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Prevalence of Sarcopenia among Nursing Home Older Residents in Cairo, Egypt

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Abstract

Sarcopenia is highly prevalent in community dwelling older adults in many countries; however, the prevalence of sarcopenia in nursing home older residents is not well characterized. The aim of this study is to assess the prevalence of sarcopenia in nursing home older residents in Cairo. Cross sectional study was performed among 357 nursing home residents in Cairo. The European Working Group on Sarcopenia in Older People (EWGSOP) recommendation was used for diagnosing sarcopenia. The study showed that the prevalence of sarcopenia in nursing home older residents in Cairo was 17.7%, 22.2% in elderly men and 14.4% in elderly women. Age, underweight and lack of physical activity were found to be associated with sarcopenia among studied participants. The study concluded that sarcopenia is an emerging health problem in nursing home older residents in Cairo.

Keywords

Nursing Homes, Prevalence, Sarcopenia

1. Introduction

Sarcopenia is a common clinical condition among elderly people. It is a syndrome characterized by progressive and generalized loss of skeletal muscle mass, strength, and muscle function [1]. Sarcopenia is associated with weakness, loss of independence, disability, higher risk of falls, and a decrease in quality of life [2]-[4]. The significant clinical impact of sarcopenia and its high costs both direct and indirect that this condition generates emphasizes the need of health care systems to focus on this geriatric syndrome [5]-[7].

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The epidemiological data available indicates that the prevalence of sarcopenia varies widely; this variation is related to the different populations being studied, ages, gender, different settings and different diagnostic criteria selected by the researchers [5]-[8].

Although the prevalence of sarcopenia in elderly people has been broadly investigated in the Unites States, European countries and to a lesser extent in Asian countries, there are no reports on the prevalence of sarcopenia in the African countries. There is no data on the epidemiology of sarcopenia in Egypt neither in nursing home residents nor community dwelling elderly. So we conducted this study to evaluate the prevalence of sarcopenia among nursing home older residents in Cairo.

1.1. Study Design

Cross sectional study.

1.2. Study Setting and Participants

Nursing homes in Cairo (Egypt's capital) were asked to participate in this survey through an announcement letters. All of them, 35 nursing homes, accepted to participate. Three hundred and fifty seven elderly (aged 60 years or more) participated in this survey after taking an informed written consent from each participant and 31 elderly didn't respond. The survey was carried out between June 2012 and June 2013. This study was approved by the ethical review committee of Ain Shams University.

2. Methods

All participants were subjected to complete medical history taking including history of physical activity [9] [10], assessment of body mass index (BMI) [11], and assessment of sarcopenia by the use of the European Working Group on Sarcopenia in Older People (EWGSOP) recommendation [12].

2.1. Physical Activity

Physical activity refers to any bodily movement produced by skeletal muscles that increase energy expenditure above a basal level. It includes exercise or non exercise physical activity. Exercise physical activity involves structured and repetitive bodily movements as walking. Non-exercise physical activity involves standing or gardening. An hour or more of physical activity; every day; is required to consider participant as physically active [9] [10].

2.2. Diagnosis of Sarcopenia

The EWGSOP recommends using the presence of both low muscle mass and low muscle function (muscle strength or physical performance) for diagnosing sarcopenia. Muscle mass was assessed by bioelectrical impedance analysis (BIA), muscle strength was assessed by hand grip strength (HGS) and physical performance was assessed by 4 meters walking test [7] [12].

2.3. Muscle Mass Assessment

BIA (Geratherm body fitness B-5010, Germany) was used to measure fat free mass. Fat free mass was used to calculate fat free mass index (FFMI) which is equal to fat free mass in kg divided by height in meter squared. Low muscle mass was diagnosed when FFMI equal or less than 15.9 kg/m^2 and 13.9 kg/m^2 in men and women respectively [13].

2.4. Measurement of Muscle Strength

A handheld dynamometer (Jamar Hydraulic hand dynamometer; 5030J1, USA) was used to assess muscle strength. Participants kept their arms by the sides of their body. The participant squeezed the dynamometer with the dominant hand using maximum isometric effort. No other body movement was allowed and the better performance of 2 trials was used [14]. Low muscle strength was defined as HGS less than 30 kg in men and 20 kg in women [7].

2.5. Measurement of Physical Performance

For all participants physical performance was assessed through 4 meters walking speed test [15]. In this test, participants were asked to walk 4 meters at a comfortable place. A stopwatch was used to record the time required to reach the 4 meters point (marked in the course). A cutoff point of less than 0.8 m/s identified participants with low physical performance [7].

2.6. Data Management and Statistical Analysis

Data was collected and analytical statistics were done using the 15th version of statistical package for social sciences (SPSS, Chicago, IL, USA). Categorical data were compared between groups by χ^2 test. Continuous data were compared between groups using unpaired t test for normally distributed variables. The *P*-value was always set at 0.05.

3. Results

Our study involves 357 elderly aged 60 years and more. The mean age of study participants was 70.7 ± 7.8 years. 50.4% of participants were women. 51.5% were educated ≤12 years and the rest were educated >12 years. As regard marital status 17.1% are married and 82.9% are singles. 19.6% were working physical work, 52.1% were working mental work and the rest had no previous occupation. Participants' BMI ranged between 17.5 - 25 kg/m^2. 55.2% of participants do regular physical activity. 43.7% of participants have hypertension, 26.1% have diabetes mellitus, 19.0% have ischemic heart disease (IHD), 19.6% have heart failure, 3.9% had previous history of stroke, 13.2% have osteoarthritis, 3.1% have chronic liver disease (CLD), and 62.2% have chronic obstructive pulmonary disease (COPD).

The prevalence of sarcopenia among nursing home older residents in Cairo was 17.7%; 22.2% in elderly men and 14.4% in elderly women.

The study detected significant associations between sarcopenia and age (p = 0.018) as well as between sarcopenia and BMI (p = 0.030). Those with sarcopenia were less likely to be involved in regular physical activity (p = 0.002). There were no significant associations between sarcopenia and presence of co-morbidities (p > 0.05) except for ischemic heart disease (IHD) which was significantly detected among residents with sarcopenia (p = 0.045) (**Table 1**).

4. Discussion

In the present study, we assessed the prevalence of sarcopenia among nursing home older residents in Cairo. Our findings showed that the prevalence of sarcopenia, using the EWGSOP recommendation, is 17.7%; 22.2% among elderly men and 14.4% among elderly women.

In 1980, a first study was performed in the United States to assess this problem. They examined 115 nursing home residents and documented that 85% of the studied participants have a low mid arm circumference [16]. In Saudi Arabia, data from 84 nursing home male residents (their age ranged between 24 - 80 years) showed a low mid arm circumference in 40% of residents [17]. In Turkey, Bahat and colleagues [8] have investigated the prevalence of sarcopenia in 157 elderly male residents in one nursing home (their mean age was 73.1 ± 6.7 years) using BIA. They reported that the prevalence of sarcopenia was 85.4%. In Israel, the prevalence of skeletal muscle mass abnormalities in 109 nursing home residents was 67.0%; 97.8% in males and 43.8% in females [18]. In Italy, Landi *et al*., 2012 [19] conducted their study on 122 nursing home residents, their mean age was 84.1 ± 6.9. They used the EWGSOP recommendation for diagnosing sarcopenia as in the current study. They found that 32.8% were identified as affected by sarcopenia and it was more common in men (68%) than in women (21%). The results of the current study showed lower prevalence than that reported previously. The higher prevalence in the aforementioned studies [8] [16]-[19] may be due to small samples size, the usage of different measurement techniques, different studied populations and environmental difference. Regarding Egypt's environment, Egypt is a country that the whole year is bathing almost in perpetual sunshine. Life course studies suggest that a modest but significant proportion of the origins of sarcopenia may be related to the environment. It was demonstrated that sun exposure may have important benefit for the prevention of muscle mass and functional declines in older adults [20]. Vitamin D, which has an important role in the maintenance of muscle function for older adults, is produced endogenously when ultraviolet rays from sunlight strike the skin and

Table 1. Characteristics of studied participants according to the presence of sarcopenia.

	Non sarcopenic (n = 294)	Sarcopenic (n = 63)	P value
Age (mean ± SD)	69.8 ± 6.6	75.3 ± 10.9	0.018
Men	114 (77.6%)	33 (22.4%)	0.214
Education ≤12 years	149 (81.0%)	35 (19.0%)	0.428
Single	245 (82.8%)	51 (17.2%)	0.818
Married	49 (80.3%)	12 (19.7%)	
Physical work	58 (82.9%)	12 (17.1%)	0.592
Mental work	166 (89.2%)	20 (10.8%)	
No previous occupation	70 (76.9%)	21 (23.1%)	
Body mass index, kg/m^2 (mean ± SD)	21.3 ± 3.7	18.4 ± 1.0	0.031
Regular physical activity	147 (74.6%)	50 (25.4%)	0.002
Fat free mass (mean ± SD)	45.3 ± 7.9	38.6 ± 5.6	0.000
Fat free mass index (FFMI) (mean ± SD)	16.8 ± 2.0	13.6 ± 1.3	0.000
Hand grip (mean ± SD)	20.2 ± 9.0	17.4 ± 10.2	0.210
Four meters walking test (m/s) (mean ± SD)	0.8 ± 0.3	0.5 ± 0.2	0.024
Hypertension	133 (85.3%)	23 (14.7%)	0.433
Diabetes mellitus	84 (90.3%)	9 (9.7%)	0.121
Ischemic heart disease	26 (38.2%)	42 (61.8%)	0.045
Congestive heart failure	47 (67.1%)	23 (32.9%)	0.100
Stroke	14 (100.0%)	0 (0.0%)	0.123
Osteoarthritis	42 (89.4%)	5 (10.6%)	0.307
Chronic liver disease	9 (81.8%)	2 (19.9%)	0.890
Chronic obstructive pulmonary disease	188 (84.7%)	34 (15.3%)	0.208

trigger vitamin D synthesis [21].

In this study there is a significant association between age and sarcopenia (p = 0.018). This is consistent with the findings of previous studies [16]-[19] [22]. Aging is associated with significant changes in body composition, with a substantial reduction in fat free mass and an increase in visceral fat [12]. As well as, the age-dependent decrease in anabolic hormones, such as testosterone, estrogen, growth hormone, and insulin like growth factor-1 (IGF-1), may lead to loss of skeletal muscle mass [23] [24].

This study reported a significant association between BMI and sarcopenia (p = 0.031). This is consistent with the information reported by previous studies who documented the association between underweight and sarcopenia [4] [8] [25].

Previous studies [4] [26] [27] and the current study found a significant association between physical activity and sarcopenia (p = 0.002). Lack of physical activity has been shown to be a risk factor for muscle weakness that, in turn, results in loss of muscle mass and muscle strength [26] [27].

Previous studies [24] [28] as well as this study found that IHD was significantly associated with the presence of sarcopenia (p = 0.045). This may be due to the reported association between sedentary life style and the two diseases either IHD [29] or sarcopenia [26]. As well as, in IHD patients there is limitation in carrying out physical activities due to fear of ischemic chest pain or anticipation of pain [30]. This lack of physical activity will lead to sarcopenia.

5. Conclusion

The prevalence of sarcopenia using the EWGSOP recommendation was 22.2% and 14.4% in elderly men and women respectively. Age, underweight and lack of physical activity were found to be associated with sarcopenia in nursing home older residents in Cairo.

Disclosure Statement

There is no conflict of interest.

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