ABSTRACT

Introduction The increasing number of older adults with multiple complex care needs has placed increased pressure on healthcare systems internationally to reorient healthcare delivery. For many older adults, their first point of contact with the health service is with their general practitioner (GP) and GP participation with integrated care models is the foundation of a population-based approach. A knowledge gap remains in relation to the effectiveness of GP participation in community-based integrated health and social care approaches for older adults. This systematic review aims to examine the effectiveness of multidisciplinary-integrated care for community-dwelling older adults with GP participation.

Methods and analysis This systematic review will include randomised controlled trials (RCTs), quasi and cluster RCTs focusing on integrated care interventions for community-dwelling older adults by multidisciplinary teams including health and social care professionals and GPs. The databases PUBMED, EMBASE, CINAHL, Central Register of Controlled Trials in the Cochrane Library and MEDLINE will be searched. The primary outcome measure will be functional status. Secondary outcomes will include: primary healthcare utilisation, secondary healthcare utilisation, participant satisfaction with care, health-related quality of life, nursing home admission and mortality. The methodological quality of the studies will be assessed using the Cochrane Risk of Bias Tool V.2. The elements of care integration will be mapped in the individual studies using the Rainbow Model of Integrated Care taxonomy. A meta-analysis will be completed, depending on the uniformity of the data. Grading of Recommendations, Assessment, Development and Evaluation will be used to assess the certainty of evidence.

Ethics and dissemination Formal ethical approval is not required as all data included are anonymous secondary data. Scientific outputs will be presented at relevant conferences and in collaboration with our public and patient involvement stakeholder panel of older adults at the Ageing Research Centre at the University of Limerick.

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INTRODUCTION

Globally, it is estimated that the number of older people aged ≥60 years is expected to double from 962 million in 2017 to 2.1 billion by 2050.1 As people age, they experience a decline in their intrinsic capacity and an increase in the incidence of multimorbidity, leading to considerable, multidisciplinary care needs.2 The complex profile of this cohort makes it challenging to coordinate and integrate care, resulting in an increased risk of adverse health outcomes,3–5 greater use of primary care,6 emergency and acute healthcare services and overall higher healthcare costs.7

Internationally, health and social care organisations recognise the need for systems to move from acute, episodic care to longitudinal, coordinated and integrated care models, reflecting the growth in multimorbidity and complexity of care needs among older adults. This shift in health service delivery is also acknowledged by the WHO, who advocates for an integrated care approach to a person-centred comprehensive assessment of health and social care needs for older people.8 One of the conceptual challenges when examining integrated care is the
lack of a universal concept and use of other terms such as patient-centred care or coordinated care interchangeably. Coordinated care is broadly considered as teamwork across a range of different healthcare professionals, while patient-centred care focuses on involving patients in their own care. While these concepts are included as components of integrated care, integrated care is considered an overarching multidimensional concept that also encompasses cross-boundary engagement and collaboration across different healthcare organisations.

To reflect this complexity, the WHO defines integrated care as ‘services that are managed and delivered so that people receive a continuum of health promotion, disease prevention, diagnosis, treatment, disease-management, rehabilitation and palliative care services, coordinated across the different levels and sites of care within and beyond the health sector, and according to their needs throughout the life course’ (World Health Organization, p.2). This definition is aligned with the Rainbow Model of Integrated Care (RMIC), a taxonomy consisting of 21 key features from an end-user, professional, management and policy-maker perspective to describe the underlying features of integrated care. The key features of the RMIC are organised into eight main dimensions, which are contained in three categories: scope (person focused or population based), type (clinical, professional, organisational and system) and enablers (functional or normative) of an integrated primary care service model. The RMIC provides a mechanism to describe key features of care integration across a range of populations.

Integrated care programmes for community dwelling older adults often include a comprehensive geriatric assessment (CGA) to increase the understanding of an older person’s care needs and preferences. CGA is defined as a ‘multidimensional interdisciplinary diagnostic process focused on determining a frail elderly person’s medical, psychological and functional capability in order to develop a coordinated and integrated plan for treatment and long-term follow-up’, and thus includes a person-centred coordinated plan of care for the older person leading to individualised interventions, specific to patient needs. A Cochrane review of 21 randomised controlled trials (RCTs) by Briggs et al demonstrates the positive effect of expert-led CGA on community dwelling frail older people, reducing the likelihood of death (risk ratio (RR) of 0.88 (95% CI 0.76 to 1.02) and unplanned hospital admission RR of 0.83 (95% CI 0.70 to 0.99). Briggs et al excluded 13 studies from the review because specialist geriatric expertise, defined as a healthcare professional including a geriatrician, specialist nurse or therapist with gerontological expertise, was not involved in the CGA team. However, for many older adults, their first point of contact with the health service is through their general practitioner (GP) in primary care. Primary care teams involve multiple healthcare professionals including GPs, nurses, physiotherapists, occupational therapists, social workers, home support providers, administrators, speech and language therapists, dieticians, pharmacists, community welfare officers, chiropodists and psychologists. These teams have specialist knowledge of the areas they serve and the patients they care for. The Irish healthcare system along with many international health systems is developing community healthcare networks, with GPs as the foundation of this multidisciplinary team (MDT) care in the primary care setting, in order to meet the changing complex medical needs of service users.

The effectiveness of GP participation in multidisciplinary integrated care on older people’s health outcomes shows conflicting results in the literature. An RCT by Béland et al found that community-based health and social care professional MDT integrated care with GP participation reduced the risk of hospital inpatient stays by 50% among community-dwelling older people. Another controlled trial found that integrated care interventions for older people in the primary care setting reduced hospital utilisation, GP visits, with an improvement in physical functioning despite the lack of specialist geriatric expertise. Two cluster RCTs examining the effectiveness of a primary care integrated care approach on older people with complex care needs found that the GP-led screening and integrated multidisciplinary assessment and treatment did not have any significant effect on disability at 6, 12 or 24 months’ follow-up.

Quality of Life (QoL), activities of daily living (ADLs), care satisfaction or cost-effectiveness at 12-month follow-up. A gap in the literature remains with respect to synthesis of the evidence on GP participation in multidisciplinary integrated care for older people residing in the community. This systematic review seeks to synthesise interventions for this cohort of older adults who have complex medical conditions resulting in a range of health and social care needs requiring MDT input. With increased efforts being placed on the transfer of care from acute to community settings and hospital avoidance strategies, determining the effectiveness of early detection and intervention for frail community-dwelling older people is essential. Furthermore, despite the increasing popularity of implementing integrated care models for community-dwelling older people, the level of integration across studies is varied.

Objectives
The objectives of this systematic review are to:
1. To examine the effectiveness of multidisciplinary integrated care for community-dwelling older adults with GP participation.
2. To apply the RMIC taxonomy of integrated care to describe the level of care integration in each individual study.

METHODS AND ANALYSIS
Study design
This systematic review will include RCTs, cluster RCTs and quasi-RCTs. We have used the Cochrane Collaboration definition of quasi-RCTs where ‘the method of allocation is known but is not considered strictly random’ and includes ‘methods of assignment include alternation, date of birth and medical record number’. This protocol for systematic review will be completed according to the
Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Protocols (PRISMA-P) standardised reporting guidelines. A template of the PRISMA-P checklist is provided in online supplemental file 1. The subsequent systematic review will be conducted in line with the PRISMA standardised reporting guidelines. The protocol is also registered on PROSPERO: CRD42022309744.

Search strategy
A comprehensive search will be completed by CH in the following databases: PUBMED, EMBASE, CINAHL, Central Register of Controlled Trials in the Cochrane Library and MEDLINE. The reference lists of selected studies to be included will also be hand searched. The search will include the Medical Subject Headings as described in online supplemental file 2. Included studies will be selected based on the population, intervention, control and outcome as described in online supplemental file 3.

Eligibility criteria
Trials will be included that meet the following eligibility criteria:
- Population: studies will be selected if they include community-dwelling adults ≥65 years.
- Intervention: the review will focus on assessment and/or interventions carried out in the community by MDTs with GP participation and comprise nursing and one or more Health and Social Care Professional (HSCP) members. Specifically, studies will be included only if the following criterion is met:
  - The MDT includes at least one of the following HSCPs: clinical pharmacist, dietician, medical social worker, occupational therapist, psychologist, physiotherapist and speech and language therapist.
- Comparison: comparison interventions will include usual care or other interventions.

Health outcomes
The primary outcome will be functional status. Functional decline will be defined as the loss in an individual’s ability to perform ADLs safely and independently. Multiple validated tools such as the Barthel Index (BI) and the Groningen Activity Restriction Scale will be used to assess functional status. Secondary outcomes will include primary healthcare use (GP, public health nurse, health & social care professional use, formal homecare support) and secondary healthcare utilisation (outpatient department services, Emergency Department (ED) presentation and unplanned hospital admission), participant satisfaction with care, health-related QoL, mortality and nursing home admission. Patient reported adverse outcomes will also be recorded (eg, falls).

The taxonomy of 21 key features of integrated care by Valentijn et al developed to classify the broad understanding of integrated care will be employed. This will facilitate the description of diverse integrated care approaches for each included study to help translate research findings into policy and practice (online supplemental file 4).

Exclusion criteria
Studies will be excluded if the population includes adults <65 years, those living in nursing homes, if the MDT does not include the GP and at least one HSCP member or if the multidisciplinary intervention was not completed in the community setting. Studies will also be excluded where integrated care is initiated among older adults who are discharged from the acute inpatient setting or from the ED as these studies have been previously synthesised.

Study selection
Study selection will be completed using a two-step process. In step 1, studies will be downloaded to Endnote, and titles and abstracts will be screened by two independent authors (CH and RG). Step 2 will involve two independent reviewers (CH and RG) screening full-text studies according to the inclusion criteria will be downloaded to Rayyan software, which will be outlined in a PRISMA flow diagram. Any inconsistencies in the inclusion process will be resolved via consensus or third author consultation (ACG).

Data collection and extraction
Data will be extracted and compiled into a data extraction form (online supplemental file 5) by one reviewer (CH). The data extraction form will be piloted on a sample of studies. The form will include data regarding the study design, objectives, results, population, intervention (including models of service delivery such as MDT or interdisciplinary care), control, outcomes and follow-up. All extraction forms will be compiled into a Microsoft Excel sheet and will be reviewed by another independent author (ACG). Any discrepancies that cannot be agreed on will be reviewed by a third author (RG). If any study includes missing or incomplete reports, an attempt will be made to contact the author, and this will be recorded in the data extraction form.

Quality assessment
Critical appraisal of each study included will be independently completed by two authors (CH and MM) using the Cochrane Risk of Bias (ROB) Tool (V.2) for RCT's or the ROB Tool (V.2) for cluster RCT's. The studies will be assessed for ROB focusing on aspects of randomisation, deviation from intended interventions, missing data, measurement of outcomes and reporting. An extra domain from bias arising from the timing of identification or recruitment will be assessed in cluster RCTs. Low risk will be categorised as ‘the study is judged to be at low ROB for all domains for this result’; some concerns will be categorised as ‘the study is judged to raise some concerns in at least one domain for this result, but not to be at high ROB for any domain’; and high risk will be categorised as ‘the study is judged to be at high ROB in at least one domain for this result or the study is judged
to have some concerns for multiple domains in a way that substantially lowers confidence in the result.\textsuperscript{34}

The certainty of evidence will be assessed using Grading of Recommendations, Assessment, Development and Evaluation (GRADE).\textsuperscript{35} The GRADE approach will be used to rate the quality of the evidence for each main outcome. It will assess study limitations, indirectness of evidence, inconsistency of results, imprecision and publication bias. The evidence will be graded as high, moderate, low or very low quality. If a disagreement between reviewers arises, both reviewers (CH and MM) will come to a consensus, and a third reviewer (RG) will be consulted if necessary.

**Data synthesis**

A meta-analysis will be completed for clinically and statistically homogenous data using Stata V.17. The measurement of effect will be calculated for dichotomous outcomes (eg, rates of hospitalisation) using RRs and 95% confidence intervals (CIs). Continuous outcomes (eg, BI, Patient Satisfaction Questionnaire Short Form) will be analysed using mean differences or standardised mean differences (where different outcomes are used to measure the same construct), standard deviation (SD) and 95% CIs. Where the mean or SD is not available, the median will be used as a proxy for the mean and a multiple of 0.25 the range or 0.75 times the IQR will be used as a proxy for the SD.\textsuperscript{36} Heterogeneity will be assessed across trials using an $I^2$ statistic which will be considered statistically significant at $p<0.05$. The $I^2$ value of 30%–60% will be considered as moderate heterogeneity, 50%–90% as substantial heterogeneity and 75%–100% as considerable heterogeneity.\textsuperscript{37} For the purposes of this review, an $I^2$ of greater than 50% will be considered substantial and a random effects model will be reported to account for variability across studies. If $I^2$ is ≤50% a fixed effects model will be employed.\textsuperscript{38}

A sensitivity analysis will be conducted to explore the impact of ROB within the included studies, by analysing the effect of the methodological and clinical characteristics on outcomes (specialist geriatric training by GP, composition of HSCP team, duration of intervention). In order to incorporate bias assessments in the analysis, we will provide a detailed description of ROB by individual domains. We will display a summary of ROB across studies and we will display all ROB judgements on forest plots. If a study is rated as high ROB in some categories, a sensitivity analysis may be completed to exclude this study from the overall analysis. Cluster randomised trials will be assessed to ensure adequate analysis was carried out to consider the effects of clusters. A subgroup analysis will be completed to explore potential sources of heterogeneity if required. A subgroup analysis will be completed stratifying the composition of the HSCP team, from, GP with physiotherapist, duration of the intervention or the location where the intervention is carried out, for example, in the home compared with in a community centre. The subgroups analyses will be presented with a test for interaction. Authors will be contacted in the event that data are not available.

**Public and patient involvement (PPI)**

There are growing imperatives for PPI in health research to enhance the design and implementation of healthcare.\textsuperscript{39} This proposal was presented to members of the PPI stakeholder panel of older adults at the Ageing Research Centre at the University of Limerick (UL). The purpose of this was to invite their feedback, comments and insights, to inform the approach to the research question and outcomes of interest. Panel members felt strongly about how functional decline strongly influences a person’s confidence and QoL. The panel agreed with the outcomes proposed and also noted that patient reported adverse outcomes should be recorded as personal safety is important and adverse outcomes can significantly negatively impact QoL. The same approach will be used for the main systematic review where the draft findings will be presented to members and feedback invited on key discussion points of the review and potential considerations for follow-on intervention studies. The PPI panel will also be consulted on the lay dissemination formats of the review.

**DISCUSSION**

This review will systematically search and synthesise primary empirical research examining and reporting on the effectiveness of multidisciplinary integrated care with GP participation on the care of community dwelling older adults. Older adults are at risk of poor health outcomes specifically functional decline during hospital admission, which results in prolonged hospital stay, increased nursing home admission and an increase in social care costs.\textsuperscript{40} Hospital avoidance strategies are essential to identify this at-risk cohort prior to experiencing adverse events. Delivery of integrated care to older people is considered a complex intervention,\textsuperscript{4} subsequently this review will identify components of integrated care strategies including HSCP team members and intervention elements. The elements of integrated care outlined in the RMIC by Valentijn et al\textsuperscript{41} will be used as a reference standard to outline the elements of integrated care used in each study. This will facilitate future recommendations to be made regarding such integrated care approaches for older people living in the community. This review will be relevant to both clinicians and policy-makers and will enable evidence-based recommendations to be made regarding current and future integrated care strategies for community-dwelling older people. It is predicted that the range of outcomes across trials will be varied which may limit our ability to pool data across studies. Functional decline was chosen as the primary outcome in our study as lower ability in completion of ADLs is negatively correlated with QoL in older adults.\textsuperscript{42}

By synthesising the evidence regarding integrated care for community-dwelling older people, there is a potential
to reduce the risk of unplanned hospital admission as is the case for CGA for community-dwelling older people.16

A reduction in hospitalisation may lead to reduced risk of functional decline and ultimately maintain older adults QoL.12

Ethics and dissemination

Formal ethical approval is not required for this review as all data included are anonymous secondary data.

The review will abide by the PRISMA standardised reporting guidelines will be published in a peer-reviewed journal and disseminated through discussion in the Ageing Research Centre at UL. Scientific outputs will be disseminated in the form of presentations at relevant older persons and primary care conferences. Lay dissemination will take place in collaboration with the PPI stakeholder panel of older adults at the Ageing Research Centre at the University of Limerick.

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Contributors CH and RG were major contributors in writing this systematic review protocol. CH, RG, MM and KR contributed to the planning and design of the overall study. CH developed the search strategy. CH, RG, MM, KR, CF, AGC, BC, LG, M’OC and ES participated in critically appraising and editing the manuscript. RG is the guarantor of the review. CH, RG, MM, KR, CF, AGC, BC, LG, M’OC and ES read and approved the final manuscript. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

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REFERENCES


2 World Health Organisation. Integrated care for older people: Realigning primary health care to respond to population ageing, 2018


19 Department of Health HSE. Sláintecare implementation strategy and next steps. Dublin, Ireland, 2018.


37 R R. Planning the analysis at protocol stage. In: Heterogeneity and subgroup analyses in Cochrane consumer and communication group reviews, 2016.
40 National clinical programme for older people (NCPOP), Health Service Executive and Royal College of Physicians Ireland. In: A guide to comprehensive geriatric assessment for older people, 2016.