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2023

Background

Body composition assessment is the practise of dissecting the human body into its constituent parts, which include body fat mass, muscle mass, bone, tissue and water, and determines the contribution of its composition. The higher the body fat percentage, particularly visceral fat that lines the organs in the abdomen, the greater the chance of acquiring nutrition-related chronic diseases such as metabolic syndrome, heart disease, obesity and diabetes. Accurate body composition measurement is a valuable diagnostic aid in elderly patients with or without sarcopenia. Sarcopenia defined as the gradual loss of muscle mass accompanied by decreased strength or performance. Sarcopenia has been associated with increased morbidity and mortality in elderly population. Malnutrition, immobility, chronic inflammation and hormonal changes associated with ageing all contribute to its development. Sarcopenia prevalence rises with age and is higher among institutionalised older adults. Prevention of sarcopenia is the most effective measure. Early detection and treatment will reduce morbidity and mortality, and improve quality of life.

Objective

To evaluate the effectiveness, safety, cost-effectiveness and organisational issues related to the bio-electrical impedance analysis for the assessment of sarcopenia in elderly.

Methods

Electronic databases were searched through the Ovid interface; Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1946 to 11 January 2023, Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations and Daily 1946 to January 11, 2023, Ovid MEDLINE(R) and In-Process, In-Data-Review & Other Non-Indexed Citations 1946 to January 11, 2023, Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations and Daily 2017 to January 11, 2023, Ovid MEDLINE(R) 1946 to January Week 1 2023, Ovid MEDLINE(R) 1996 to January Week 1 2023, Ovid MEDLINE(R) Epub Ahead of Print January 11, 2023, Ovid MEDLINE(R) Daily Update January 11, 2023 and Ovid MEDLINE(R) 2017 to January Week 1 2023. Searches were also run in PubMed, INAHTA, Cochrane Library and US Food and Drug Administration. Google was used to search for additional web-based materials and information. Additional articles were identified from reviewing the references of retrieved articles. Last search was conducted on 12 January 2023.

Results and conclusion:

A total of 21,721 titles were retrieved. After removing duplicates, applying inclusion and exclusion criteria, there were 11 studies reported on bio-electrical impedance analysis for the assessment of sarcopenia in elderly included in this review; one systematic review of cross sectional studies, three cohort studies and seven cross sectional studies. The studies were conducted in Poland, Italy, Sweden, Turkey, Netherlands, German, Brazil, Switzerland, Taiwan and China.

Based on the review, there was sufficient evidence retrieved on the diagnostic accuracy of the bio-electrical impedance analysis for the assessment of sarcopenia in elderly. The evidence showed bio-electrical impedance analysis correlated well with dual-energy X-ray

absorptiometry and magnetic resonance imaging-measured in measuring muscle mass, appendicular skeletal muscle mass and appendicular skeletal muscle mass index. However, evidence also showed that bio-electrical impedance analysis may over and underestimate the measurement of fat mass, fat-free mass, lean soft tissue and appendicular skeletal muscle mass especially in obesity, very old patients and patients with prosthesis.

As per safety, there was no study retrieved on the bio-electrical impedance analysis for the assessment of sarcopenia in elderly. However, there were studies reported no adverse events, rhythm disturbances and implantable electronic devices malfunctions. Despite an increased arrhythmic potential on inotropic support or the presence of implanted electronic devices, a bio-electrical impedance analysis was reported as safe.

There was no study retrieved on cost-effectiveness of the bio-electrical impedance analysis for the assessment of sarcopenia in elderly. The estimated cost per test was reported between [REDACTED] and [REDACTED]. The cost was determined by the location and the level of professional consultation.