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Is telehealth effective in managing malnutrition in community-dwelling older adults? A systematic review and meta-analysis

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ABSTRACT

Telehealth offers a feasible method to provide nutrition support to malnourished older adults. This systematic review and meta-analysis aims to determine the efficacy of telehealth methods in delivering malnutrition-related interventions to community-dwelling older adults. Studies in any language were searched in five electronic databases from inception to 2nd November 2017. Quality of the evidence was assessed using the Cochrane Risk of Bias tool and the GRADE approach. Nine studies were identified, with results published across 13 included publications, which had mostly low to unclear risk of bias. There were two interventions delivered to disease-specific groups, one with kidney disease and one with cancer; the remaining seven interventions were delivered to patients with mixed morbidities following discharge from an inpatient facility. Seven studies delivered telehealth via telephone consultations and two used internet-enabled telemedicine devices. Ten meta-analyses were performed. Malnutrition-focused telehealth interventions were found to improve protein intake in older adults by 0.13 g/kg body weight per day ([95%CI: 0.01–0.25]; P = .03; n = 2 studies; n = 200 participants; I^2 = 41%; GRADE level: low) and to improve quality of life (standardised mean difference: 0.55 [95%CI: 0.11–0.99]; P = .01; n = 4 studies with n = 9 quality-of-life tools; n = 248 participants; I^2 = 84%: GRADE level: very low). There were also trends towards improved nutrition status, physical function, energy intake, hospital readmission rates and mortality in the intervention groups. Overall, this review found telehealth is an effective method to deliver malnutrition-related interventions to older adults living at home, and is likely to result in clinical improvements compared with usual care or no intervention. However, further research with larger samples and stronger study designs are required to strengthen the body of evidence.

1. Introduction

Despite being preventable and treatable, malnutrition is highly prevalent and a strong independent contributor to poor health in the older adult population [1–4]. Malnutrition is defined as the unintentional and preventable loss of lean tissues such as muscle, with or without fat loss, due to prolonged inadequate dietary intake of protein and energy, increased requirements and/or excessive losses [1,5]. A sufficient increase in dietary protein and energy intake to meet individualized requirements and cease the loss of lean tissues will reverse

Abbreviations: MD, mean difference; OR, odds ratio; PRISMA, preferred reporting items for systematic reviews and meta-analyses; SMD, standardised mean difference

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malnutrition [3,5]. However, encouraging malnourished patients to consume appropriate types and quantities of foods to meet their nutritional requirements encounters many diverse barriers due to its complex physiological, socio-economic, and environmental risk factors, as well as unique presentation in each individual [5]. Individualised and long-term nutrition support is required to overcome these barriers and enable the older adult to meet their energy and protein requirements; thus, the current usual care of short term treatment during a health care admission is insufficient to properly treat malnutrition in many cases [5,6]. Therefore, it is now essential to look to alternative methods of healthcare delivery which facilitate patient-centred care across the continuum and reduce barriers patients face, while also maximising current healthcare resources.

For this reason, healthcare providers have increasingly been using telehealth, which enhances patient access to long-term care. With the use of technology growing rapidly around the world, [7], telehealth methods have demonstrated a credibility in overcoming typical logistical challenges in modern healthcare delivery [8]. Telehealth can be defined as the delivery of healthcare services from a distance using telecommunication techniques synchronously (i.e. same time, different location) and/or asynchronously (i.e. different time, different location) [8]. As such, telehealth may allow for specialised nutrition care to be delivered more cost-effectively and to more patients in need.

Telehealth strategies have been shown to be effective at improving dietary behaviour in chronic disease [9,10] and in primary care [11,12]. Older adults suffering from chronic conditions have also shown improvements in areas of their self-management and confidence in using telehealth modalities [13]. Therefore, telehealth offers a feasible method to provide regular and long-term nutrition support to malnourished older adults living at home; a population group who may find it difficult to access health services, particularly in rural areas [6,14–16]. However, this age group may also have limitations related to lack of internet accessibility, hearing difficulties, and familiarity and acceptance of technology, which may limit the effectiveness of telehealth interventions. Consequently, the effectiveness of telehealth with older adults to improve malnutrition warrants examination so that healthcare resources may be directed appropriately. This study aims to determine the efficacy of telehealth methods in delivering malnutrition-related interventions to community-dwelling older adults.

2. Methods

A systematic review and meta-analysis of the literature was conducted and reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [17] and was registered with the International Prospective Register of Systematic Reviews (PROSPERO number: CRD42017080922).

2.1. Search strategy

Studies in any language were searched for in the electronic databases CENTRAL, CIHAHL (via Ebscohost), EMBASE, PubMed and Web of Science from database inception to 2nd November 2017 using a combination of keywords and controlled vocabulary (Appendix A). The search strategy was designed in PubMed and translated to the other databases using Polyglot [18]; and was further supported by snowball searching of the literature.

Inclusion criteria were older adult samples with a mean age of ≥65 years living independently in their own homes (including post-hospital discharge and outpatients) who received intervention for managing risk or progression of protein-energy malnutrition. Participants in residential aged care or assisted living facilities were excluded. Studies where the intervention was delivered in both inpatient and community settings (e.g. during admission and then follow-up post-discharge) were included only if the intervention delivered in the community setting was of equal or greater duration than that delivered in the inpatient setting. Telehealth was considered as: 1) a synchronistic consultation with a health professional with point-of-contact via any telephone or internet-based method, or 2) an asynchronistic telephone- or internet-based intervention system. Studies were included only where community-based interventions were delivered with at least 50% of the intervention contacts (frequency or duration) were from telehealth methods, and at least two points-of-contact made via telehealth. If an intervention was multidisciplinary and focussed on more than just nutrition (e.g. support for dementia or stroke patients), studies were included only where there were at least two malnutrition-specific telehealth contacts within the larger intervention program. Studies were included if the telehealth intervention was given directly to the patient or to their family carer.

Any original research intervention study was included. Excluded study and publication types were abstracts, observational studies, conference papers, qualitative studies, study protocols, opinions, commentaries, and review papers.

2.2. Selection of studies and data extraction

After citations were identified from all databases, duplicates were removed using Systematic Review Assistant-Deduplication [19]. Two authors (MC and HM) scanned the titles and abstracts of studies identified by the search for their potential eligibility. Full-text articles were assessed for eligibility independently by two authors (DC and MC); with disagreements managed by consensus between the two authors and eligibility confirmed by the senior author (SM). Data were extracted into standardised tables by one author (WM) and checked for accuracy by a second (SM).

1 Outcomes of interest were nutrition status according to any tool validated for use in older adults [20], energy and protein intake, body composition, physical function, quality of life, admission to residential aged care, hospitalization, pressure wounds, falls, cost-efficacy and all-cause mortality. Feasibility was of interest and was assessed by attrition rate (reflecting participant engagement) and participant satisfaction. In addition to outcomes, data describing the study intervention and participant sample were extracted.

2.3. Review of study strength and quality

The Cochrane Risk of Bias tool [21], which assesses selection, performance, detection, attrition and reporting bias, was applied to each included study by two independent authors (DC, JC or SM) and consensus reached via discussion. Regarding performance bias, due to the nature of nutrition support interventions, it is not possible to implement participant and researcher blinding. Therefore, acknowledging some bias may be introduced by the lack of intervention blinding but that it is an accepted and necessary approach in these study designs, “unclear risk of bias” was allocated to all studies for this item.

The certainty in the body of evidence for each outcome of interest for which there was sufficient data reported was classified using