whether HGH could stimulate cancer growth and whether it will contribute to cancer development in patients with existing malignant or pre-malignant tumors.

Insulin-like growth factor 1 (IGF-1) is another hormone that may play a role in aging and can be purchased as a supplement. IGF-1’s production is induced by GH and, like GH, IGF-1’s levels decline with age and, in mice, low levels of IGF-1 appear to correlate with longevity. In fact, there is some evidence that little people with low levels of IGF-1 live longer [10]. Interestingly, anti-aging therapies based on lowering IGF-1 may be possible. IGF-1 does appear to play a role in aging, but whether it can be used in anti-aging is pure speculation at this stage. Clearly, however, IGF-1 injections are unlikely to extend lifespan and, like HGH, may even be harmful.

Other hormones whose production decreases with age include, Dehydroepiandrosterone (DHEA) and melatonin. DHEA has been reported to improve the wellbeing of the elderly by a variety of ways: improved memory, immune system, muscle mass, sexual appetite, and benefits to the skin. Protection against cancer has also been argued but there is really no strong scientific evidence for this. Minor side effects such as acne have also been reported. One clinical study in elderly women found no evidence of benefits from DHEA [11].

Melatonin is a hormone mostly involved in sleep and circadian rhythms, the latter hypothesized by some to be associated with aging and life-extension [12]. Some of its proponents claim it delays the aging process and many age-related diseases, though this is far from proven. In mice, melatonin can increase lifespan but also appears to increase cancer incidence. In humans there is no data to determine whether melatonin extends longevity, though it might have benefits in some patients [13]. Although it can be used for jet lag and some sleep disorders, it may also cause sleep disorders such as nightmares and vivid dreams.

For women, estrogen is a popular anti-aging therapy. This hormone is generally used in conjunction with others in hormone replacement therapy. It does appear to reduce some of the effects of menopause by protecting against heart disease and osteoporosis. On the other hand, it could increase risk of breast cancer and may lead to weight gain and thrombosis as side effects. In the context of aging, there is no evidence that estrogen is a viable anti-aging therapy. For men, testosterone has also been touted as anti-aging but, again, there is no evidence it has anti-aging benefits even if it might have some benefits like, say, increased sexual function and muscle mass [14].

**Antioxidants**

A number of prospective cohort studies and case-control studies have reported that increased intake of dietary antioxidants including vitamin E, vitamin C, and B-carotene, are associated with reduced risk of atherosclerotic diseases [15]. Antioxidants seem to prevent the development and progression of arteriosclerosis [16].

However, a randomized controlled trial, enrolling more than 35,000 healthy women aged 45 years and older, showed no beneficial effect from vitamin E supplementation (600 IU on alternate days
for a mean of 10.1 years) for the prevention of major cardiovascular events, cancer, total mortality, and cardiovascular mortality [17]. Similar results were also obtained from The Heart Outcomes Prevention Evaluation (HOPE) and the Heart Outcomes Prevention Evaluation -- The Ongoing Outcomes (HOPE-TOO) trials Investigators, 2005[18], where a possible increased risk of heart failure was also hypothesized in the intervention group (vitamin E 400 IU daily).

On the other hand, the effect of vitamin E on Alzheimer’s disease patients shows considerable variations both in its antioxidant function and in its capacity to improve cognitive functions. Therefore, the determination of the oxidant-antioxidant status of the patient is particularly important to test the effect of antioxidants on given functions [19].

**Telomere-Based Therapies**

Telomerase is an enzyme that, at least in some cell lines, appears to overcome cellular senescence by extending the tips of the chromosomes called the telomeres. Some have argued that if telomerase can avoid aging in cells in vitro, maybe it can be used to combat human aging [20]. A number of companies and labs are developing telomerase-based therapies to fight aging and at least one product, a natural product-derived telomerase activator called TA-65, is already available. One study reported that taking TA-65 may result in a decline of senescent immune system cells [21]. TA-65 can also increase telomerase levels in some mouse tissues and was reported to improve some health indicators in mice but it did not increase mean or maximum lifespan [22].

**Stem Cells**

In recent years stem cells have received widespread attention. The possibility of using stem cells to treat diseases of aging and for rejuvenation is also exciting. While depletion/dysfunction of stem cells are thought to play a role in aging [23], there is no evidence that stem cell-based anti-aging treatments will work. Harvesting and/or preparing stem cells for treatments is complex and much work remains to optimize protocols. In some areas indeed stem cells have been shown to be useful. For example, blood- and marrow-derived stem cells have been used successfully in some autoimmune and cardiovascular diseases. Interestingly, mesenchymal stem cells, transplanted from young donors were found to extend lifespan in mice [24]. Yet stem cell applications are still in their infancy and a long way before physicians can employ stem cells to delay aging.

**Future Therapies**

One exciting finding in anti-aging research was the discovery that feeding rapamycin, also known as sirolimus, to middle-aged mice extends lifespan by 9-14%. When fed to younger mice, rapamycin extend lifespan by 10-18% [25]. Rapamycin is also an immunosuppressant, used to prevent organ rejection, with serious side-effects and so it is not suitable as an anti-aging drug. However, rapamycin works by inhibiting a complex pathway called TOR (Target of Rapamycin) and a number of labs and companies are now trying to target more specific downstream nodes of the pathway to develop anti-aging drugs without the side-effects of rapamycin [26].

One gene that appears to influence aging in mice is *klotho*. High levels of klotho increase lifespan by about 30%, though it is not entirely clear if aging is delayed, and low levels appear to foster aging. Human longevity has also been linked to allelic variants in this gene [27]. Its functions are still largely a mystery but since the gene encodes one secreted form that acts as a hormone, it could be synthesized and presented as an anti-aging therapy.

The American Academy of Anti-Aging Medicine (A4M) believe that an “anti-aging transformation” can be produced by a combination of interventions, which include hormones, antioxidants, lifestyle modifications and exercise [28]. A 2002 presentation produced by Klatz highlights many widely recommended interventions to maintain health in old age, such as staying slim, avoiding smoking, regular exercise, maintaining an active social and sex life, continued mental stimulation, avoiding stress, a healthy diet, and
moderate alcohol consumption. The presentation also recommends consuming antioxidant supplements [29]. The A4M argues that the application of this set of interventions can produce "practical immortality", which are human lifespans in excess of 150 years, and predict future lifespans ranging up to 200 years old before the year 3000. Klatz predicted that such dramatic increases in lifespan will be produced by emerging technologies such as nanotechnology or stem cell therapy, which he states "shows ubiquitous promise for everything from stroke to spinal cord injury." With the discovery of such future technologies, Klatz believes that "Humankind will evolve toward an Ageless Society, in which we all experience boundless physical and mental vitality."

Several of the anti-aging methods recommended by the American Academy of Anti-Aging Medicine (A4M) have wide support among experts in the field, such as exercise and a healthy diet, but others, such as hormone treatments, do not have support from a consensus of the wider medical community. Many scientists studying aging dissociate themselves from the claims of A4M [30]

**Conclusion**

There is no magic pill at present that will retard aging. But that is simple lifestyle and dietary adjustments that can make you live longer. Most components of a healthy lifestyle are well-known already. Diet rich in fruits and vegetables and low in carbohydrates and fat together with regular exercise, avoiding smoking and stress are likely to make man live longer.

**References**


Effectiveness of 14-days course of clarithromycin-based triple therapy as first line therapy for h.pylori infection in egyptian elderly patients

Salamah A.M¹., Gad M.¹, Deghady A.², Elgayar N.H.¹

Geriatric Unit, Internal Medicine Department, Faculty of Medicine, Alexandria University¹
Clinical Pathology Department, Faculty of Medicine, Alexandria University².

Abstract: The aim of the study is to assess the effectiveness of 14-days course of Clarithromycin-based triple therapy as first line therapy for H. pylori infection in Egyptian elderly patients with normal liver and kidney functions. Methods: The study was experimental study carried out on 34 elderly patients having H. pylori gastritis with normal liver and kidney functions. We tested for H. pylori stool antigen using a quantitative monoclonal enzyme-linked immunosorbent assay (ELISA) assay before and 4 weeks after the treatment to confirm eradication. Patients received Clarithromycin-based triple therapy (Clarithromycin 500mg twice daily, Amoxicillin 1000mg twice daily, and Omeprazole 40mg twice daily) for H. pylori eradication for 14 days. Results: The cure rate of Clarithromycin-based triple therapy was 88.2% (30/34) and only 11.8% (4/34) was having persistent infection. None of the patients discontinued the drugs indicating good tolerability. Conclusion: The use of 14-days course of Clarithromycin-based triple therapy as first line therapy for H. pylori infection is highly effective and tolerable in Egyptian elderly patients with normal liver and kidney functions.

Key words: Helicobacter pylori, elderly, Clarithromycin.

Introduction

Helicobacter pylori (H. pylori) are Gram-negative bacteria, belonging to a separate group of Helicobacter species. It contains a hydrogenase, used to obtain energy by oxidizing molecular hydrogen (H2) produced by intestinal bacteria [1]. It produces oxidase, catalase, and urease [2].

The most common routes of H. pylori infection are fecal-to-oral, oral-to-oral, or gastro/oral exposure. Humans appear to be the major reservoir of infection [3]. H. pylori is the most common chronic bacterial infection in humans. At least 50% of all people are infected [4]. The prevalence of Helicobacter pylori infection increases with age and may affect 75% of elderly patients [5].

There are many virulence factors of H. pylori that may be responsible for the pathogenesis of H. pylori related diseases such as ammonia, CAG-A (cytotoxin-associated gene A) and VAC-A (vacuolating cytotoxin A) toxins, lipopolysaccharides, and histidine-rich protein [6-9].

Gastric diseases caused by H. pylori include gastritis (acute, chronic, and atrophic), peptic ulcer disease, non-ulcer dyspepsia, Mucosa associated lymphoid tissue (MALT) lymphoma, hypochlorhydria, and gastric carcinoma [10-12].

Many extra gastrointestinal manifestations of H. pylori include affection of the cardiovascular system, Ear, Nose and Throat and oral cavity, dermatological, hematological, hepato-biliary, endocrinal, ocular, rheumatologic, renal, andrologic, gynecologic, and neuropsychiatric manifestations.

Diagnostic testing of H. pylori is divided into: Invasive tests and non-invasive tests based on the need for endoscopy. Invasive tests are rapid urease test, histological examination, and culture and sensitivity tests. While non-invasive tests include serology, urea breath test, and H. pylori stool antigen [13].
The Faecal Antigen Test (FAT) can be used interchangeably with the urea breath testing (UBT) to identify H. pylori before antibiotic therapy [14]. The FAT has been approved by the U.S. Food and Drug Administration and supported by the European “Maastricht2–2000 Consensus Report” as an alternative to UBT in establishing the cure of H. pylori infection [15]. Recent studies indicate that the FAT may be effective in confirming eradication as early as 14 days after treatment [16,17].

A systematic review stated that quantitative monoclonal enzyme-linked immunosorbent assay (ELISA) assay for the detection of H. pylori stool antigen has better sensitivity, specificity, Positive predictive value (PPV), and negative predictive (NPV) than the polyclonal test especially in the confirmation of eradication [18,19].

No single drug cures H. pylori infection. Treatment involves taking several medications for 10 to 14 days. Two antibiotics are also generally recommended; this reduces the risk of treatment failure and antibiotic resistance. It is important to confirm eradication of infection. Confirmation should be performed at least 4 weeks after eradication therapy has been completed [14].

The resistances of H. pylori to antibiotics may be particularly relevant in elderly patients for two reasons. First, the prevalence of drug consumption including antibiotics is higher in this population. Second, the compliance in elderly population is lower than younger population [20,21].

The aims of the current study were to:

- Assess the use of Clarithromycin-based triple therapy as a first line therapy in Egyptian elderly patients with normal liver and kidney functions.
- Estimate the resistance rate of this therapy.
- Assess the compliance of our elderly patients on this regimen.

Subjects and Methods

This study was carried out on Egyptian non-hepatic non-renal elderly patients (65 years or older) having Helicobacter pylori gastritis attending the geriatric clinic in Faculty of Medicine, Alexandria University at year 2013. There were 34 patients who met the criteria for the study

Inclusion Criteria:
- Elderly patients.
- H.pylori infected.
- The patient did not receive H.pylori eradication therapy before.

Exclusion Criteria:
- Abnormal liver function tests.
- Abnormal renal function tests.
- Patients with history of PPI intake within the past 2 weeks.
- Patients with history of antibiotic intake within the past 4 weeks.

The study was accepted by the local ethical committee and each patient has full explanation about the study and informed consent was signed by each patient.

All patients included in the study were subjected to the following:
I. Thorough history taking.
II. Complete clinical examination.
III. Basic Laboratory investigations:
- Complete blood picture.
- Complete urine analysis.
- Complete stool analysis.
- Serum Glutamic-Oxaloacetic Transaminase (SGOT), Serum glutamic pyruvic transaminase (SGPT), serum albumin and prothrombin time (PT) and international normalized ratio (INR) as indicators of liver functions.
- Serum creatinine and Blood Urea Nitrogen (BUN) as indicators of renal function.
- Occult blood in stool.

IV. Abdominal ultrasound

V. ELISA for H. pylori stool antigen [22].

We used the International Immuno-Diagnostic H.pylori stool antigen ELISA Kit – Foster City – Canada – code no. 2038 which is a quantitative monoclonal assay for the detection of H. pylori antigens in stool specimen.

*Principle of the test:*

Purified H.pylori antibody is coated on the surface of microwells. An aliquot of diluted stool sample is added to wells, and the H. pylori antigens, if present, bind to the antibody. All unbound materials are washed away. After adding enzyme conjugate, it binds to the antibody-antigen complex. Excess enzyme conjugate is washed off and Tetramethylbenzidine (TMB) Chromogenic substrate is added. The enzyme conjugate catalytic reaction is stopped at a specific time. The intensity of the colour generated is proportional to the amount of antigen in the sample. The results are read by a microwell reader compared in a parallel manner with calibrator and controls [18].

ELISA for H.pylori stool antigen is done, and if the test is positive for H.pylori stool antigen the patient is included in the study but if the test is negative the patient is excluded from the study.

VI. Treatment of H. pylori positive patients by 14 days course of:

- Omeprazole 40 mg twice daily.
- Clarithromycin 500 mg twice daily.
- Amoxicillin 1000 mg twice daily.

VII. Repetition of quantitative monoclonal ELISA assay for H. pylori stool antigen 4 weeks after completion of treatment course to detect who became cured and who remained infected.

Results

All patients were elderly patients aged 65 years or more with a range from 65-80 years, a mean of 70.21 years, and a standard deviation of 4.38 years. Patients were distributed as 18 (52.9%) males, and 16 (47.1%) females.

After completion of the treatment course, 88.2% (30/34) were found to be cured from H. pylori infection by repeating the H. pylori stool antigen test and only 11.8% (4/34) was having persistent infection (fig.1).

None of the patients discontinued the treatment regimen indicating good tolerability (fig.2).

There was no statistical significant difference between the responders and the non-responders as regards the sex and the age (table1).

Discussion

No single drug cures H. pylori infection. There are several regimens for H. pylori eradication [14].

One regimen consists of standard dose PPI (proton pump inhibitor) b.i.d. (twice daily) [Esomeprazole is q.d. (once daily)], Clarithromycin 500 mg b.i.d., and amoxicillin 1,000 mg b.i.d. for 10–14 days. Standard dosages for PPIs are as follows: Lansoprazole 30 mg p.o. (orally), Omeprazole 20 mg p.o., Pantoprazole 40 mg p.o., Rabeprazole 20 mg p.o., or Esomeprazole 40 mg p.o. This regimen achieved 70–85% eradication rate. It should be considered as first line therapy in non-penicillin allergic patients who have not previously received a macrolide [14].

Another regimen consists of standard dose PPI b.i.d., Clarithromycin 500 mg b.i.d., and Metronidazole 500 mg b.i.d. for 10–14 days. This regimen achieved 70–85% eradication rate. It should be considered as first line therapy in penicillin allergic patients who have not previously received a macrolide or are unable to tolerate bismuth quadruple therapy [14].
Large randomized trials suggest that the inclusion of amoxicillin or Metronidazole yields similar results when combined with a PPI and Clarithromycin [23].

The bismuth quadruple therapy consists of Bismuth subsalicylate 525 mg p.o. q.i.d. (four times daily), Metronidazole 250 mg p.o. q.i.d., tetracycline 500 mg p.o. q.i.d., and ranitidine 150 mg p.o. b.i.d. or standard dose PPI q.d. to b.i.d. for 10–14 days. This regimen achieved 75–90% eradication rate. It should be considered as first line therapy in penicillin allergic patients who have previously received a macrolide. A criticism of this regimen involves its complexity (q.i.d. dosing regimen and high pill count) and perceived frequency of side effects [14].

Another regimen is the sequential therapy regimen which consists of standard dose PPI b.i.d. and amoxicillin 1 g b.i.d. followed for 5 days followed by standard dose PPI b.i.d., Clarithromycin 500 mg, and Tinidazole 500 mg b.i.d. for 5 days. This regimen achieved >90% eradication rate. In the available studies, the reported compliance with therapy has exceeded 90% and side effects have been no greater than those experienced with Clarithromycin triple therapy. But the compliance may be lower in elderly patients. In addition, it is not clear that there is any incremental benefit to providing antibiotic therapy sequentially rather than as a concurrent quadruple regimen. So, further studies are needed to consider this regimen as first line therapy and to compare it with other regimens especially in the elderly patients [14].

So in the current study, Clarithromycin-based triple therapy for 14 days was used as first line therapy for H. pylori infected elderly patients. The regimen has achieved a cure rate of 88% which is slightly better than the recorded cure rate for this regimen. The American College of Gastroenterology Guideline on the Management of H. pylori Infection 2007 stated that this regimen can achieve a cure rate up to 85% [14]. In elderly patients, either 14-days course or 7-days course can be used. A recent meta-analysis of seven studies including more than 900 patients found that a 14-day course of Clarithromycin triple therapy provided better eradication rates than a 7-day course of therapy [24].

In the current study, a twice daily dosing of PPI was used instead of once daily dosing because data from a recent meta-analysis of 13 studies suggested that twice daily dosing of a PPI in Clarithromycin-based triple regimens is more effective than once daily dosing [25].

Helicobacter pylori resistance is an important factor involved in the failure of treatment. The prevalence of primary resistance of H. pylori to clarithromycin has been reported to range from 2.2 to 24% in different countries [26-29]. The prevalence of H. pylori resistance to metronidazole has been reported to range from 8 to 80% in different countries. The prevalence is much higher in developing countries (>60%) than in developed countries [30-32]. The prevalence of primary resistance of H. pylori to quinolones has been reported to range from 2 to 22% in different countries [27,33].

Accordingly, 14-days course of Clarithromycin-based triple therapy (Omeprazole 40 mg twice daily, Clarithromycin 500 mg twice daily, and Amoxicillin 1000 mg twice daily) is highly effective as first line therapy for treating H. pylori infected elderly patients in Egypt with a cure rate of about 88% and very high tolerability rate.

So, the use of 14-days course of Clarithromycin-based triple therapy is recommended as first line therapy for elderly patients infected with H. pylori.

Further studies should be done to assess the use of this regimen as a second line therapy if other regimen has failed as first line therapy.

Comparative studies should be done between this regimen and other regimens as first line therapy for elderly patients infected with H. pylori.

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Guarantor of the article: Salamah A.M.
Specific author contributions:
Salamah A.M., manuscript preparation.
Gad M., manuscript review.
Deghady A., laboratory investigations and manuscript review.
Elgayar N.H., manuscript review.
Financial support: None.

References

Thanks for our 34 patients for their compliance with the treatment and with the study because without them this work would not have been completed.


### Tables and Graphs

**Fig. 1:** Response to Treatment

**Fig. 2:** Treatment Tolerability

**Table (1):** Comparison between the two groups according to demographic data

<table>
<thead>
<tr>
<th></th>
<th>Responders (n=30)</th>
<th>Non Responders (n=4)</th>
<th>Test of sig.</th>
<th>P</th>
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<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
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<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Male</td>
<td>16</td>
<td>53.3</td>
<td>2</td>
<td>50.0</td>
</tr>
<tr>
<td>Female</td>
<td>14</td>
<td>46.7</td>
<td>2</td>
<td>50.0</td>
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<tr>
<td><strong>Age (years)</strong></td>
<td></td>
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<tr>
<td>Min. – Max.</td>
<td>65.0 – 80.0</td>
<td>65.0 – 70.0</td>
<td>t=1.461</td>
<td>0.154</td>
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<tr>
<td>Mean ± SD</td>
<td>70.60 ± 4.47</td>
<td>67.25 ± 2.22</td>
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<tr>
<td>Median</td>
<td>69.50</td>
<td>67.0</td>
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$\chi^2$: Chi square test  
$t$: Student t-test
Long Term Care: An Egyptian Perspective

Amira Eltaliawi
M.B.B.Ch., M.Sc., Ph.D.
Consultant of Geriatric Medicine

The term "Long term care" refers to a variety of services that includes medical and non-medical care to people who have a chronic illness or disability. It can be provided both at home or within the community as well as in a variety of facilities adjusted to meet the different needs of the elderly. It may be carried out both informally by family, friends and volunteers, and formally by health care professionals. It may also be in the form of services provided to the elderly such as meals and transportation services.

Background

Traditionally speaking, it has been the responsibility of the family to care for their elderly including those who need special care or assistance in activities of daily living. Only the poor who lacked family were forced to confine to what was then called “almshouses”. But with the demographic shift and increased urbanization, more and more elderly were left uncared for in the absence of the traditional extended families. Some of the first nursing homes were established by women’s groups for the disabled elderly who belonged to their own social classes and religious groups yet the poor were still left to almshouses in which their percentage started to increase with the rising attention to other groups such as children and the mentally ill and younger infirm patients. Today’s long term care facilities come as a result of continuous recognition of the needs of the elderly who can’t live on their own and who may lack social support, and the ongoing development of these institutions and the regulations that ensure their provision of standard care to this needy age group. The first homes of the aged in Egypt were established in the last decade of the nineteenth century by expatriate communities and were intended mainly to serve older members of these communities who had no relatives to provide care.

The first homes for Egyptians were initiated by local Christian and Jewish communities during the 1930s. The first Muslim home was established in the following decade. The establishment of the first ministry of Social Affairs in 1939 represented a milestone in social work. Due to the traditional system of family support which is still the case, the number of new foundations remained limited. According to a report from Cairo Demographic center, most of the elderly people (66.8%) live with sons and daughters and (13%) live with spouse and 9.1% live with relatives other than fore mentioned and the same percentage live alone due to different reasons. However, social changes e.g. rural-urban migration with older people behind left Egyptian women increasingly being employed outside home, changing in housing stock (nuclear instead of extended family) and decreasing family size with fewer people in the young generation available to take care of larger numbers of people in the older generation. All these factors caused changes in living arrangements resulting in increasing number of older people living alone especially females. This has created some demands for extra familial services raising the needs for institutions for the aged.

At the end of the 1970s, 28 homes for the aged were registered with Ministry of Social Affairs. The number has quadrupled since 1978. Yet the registry at the Ministry fails to include nursing homes that are run by mosques and churches and other charity organizations. The precise number of care facilities for older persons remains unknown [1]. The official policy has encouraged and supported social work through numerous
associations. One of those is the General Association for the Care of the Aged established in 1981 to offer social, cultural and religious services to the aged with branches in different governorates. The association has given the priority to two services: setting up homes and clubs for the aged and training staff for this purpose.

**Mission of Long term Care Services**

The philosophy behind long term care is care oriented rather than management oriented. Long-term care is primarily concerned with maintaining or improving the ability of elderly people with disabilities to function as independently as possible for as long as possible. Long-term care also encompasses social and environmental needs and is therefore broader than the medical model that dominates acute care. It is primarily low-tech, although it has become more complicated as elderly persons with complex medical needs are discharged to, or remain in, traditional long-term care settings, including their own homes.

**Types of Provided Care**

Elderly needs differ greatly according to their medical, social and care needs. Thus long term care has developed substantially to meet those different needs putting costs as well into consideration. The most popular long term care institutions are group homes, assisted living facilities and skilled nursing facilities, better known as nursing homes, all of which meet different needs of an increasingly diverse population. Group homes are facilities that offer personalized service to small groups of adults. These residential homes provide lodging, meal services and assistance with daily living activities. They offer a smaller, more home-like family setting for seniors. They do not typically have a medical professional on-site. Limited, part-time medical care is offered, but it's not a primary focus of this type of senior living community. They are designed to meet social needs rather than medical or care needs. A typical assisted living facility resident would usually be an elderly person who does not need the level of care offered by a nursing home but prefers more companionship and needs some assistance in day-to-day living. Skilled nursing facilities (also known as nursing homes) are designed for those need medical supervision and nursing care as well as extensive help with activities of daily living. All three facilities are available in Egypt; however there is usually a lack of differentiation, and sometimes a lack of specialization by the existing institutions.

Institutional long term care is far from the only form of long term care that can be provided to the elderly. Home care is a rising trend in long term care which is based on the idea that elderly belong at home and should be cared for at home. Home Care, is health care provided in the patient's home by healthcare professionals. It of course provides a much preferred option according to most patients than institutionalization. It offers the advantage of a familiar environment, social support, preserved functionality and avoids many complications of institutionalization. Nowadays, it is possible for patients to receive high-tech including monitoring and mechanical ventilation by specialized medical staff.

Less known forms of care are delivered within the community but are still deficient in Egypt such as adult day care facilities that help families who only need care during working hours and hospice care that specializes in palliative care for the terminally ill.

**Nursing Homes**

Common risk factors for nursing home placement are lack of social or informal support, immobility, impaired mental status (eg, dementia), incontinence, older age, living alone, inability to care for self, poverty and female sex. The length of stay
depends on the condition and needs of patients. There are the short-term residents who stay for 3 months or less and are usually patients in for rehabilitation and terminal care. Other residents stay for at least one year and the long-term residents stay for around 5 years and are usually dementia patients. Indications for admission include: a need for patient observation, evaluation of treatment plans, and updating of medical orders by the responsible physician; a need for constantly available skilled nursing services such as for patients with a tracheostomy, indwelling catheter, surgical wounds or pressure ulcers….etc. and patients who have a physical or mental functional limitation [2].

**Services Provided at Nursing Homes:**

Services provided at nursing homes vary, but the basic services include room and board, personal care, monitoring of medication, social and recreational activities and 24 hour emergency care. Additional services include rehabilitation, short term post-acute care, terminal care and respite care.

**Recommended Design for Nursing Home**

The ideal nursing home starts with its architecture. It should give spaces a homelike, rather than institutional, size and scale with natural light and views of the outdoors and create a warm reassuring environment by using a variety of familiar, non-reflective finishes and cheerful, varied colors and textures, keeping in mind that some colors are inappropriate and can disorient or agitate impaired residents. It should also provide each resident a variety of spatial experiences, including access to a garden and the outdoors in general and promote traditional residential qualities of privacy, choice, control, and personalization of one's immediate surroundings. Disorientation is a major problem in elderly patients so design should have clocks, calendars, and other "reminders" at hand. It should also encourage resident autonomy by making their spaces easy to find, identify, and use.

Higher lighting levels are vital for residential occupancies to avoid falls. The nursing home design should promote staff efficiency by minimizing distance of necessary travel between frequently used spaces and allow easy visual supervision of patients by minimal staff as well as make efficient use of space by locating support spaces so they may be shared by adjacent functional areas, and by making prudent use of multi- purpose spaces. A consistent and well thought out system of way-finding, helps to maintain the residents' dignity and avoid their disorientation. It should use multiple cues from building elements, colors, texture, pattern, and artwork, as well as signage, to help residents understand where they are, what their destination is, and how to get there and back. There should be architectural features and landmarks which can be seen from a distance, as well as symbols, signage, art, and elements such as fish tanks, birdcages, or greenery to help elderly find their way and to avoid prominent locations and high visibility of doors to spaces which patients should not enter.

Many residents may be ambulatory to varying degrees, but will require the assistance of canes, crutches, walkers, or wheelchairs. To accommodate these residents, all spaces used by them, both inside and out, should be designed so that all spaces, furnishings, and equipment, including storage units and operable windows, are easily usable by residents in wheelchairs. It must be equipped with grab bars in all appropriate locations and must be free of tripping hazards. Ideally, it should be located on one floor if feasible, preferably at grade. If residents' bedrooms must be located on more than one floor, then dining space must be apportioned among those floors, not centralized [3].
**Required staffing for Nursing Homes:**

Ideally a nursing home should have a staff composed of a licensed charge nurse on site 24 h/day, certified nurse assistants, a full-time social worker if the facility has more than 120 beds, a medical director (clinical, education, quality of care), a qualified recreational therapist to provide recreational programs, a rehabilitative therapist and a dietitian. Physicians, pharmacists, dentists, and pastoral services to be available as needed, but not required on site. The positive relationship between nurse staffing levels and the quality of nursing home care has been demonstrated widely and different research groups have used different methodologies but few spell out specifically different quantitative conclusions [4]. Regulations differ, however, in the U.S, according to the federal Nursing Home Reform Act (NHRA), as part of the Omnibus Budget Reconciliation Act (OBRA) it is required that there be registered nurses (RNs) and licensed practical nurses (LPNs), and a minimum educational training for nurse's aides (NAs). The NHRA requires Medicare and Medicaid certified nursing homes to have: an RN director of nursing (DON); an RN on duty at least 8 hours a day, 7 days a week; a licensed nurse (RN or LPN) on duty the rest of the time; and a minimum of 75 hours of training for nurse's aides. The law allows the DONs to also serve in the capacity as the RN on duty in facilities with less than 60 residents [5]. According to UK guidelines in 2009 by the Regulation and Quality Improvement Authority, The following framework is a guide to determining reasonable and practical ratios of staff to patients in nursing homes in the first instance:

- 8.00 am - 2.00 pm ratio of 1:5
- 2.00 pm – 8.00 pm ratio of 1:6
- 8.00 pm - 8.00 am ratio of 1:10

Within this ratio framework there is a minimum requirement for a skill mix of 35% registered nurses to 65% care assistants over the 24 hour period [6].

The typical nursing home physician is a primary care internist or family physician who devotes 2 hours per week to nursing home care. Physician role in the nursing is admission and follow up. Admission procedures should include a comprehensive geriatric assessment, labs as needed, review of medications and correlation with diagnosis, review of old records, assessment for presence of pain and establishing advance directives. Formulation of a problem list should be done based upon individual goals in addition to medical condition. For example a patient in for rehabilitation following a fracture or a short term post-acute care patient will have different goals than a patient with advanced dementia or a patient with terminal illness. Whereas the former need a more management oriented care, the latter may need palliative care focused on comfort. Establishment of good relationships with residents and their families as well as staff is vital to the success of the care oriented philosophy of long term care. Follow up should include checking vital signs, weight, labs and consultant reports since last visit and a review of medications in light of problem list and care plan and review of medications. Nursing and caregivers are a vital source of information to the physician and addressing their concerns is vital. As opposed to acute care, where the patient-doctor encounter may be short, long term care is a long and challenging road that requires utmost social skills and compassion on the part of the physician.

One of the major problems we face in Egypt is the lack of geriatric training for staff members and lack of awareness of nursing home “culture”. In addition most nursing homes are understaffed and maybe defective in some of the necessary skilled staff members such as a dietician and a rehabilitation therapist. There are few regulations to ensure meeting of standards and payment is usually out of pocket which poses a financial burden for families or paid
for by charity both from religious institutions or social non-governmental organizations. There is also much room for improvement of medical care through proper documentation, screening and preventive measures and using guidelines.

**Important Problems**

Long term care, however are not without their problems. Patient stay may be complicated by a host of different problems some of which are social as isolation, sense of being trapped in a facility with often infrequent visitors. The sense of lost credibility and competency which all may be not lost on the patients even those with dementia and which may all lead to depression. Medical complications include falls, pressure ulcers, infections, polypharmacy and neglect by in an understaffed or unsupervised facility.

**Ethical Considerations**

Ethical considerations pose a considerable challenge for long term care staff. The most important ethical principles of long term care include: beneficence, non-maleficence, futility of treatment, confidentiality, autonomy and informed consent, physician-patient relationship, truth telling, justice and non-abandonment and recognizing limited resources [7].

Beneficence is doing right by the patient, which implies that the physician’s main concern should be the welfare of the patient doing the interventions and treatments that are medically helpful. Maleficence is avoiding harm, which implies that the physician should avoid situations or interventions that are not likely to benefit the patient, but may even harm them. A good example for this is avoiding unnecessary hospitalizations that may lead to complications or a diagnostic work-up if it is unlikely to result in a meaningful survival of the patient. Futility of treatment means that treatment should be consistent with patient’s (clinically realistic) goals and that the physician must assess each case individually so as to determine whether treatment would be beneficial, and avoid interventions that would not benefit the patient and/or prolong suffering. The physician must assume the role as an educator to help clarify issues. Complete and absolute confidentiality is the underlying tenet and physician must comply with local laws regarding disclosure to public health authorities and third parties.

Autonomy and informed consent mean that a patient has the inherent right of self-determination and that a patient has the right to consent and a right to refuse diagnostic work-up or treatment. This includes protection from unwanted touching. A patient has the right to be educated on the pros and cons of a medical decision. Although patient/proxy may request care in excess of what is considered good medicine, individual autonomy should not violate the principle of beneficence and force physicians to go beyond appropriate medical intervention. Autonomy ceases when a patient’s request breaks the law or jeopardizes public health or safety (eg, smoking in one’s room in a LTC facility). To ensure autonomy a patient has the right and is encouraged to execute an advance directive. The physician’s role as an educator is important in this process. To make autonomous decisions, patients must have capacity pertaining to the complexity of the situation. However, the level of capacity may vary as to the complexity of the decision (refusing to be turned in bed may require less mental capacity than deciding on the pros and cons of a complex operation). Surrogate decision making may be used when a patient’s wishes are unknown or unclear or the patient lacks capacity. The amount of value placed on the principle of autonomy varies with different cultures. Some cultures may regularly use a surrogate as the decision-maker even if the patient has capacity to decide.

A therapeutic alliance should exist between physician and patient. There should be fidelity, trust, confidentiality, and protection.
from intended harm. Physicians have an important role in educating their patients. Physicians also have a duty to tell the truth and be honest versus incomplete statements of encouragement. This should be integrated into good “bedside” manner and patient support. Simple language must be used to avoid obscuring the facts and an honest communication of the estimate of prognosis should be made. Physicians have a duty to uphold the principle of fidelity—not to abandon the patient after establishing a therapeutic relationship. A physician may voluntarily terminate care of a patient after the patient/proxy has been informed and provided with a reasonable amount of time to make other arrangements. The physician may be asked to help with such alternative arrangements when there is conflict between a patient/proxy and physician concerning a course of treatment, guidance may be obtained through an ethics committee, ombudsman, and/or Department of Health. Justice includes distribution of resources and treatment in an equitable manner and the use of objective decision-making processes, not emotional or subjective ones. Physicians must realize that there are limited health care resources.

The previous ethical consideration have been developed and legalized in Western societies, but many of them may need review in the context of our own culture and laws. Among the more complicated issues is truth telling, should we deny the patient telling him/her about the reality of their medical condition? This issue is more complicated in our eastern paternal culture. Who is the decision maker? In absence of a clear proxy or surrogate which are absent in the Egyptian legal system, sometimes the physician can get caught up in conflicts between patient’s preferences and those of the families or worst yet between different family member’s demands. An easy solution would be to have clearly written advance directives, but is it? How ethical is it in the context of our own culture to state end of life options such as discontinuation of treatment? All the previous questions still need answers which should be ideally addressed by a multi-disciplinary committee of geriatricians, religious leaders and lawyers.

**Conclusion**

Various services and facilities have developed over the years to meet the needs of the elderly who are a growing and diverse population. Provision of adequate and competent long term care is not only a moral obligation by society but is dictated by a reality of the aging of the Egyptian population and current demographic changes leaving more and more elderly without the social and financial support, they need to live what is left of their lives in dignity.

**References:**

Association between physical performance and muscle strength among elderly

Basma G.Azab¹, Heba Y. Youssif¹, Manar MA. Maamoun¹, Hala S. Sweed¹
¹Geriatrics and Gerontology department, Faculty of Medicine, Ain Shams University, Cairo, Egypt

Abstract

Aim: Studies about the relationships between muscle mass, muscle strength and physical performance in Egyptian elderly are scarce. The current study aimed to investigate the relationships between muscle mass, muscle strength and physical performance in a sample of older Egyptians. Methods: The study was a case-control study conducted on 76 elderly subjects, aged from 60 -75 years old, males and females, recruited from geriatric outpatient clinic, Ain Shams University hospital. Subjects were divided according to gait speed (measured by four meters walking test) as indicator of physical performance into two groups, cases: 38 subjects with low gait speed (<0.8 m/s), and controls: 38 subjects with normal gait speed (≥0.8 m/s). Appendicular skeletal mass (ASM) was measured by dual-energy X-ray absorptiometry and skeletal muscle index (SMI) was calculated, whereas, grip strength was measured by dynamometer (Jamar Hydraulic hand dynamometer) for all participants. Results: Muscle mass was not significantly different between the two groups whereas, Muscle strength was significantly lower in subjects with impaired physical performance measured by gait speed (89%, p=<0.01). There was a significant inverse correlations between muscle strength, height and the gait speed in seconds (p=<0.01, p=<0.05) respectively. Low muscle strength and advanced age were significant independent predictors of low gait speed among studied population. Conclusion: Muscle strength has greater effect on physical performance than muscle mass among elderly subjects. Programs that target muscle strength can have great impact on the physical function and quality of life of the elderly. Keywords: Muscle strength, muscle mass, Elderly, Physical performance

Introduction

One of the main characteristics of aging process is loss of muscle mass, muscle strength and subsequent functional decline. The relationships between the three parameters in elderly were a major research question in the last decades all over the world. The European Working Group on Sarcopenia in Older People (EWGSOP) recommends muscle mass, muscle strength and physical performance as primary outcome variables for intervention trials of sarcopenia (1). Several studies strongly suggested that the loss of muscle strength with aging was largely independent of the loss of muscle mass (2). Kim and his colleagues found that muscle mass decline explained only 5% of the decline in strength and the rate of strength decline was about three times greater than the rate of lean mass loss (3). Low muscle strength is predictive of functional limitation and physical disability in older people (4). With increasing age, there was a 10-18% successive decline in performance throughout the entire age span (5).

Grip strength is a good simple measure of muscle strength. Isometric hand grip strength is strongly related with lower extremity muscle power and low handgrip strength is a clinical marker of poor mobility and a better predictor of clinical outcomes than low muscle mass (6). In practice, there was also a
linear relationship between baseline handgrip strength and incident disability for activities of daily living (ADL)\(^7\).

Several studies strongly suggested that the loss of muscle strength with aging was largely independent of the loss of muscle mass and muscle weakness carried a greater relative risk for the development of disability than low muscle mass. The number and magnitude of associations for low physical performance or disability were found to be greater for low muscle strength than low muscle mass\(^6\).

Scarce data are available regarding Egyptian elderly, hence the aim of the current study is to assess the relationship between muscle strength, muscle mass and physical performance among community dwelling elderly subjects.

### Subjects and Methods

**Design:** A case control study was conducted on 76 elderly participants (34 males and 42 females) aged 60-75 years, independent in activities of daily living (ADL) & instrumental activities of daily living (IADL), randomly selected from geriatric outpatient clinic, Ain Shams University Hospital. Subjects with cognitive impairment as measured by mini-mental status examination, liver cell failure, respiratory failure, heart failure and renal failure, hemoglobin less than 10 g/dL, peripheral neuropathy, past or current history of malignancy, severe knee osteoarthritis, any history of inflammatory joint diseases, neurological disorder or injury to upper extremities and lower extremities that may affect the tests performance were excluded from the study.

**Methods:** After taking informed consent, each participant subjected to full history taking (demographic data, medical history, review of medications), clinical examination. Assessment of physical performance by four-meters walking test, a cut-off point of \(<0.8\) m/s identifies subjects with poor physical performance\(^6\). Measurement of hand grip strength of dominant hand using a dynamometer (Jamar Hydraulic hand dynamometer; 5030J1 Sammons Preston – USA). Low muscle strength was classified as hand grip strength less than 30 kg and 20 kg in men and women, respectively\(^8\).

Estimation of appendicular muscle mass was estimated by a dual energy X-ray absorptiometry (DXA) (total-body) (GE Lunar Radiation Corporation, 726 Heartland Trail, Madison, WI 53717-1915). The lean mass of the four limbs was summed from a DXA scan as appendicular skeletal muscle mass (ASM) divided by height squared and defined a skeletal muscle mass index (SMI) as ASM/height\(^2\) (kg/m\(^2\)). Cut-off point of normal muscle mass measured by a DXA scan is (SMI) 7.26 kg/m\(^2\) in men and women, respectively\(^9\).

**Ethical considerations:** Informed consent was taken from every elder participating in this study. The study methodology was reviewed and approved by the ethical committee, Faculty of Medicine, Ain Shams University.

**Statistical analysis:** Data was processed and analyzed using SPSS (Statistical Package for Social Science) software version 20.0. The data was presented using frequency & its related percentage. Comparison between groups was done using chi-square test; Fisher Exact test was used when the expected count in more than or equal 25% of the cells was less than 5. The risk factors for poor physical performance were analyzed by both univariate and Logistic regression methods. Independent sample t-test was used to compare between means of two independent groups. A P value of 0.05 was chosen as a level of significance. P>0.05 is insignificant, P<0.05 is significant and p<0.01 is highly significant.

### Results

The current study revealed that more than half of studied population (53.9%) had low muscle strength while only 18.4% had low...
muscle mass, and sarcopenia were diagnosed in 11.8% of total population. After subdivision of subjects according to gait speed as indicator of physical performance. Cases with poor physical performance were significantly shorter, thinner and had more comorbidities than control group (table 1). Cases had significantly lower muscle strength (89.5% vs 18.4%) and sarcopenia (21.1% vs 2.6%) than controls (p<0.01) (p<0.05) respectively. While low muscle mass represents (21.1%) in cases and (15.8%) in controls with no significant difference between two groups. (table 2).

Factors inversely correlated with gait speed in seconds were muscle strength and height (p<0.00, p<0.05 respectively) while muscle mass, weight, BMI and age had non-significant correlations (table 3). Muscle strength (p=0.01) and age (p=0.05) were significant independent predictors of gait speed using logistic regression model. (table 4).

Discussion

A relationship between muscle strength and physical performance may be of importance in identifying individuals who would benefit from early intervention to prevent loss of muscle strength with age\(^{(10)}\). The current study showed that low muscle strength is more prevalent than low muscle mass in either total population or subgroups, several studies support the same findings that the loss of muscle strength with age is much more rapid than the parallel loss of muscle mass denoting that muscle strength decreased with aging before muscle mass\(^{(11)}(12)(13)(4)\).

While, the current study failed to find significant difference in prevalence of low muscle mass between two groups, sarcopenia is significantly more prevalent in cases which demonstrate the key role of low muscle strength in sarcopenia and support the use the term “dynapenia” instead of sarcopenia to describe the age related loss of muscle strength regardless muscle mass as recommended by The European Working Group on Sarcopenia in Older People (EWGSOP)\(^{(1)}\).

In agreement with several studies the current study showed that cases are shorter, thinner and have more comorbidities than control group\(^{(14)(15)(4)(16)}\).

Studies concerning the relation between muscle strength and physical performance showed variable results with a general agreement that muscle strength is an independent predictor of physical performance regardless the tools used for measurement. While the role of muscle mass showed diverse results and much debate exist about its association with physical performance.

Several studies agreed with the current study that muscle strength, not muscle mass, was a significant independent predictor of gait speed in older people and muscle strength is associated with poor physical performance as demonstrated by the significant inverse correlation between muscle strength and gait speed in seconds\(^{(17)(18)(19)(20)(21)(22)(23)(25)(26)}(10)\).

Samuel and colleagues measured muscle strength at the knee and hip joints using a torque dynamometer, Functional assessment was done by three-dimensional biomechanical analysis of gait, chair rise and sit-down, stair ascent and descent and body mass was assessed by anthropometric measures. They found that loss of muscle strength was independently associated with poorer functional ability\(^{(10)}\).

Hicks et al. (2011) found, in a longitudinal analysis of 934 adults aged ≥65 years followed after 3 and 6 years that low muscle strength was particularly powerful risk factor of functional limitation in elderly subjects. Muscle strength was measured by knee extension strength, grip strength, muscle mass by DXA and Mobility function using gait speed and self-reported mobility disability.

Hairi et al., (2010) confirmed the same results, in a large study enrolled one thousand seven hundred five community-dwelling men aged 70 and above that muscle strength was
the single best measure of age-related muscle change and low muscle strength was associated with physical disability in IADLs and functional limitation.

Supporting our results in a cross-sectional study of 542 older men and women aged (65–97 years) using the baseline data from the Korean Longitudinal Study on Health and Aging. Short Physical Performance Battery (SPPB) was used to assess physical performance and the appendicular skeletal muscle mass (ASM) (kg) was measured using DXA, there was no association between muscle mass and physical performance (3).

Also, Visser and colleagues found that there was no association between total body muscle mass or leg muscle mass and self-reported disability for either men or women. They measured skeletal muscle mass by dual-energy X-ray absorptiometry (DXA) (27).

In contrast with the current study, a cross-sectional study of fifty-seven older males and females aged (67–81 years) demonstrated that muscle mass was an important determinant of physical performance among functionally-limited elders. Functional performance was assessed by Short Physical Performance Battery test (SPPB) muscle mass was measured using DXA, and muscle strength was estimated at the hip joint using pneumatic double leg press resistance machine (28).

Janssen et al., (2002) also found in a large study enrolled four thousand five hundred four adults aged 60 and above using data from the Third National Health and Nutrition Examination Survey (NHANES III) that low skeletal muscle mass was significantly and independently associated with functional impairment and disability. Skeletal muscle mass was measured using bioimpedance analysis measurements and functional limitations, was defined as difficulty in performing at least three of five functional living tasks (29).

The discrepancy in results concerning the relation between muscle mass and physical performance, signifies the role of considering muscle quality as a determinable factor in delineating the relation between muscle mass and physical function.

**Conclusion**

Low muscle strength is associated with impaired physical performance in elderly subjects. Muscle strength and age is a significant independent predictor of gait speed among elderly. There is a significant inverse relation between gait speed in seconds and muscle strength and height.

**Acknowledgement:** This research was supported by Ain Shams University.

**Disclosure statement:** No potential conflicts of interest were disclosed.

**References:**


### Tables and Graphs

**Table 1: Comparison between the two groups as regard subjects' characteristics**

<table>
<thead>
<tr>
<th>Patient Characteristics</th>
<th>Case (n=38)</th>
<th>Control (n=38)</th>
<th>Independent sample t-test</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ±SD</td>
<td>Mean ±SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (yrs.)</td>
<td>66.4 ± 5.2</td>
<td>66.3 ± 5.3</td>
<td>0.08</td>
<td>0.93</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>72.4 ± 13.3</td>
<td>79.7 ± 17.1</td>
<td>2.08</td>
<td>0.04*</td>
</tr>
<tr>
<td>Height(cm)</td>
<td>155.4 ± 9.1</td>
<td>160.6 ± 8.8</td>
<td>2.49</td>
<td>0.01*</td>
</tr>
<tr>
<td>BMI</td>
<td>30.1 ± 6.0</td>
<td>30.9 ± 6.3</td>
<td>0.61</td>
<td>0.54</td>
</tr>
<tr>
<td>Number of medications used</td>
<td>3.1 ± 2.3</td>
<td>2.9 ± 2.1</td>
<td>0.25</td>
<td>0.80</td>
</tr>
<tr>
<td>Number of co-morbidities</td>
<td>3.2 ± 2.0</td>
<td>2.3 ± 1.4</td>
<td>2.06</td>
<td>0.04*</td>
</tr>
</tbody>
</table>

(*) Statistically significant \( p<0.05 \)

**Table 2: Comparison between the two groups as regard Muscle mass, Muscle strength and Presence of sarcopenia**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Case (n=38)</th>
<th>Control (n=38)</th>
<th>( \chi^2 ) test</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.(%)</td>
<td>No.(%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Muscle Mass</td>
<td>8(21.1)</td>
<td>6(15.8)</td>
<td>0.350</td>
<td>0.55</td>
</tr>
<tr>
<td>Low Muscle Strength</td>
<td>34(89.5)</td>
<td>7(18.4)</td>
<td>38.609</td>
<td>0.00**</td>
</tr>
<tr>
<td>Sarcopenia</td>
<td>8(21.1)</td>
<td>1(2.6)</td>
<td>6.176#</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Low muscle mass < 7.26 kg/m2 men low muscle strength <30 kg men  
< 5.5 kg/m2 women < 20 kg women

(*) Statistically significant \( p<0.05 \) (**) Highly statistically significant \( p<0.01 \) (#) Fisher exact test
Table 3: Correlation matrix displaying relationship between gait speed in seconds, Muscle strength, Muscle mass, Age, Weight, Height and BMI in the studied population.

<table>
<thead>
<tr>
<th>Variables</th>
<th>R</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gait Speed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muscle strength</td>
<td>-0.530**</td>
<td>0.00**</td>
</tr>
<tr>
<td>Muscle mass</td>
<td>-0.177</td>
<td>0.22</td>
</tr>
<tr>
<td>Age</td>
<td>0.035</td>
<td>0.81</td>
</tr>
<tr>
<td>Weight</td>
<td>-0.026</td>
<td>0.85</td>
</tr>
<tr>
<td>Height</td>
<td>-0.291*</td>
<td>0.04*</td>
</tr>
<tr>
<td>BMI</td>
<td>0.110</td>
<td>0.45</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).*. Correlation is significant at the 0.05 level (2-tailed).

Table 4: Logistic Regression Model Revealing Variables independently associated with Gait Speed in the studied population

<table>
<thead>
<tr>
<th>Variables</th>
<th>Sig.</th>
<th>Odd ratio</th>
<th>95% C.I.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.04*</td>
<td>0.83</td>
<td>0.69-0.98</td>
</tr>
<tr>
<td>Weight</td>
<td>0.36</td>
<td>0.95</td>
<td>0.87-1.05</td>
</tr>
<tr>
<td>Height</td>
<td>0.66</td>
<td>0.88</td>
<td>0.52-1.505</td>
</tr>
<tr>
<td>Education</td>
<td>0.69</td>
<td>1.38</td>
<td>0.27-6.87</td>
</tr>
<tr>
<td>Number of Comorbidities</td>
<td>0.74</td>
<td>0.91</td>
<td>0.53-1.56</td>
</tr>
<tr>
<td>Knee arthritis</td>
<td>0.13</td>
<td>4.13</td>
<td>0.63-26.78</td>
</tr>
<tr>
<td>Cervical spondylosis</td>
<td>0.48</td>
<td>2.93</td>
<td>0.14-61.46</td>
</tr>
<tr>
<td>Muscle strength</td>
<td>0.00**</td>
<td>47.74</td>
<td>7.18-31.74</td>
</tr>
<tr>
<td>Sarcopenia</td>
<td>0.36</td>
<td>3.47</td>
<td>0.23-52.27</td>
</tr>
</tbody>
</table>

(*) Statistically significant at p<0.05(**) Highly statistically significant at p<0.01