Asian Nursing Research 12 (2018) 231–236

Contents lists available at ScienceDirect

Asian Nursing Research

journal homepage: www.asian-nursingresearch.com

Research Article

Handgrip Strength and Its Associated Factors among Community-dwelling Elderly in Sri Lanka: A Cross-sectional Study

Hewaratne D.W.T. Damayanthi,[1, 3] Foong-Ming Moy,[2, *,☆] Kathijah L. Abdullah,[1] Samath D. Dharmaratne[4, 5, 6]

[1] Department of Nursing Sciences, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia
[2] Julius Centre University of Malaya, Department of Social and Preventive Medicine, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia
[3] Department of Nursing, Faculty of Allied Health Sciences, University of Peradeniya, Peradeniya, Sri Lanka
[4] Department of Community Medicine, Faculty of Medicine, University of Peradeniya, Peradeniya, Sri Lanka
[5] Department of Family and Community Medicine, College of Medicine, University of Kentucky, Lexington, United States
[6] Department of Health Metric Sciences, School of Medicine, University of Washington, Seattle, United States

ARTICLE INFO

Article history:
Received 6 December 2017
Received in revised form
29 August 2018
Accepted 30 August 2018

Keywords:
aged
hand strength
independent living

ABSTRACT

Purpose: Low muscle strength is central to geriatric physical disabilities and mortality. The purpose of the present study was to examine handgrip strength (HGS) and its associated factors among community-dwelling older people in Sri Lanka.

Methods: A cross-sectional study was conducted in the Kandy district using multistage sampling. A total of 999 older people were recruited, with a female preponderance. Data were collected using interviewer-administered questionnaires on demographic characteristics, depression, and physical activity. Anthropometric measurements including weight, height, mid-upper arm circumference, calf circumference, and HGS were recorded. Complex sample general linear model was used to examine the association between HGS and its associated factors.

Results: The mean highest HGS of the study group was 12.56 kg (95% confidence interval: 11.94–13.19). Male older people had a higher HGS (17.02, 95% confidence interval: 15.55–18.49 kg) than females (10.59, 95% confidence interval: 10.12–11.06 kg). For both men and women, older age was associated with lower HGS, while mid-upper arm circumference was associated with better HGS. Diabetes mellitus, vegetarian diet, and alcohol consumption were associated with HGS for women only.

Conclusion: Men had a higher HGS compared with women. Age, mid-upper arm circumference, diabetes mellitus, vegetarian diet, and alcohol consumption were factors associated with HGS among community-dwelling older people in Kandy district, Sri Lanka. HGS can be used as a feasible strategy to improve health status of older people by community health nurses.

Introduction

Aging is associated with loss of muscle mass which results in decreased muscle strength. Decreasing muscle strength is linked with premature mortality, disability, physical frailty, other age-related health complications, and prolonged length of stay after hospitalization or surgery. Furthermore, maintaining muscle strength is very important to reduce functional limitations of older people [1]. Handgrip strength (HGS) is frequently measured as a proxy for muscle strength [2]. It is a simple, noninvasive, reliable, and low-cost screening technique which does not require trained personnel [3].

HGS is associated independently with disability in daily living and gait speed (mobility-related items) and quality of life [4,5]. HGS is an excellent indicator of nutritional status as well as a risk-stratifying method for all-cause death and cardiovascular disease including increased health recovery time after illness or surgery [1]. Recent evidences summarize that various factors associated with HGS of older people such as physical and mental health, cardiovascular mortality, and stroke, demographic factors (age and

* Correspondence to: Foong Ming Moy, Julius Centre University of Malaya, Department of Social and Preventive Medicine, Faculty of Medicine, University of Malaya, 50603, Kuala Lumpur, Malaysia.
E-mail address: moyfm@ummc.edu.my
☆ ORCID: https://orcid.org/0000-0002-0306-4419

https://doi.org/10.1016/j.anr.2018.08.008

gender), anthropometric measurements (height, weight, and muscle circumference), and chronic disease such as diabetes, depression, and physical activity are all important predictors for HGS [6–8].

In Sri Lanka, older people contributes to 12.3% of the population. Women comprise majority in the total and old population which mark the feminization of aging in Sri Lanka. Females accounted for about 56% of the total aged population in Sri Lanka, while for the oldest-old group (80 or over), this proportion was 61%. Although various types of health-care programs are available in Sri Lanka, there is a lack of regular health screening programs for older people in the community settings. Public health professionals including public health nurses and nursing sisters focus more on maternal and child care in the community neglecting the needs of the older population. The health status of older people can be assessed using a variety of indicators, including HGS which is cost-effective and easy to measure. The assessment of HGS may be helpful for community health-care professionals especially community health nurses in early detection of malnutrition; functional disability and frailty of community-dwelling older people in Sri Lanka. Understanding HGS and its associated factors is very crucial to plan and implement public health initiatives and programs in preservation of muscle strength of older people to enhance the general health of this population. However, there have been limited studies using HGS in the assessment of community-dwelling older people in Sri Lanka as well as a scarcity in published studies about factors associated with HGS. Therefore, the present study aimed to examine HGS and its associated factors among community-dwelling older people in Sri Lanka.

Methods

Study design

This study used a cross-sectional descriptive design.

Setting and participants

This study was conducted in the Kandy district in Sri Lanka from August 2015 to March 2016. Kandy is the largest district in the central province of Sri Lanka which is made up of three main sectors: estate, rural, and urban. It comprised 20 divisional secretariats (DSs) and 1,188 Grama Niladhari Divisions (GNDs, the smallest administrative unit) and accommodates the second largest older population in the country.

Participants were selected using multistage sampling technique. It was performed sequentially across three stages. The first stage was the selection of DS. DSs are categorized into rural/estate (6), rural/estate/urban (12), and rural (2). One from rural, four from rural/estate/urban, and two from rural/estate were randomly selected as depicted in Figure 1. In the second stage, GNDs were selected from the identified DSs included in the study. Two GNDs from the rural DS, 13 GNDs from rural/estate/urban DS, and 11 GNDs from rural/estate DS were selected according to probability proportionate to seize. The third stage was the sampling of eligible older people from the GNDs. In this third stage, a list of all older people was obtained using the 2012 electoral registers utilizing simple random sample approach. Simple random sampling of 50 eligible older people per GND was carried out. The multistage sampling procedure used in the present study was described elsewhere [9]. Older people who were aged 60 years and above; stayed in the community, understood, and were able to answer the questionnaire; and consented to the study were included. Exclusion criteria included older people who were disabled such as paralysis and mentally unfit such as severe communication disabilities and cognitive impairments to answer the questionnaires. Of the 1300 randomly selected older people, 999 (response rate 76.8%) were included for data collection.

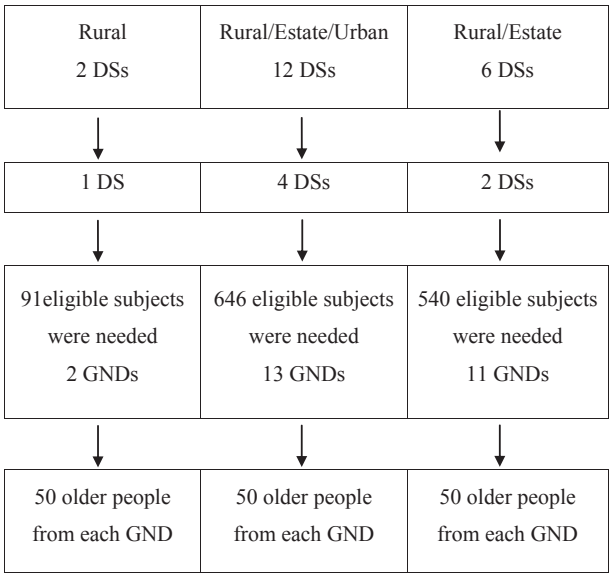

Figure 1. 20 divisional secretariats in Kandy district.
DSs = divisional secretariats; GNDs = Grama Niladhari Divisions.

Ethical considerations

The institutional review board of University of Malaya Medical Centre approved the study (Approval no. 20156-1437). Administrative permission was obtained from the respective authorities. Participants signed an informed consent form before the survey. Anonymity and confidentiality of the participants were assured.

Measurements

Data were collected using interviewer-administered questionnaires in Sinhala language. Information on sociodemographic characteristics (age, sex, education level, marital status, income), chronic diseases including diabetes mellitus, hypercholesterolemia, and hypertension, psychological factors (depression), lifestyle factors (physical activity, cigarette smoking, and alcohol consumption), and dietary factors (tooth loss, denture usage, vegetarian diets) were obtained. Weight, height, mid-upper arm circumference (MUAC), calf circumference (CC), and HGS were measured using standard protocols by three trained data collectors.

Physical activity assessment

A Sinhala version of the international physical activity questionnaire (IPAQ) validated for Sri Lankans was used for physical activity assessment [10]. The questionnaire included seven questions on frequency and time spent on walking, moderate and vigorous activities in four domains (work, transportation, home, and leisure time activity), and time spent sitting. Participants were requested to recall their activities during the last 7 days. Metabolic equivalent (MET) values 3.3, 4.0, and 8.0 were used to analyze the IPAQ data on walking, moderate physical activity, and vigorous physical activity, respectively. The MET-min week $^{-1}$ was calculated as minutes of activity/day $\times$ days per week $\times$ MET level.