A complex intervention to reduce avoidable hospital admissions in nursing homes: a research programme including the BHiRCH-NH pilot cluster RCT

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Scientific summary

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Scientific summary

Background

Number of frail older people with comorbidities in care homes

In England, there are approximately 450,000 adults aged > 65 years living in care homes, of which slightly more than 220,000 live in nursing homes. Nursing home residents have increasing levels of comorbidity, frailty and physical health needs.

Ambulatory care-sensitive conditions and hospitalisation

Ambulatory care-sensitive conditions are conditions that can lead to unplanned hospital admissions that may have been avoidable or manageable by timely access to medical care in the community. Such conditions include angina, asthma, cellulitis, chronic obstructive pulmonary disease, congestive heart failure, dehydration, diabetes mellitus, gastroenteritis, epilepsy, hypertension, hypoglycaemia, urinary tract infections, pneumonia, and severe ear, nose and throat infections.

In the UK, ambulatory care-sensitive conditions account for one-sixth of hospital admissions from all age groups. The ageing population has led to a 40% increase in admissions between 2001 and 2011, and all-cause hospital admissions from nursing homes rose by 63% between 2011 and 2015. Four ambulatory care-sensitive conditions contribute to a large proportion of hospitalisations from nursing homes: respiratory infections, acute exacerbation of chronic heart failure, urinary tract infections and dehydration; these may underlie other problems such as falls and delirium.

Adverse impact of hospitalisation

As well as causing distress to residents, their families and staff, hospitalisation is expensive for the health and social care system. Hospital admission increases the risk of decline in functional ability, delirium, adverse events and prolonged stays. Areas with many nursing homes tend to have higher rates of unplanned hospital admissions for those aged > 75 years. The King's Fund and the British Geriatrics Society have raised concerns about the quality of health-care provision to nursing homes. The UK NHS has made reducing avoidable hospital admission from nursing homes a policy imperative.

Reducing potentially avoidable hospital admissions

A number of interventions have been developed to address avoidable hospital admissions. These fall broadly into two categories: multicomponent interventions (implementation of a range of tools) and single-component interventions (predominantly advance care planning or single-disease care pathways, e.g. pneumonia). Multicomponent interventions showed significant reductions in avoidable admissions. Key characteristics of these included enhancing knowledge and skills of nursing home staff, clinical guidance and decision support tools (care pathways), engaging with families, and specialist input from geriatricians or nurse practitioners. In addition, research highlights the importance of collaborative development of interventions with nursing home staff, residents and families, considering implementation support and using local champions.

The intervention that is most widely published is Interventions to Reduce Acute Care Transfers (INTERACT) [Ouslander JG, Bonner A, Herndon L, Shutes J. The Interventions to Reduce Acute Care Transfers (INTERACT) quality improvement program: an overview for medical directors and primary care clinicians in long-term care. *J Am Med Dir Assoc* 2014;**15**:162–70]. This complex intervention,

developed and implemented in the USA, aims to detect and diagnose a range of medical conditions in residents recently discharged from hospital to skilled nursing facilities to reduce hospital re-admissions.

It comprises a quality improvement programme focusing on the management of acute changes in residents' condition, and includes:

- communication tools, for example the Stop and Watch Early Warning Tool or the situation, background, assessment, recommendation technique, which is a structured tool for communication with primary care
- care pathways or clinical decision-support tools addressing, for example dehydration, urinary tract infection, fever and acute mental status change
- advance care planning, tracking and communication tools for use in everyday practice in long-term care facilities.

In this study, we identified the likely elements of a multicomponent intervention, including:

- observation, communication and decision-making tools and documentation for care of ambulatory care-sensitive conditions in UK nursing homes
- knowledge and skills development of nurses and care assistants
- involvement of family members
- nurse confidence, empowerment and leadership
- implementation guidance.

Aims

The overall aim was to develop and test a complex intervention with support for its implementation to improve rates of early detection, assessment and reporting for four conditions. Two sequential workstreams aimed to (1) develop a complex intervention and implementation support to reduce avoidable hospital admission and (2) test the complex intervention and implementation support.

Workstream 1: develop a complex intervention for early detection, assessment and treatment of ambulatory care-sensitive conditions

This workstream included the following work packages:

- Work package 1 – develop care pathways using care pathways in the literature, getting expert panel input via e-mail and holding a consensus workshop with diverse stakeholders.
- Work package 2 – identify approaches to enhance knowledge and skills using rapid research review, semistructured interviews with key informants and consensus workshop with diverse stakeholders.
- Work package 3 – develop implementation support based on change theory and consensus workshop with diverse stakeholders.
- Work package 4 – clarify the role of family following semistructured interviews with 16 family carers.

Method

We used mixed methods, comprising rapid research reviews, 18 semistructured interviews and three consensus groups, over a period of 5 months with a total of 22 diverse stakeholders, comprising two care home managers, three care assistants, eight nurses, four general practitioners, three family carers, a geriatrician and a quality improvement manager.

Key findings

We developed a first draft of the complex intervention, which we called the Better Health in Residents in Care Homes with Nursing (BHiRCH-NH), with the following elements:

- three intervention tools – the Stop and Watch Early Warning Tool; condition-specific care pathways; and the situation, background, assessment, recommendation technique
- family involvement
- knowledge and skills enhancement.

We based our support for implementation of the intervention on two change theories: (1) the Promoting Action on Research Implementation in Health Services (PARiHS) framework of change, which focuses on the context, evidence and facilitation; and (2) quality collaboratives, operationalised through Practice Development Champions and practice development support groups.

We developed a range of support for the Practice Development Champions: a 2-day training workshop, monthly coaching telephone calls, handbooks and web-based resources.

Workstream 2: test the complex intervention for early detection, assessment and treatment of ambulatory care-sensitive conditions

To test the intervention and implementation support, we first conducted a feasibility and acceptability study, and then conducted a cluster randomised controlled trial.

Workstream 2, work package 1: feasibility test of the complex intervention and implementation support

Method

We conducted a feasibility and acceptability study in two nursing homes to make amendments to the intervention and implementation support and to refine the study procedures in preparation for the pilot trial. Ethics approval was gained from the Queen Square Research Ethics Committee. We delivered training for two Practice Development Champions from each home and provided them with monthly telephone support.

Key findings

We learned that further refinements were required, both in the complex intervention and the implementation support. We simplified the intervention to prioritise the three intervention tools. We focused family involvement on prompting use of the Stop and Watch Early Warning Tool. We established that the approaches to recruitment and collecting data were feasible.

Workstream 2, work package 2: pilot test the complex intervention and implementation support

Method

We used mixed methods to pilot test and evaluate the implementation of the complex intervention. We used a cluster randomised controlled trial and a nested process evaluation of qualitative interviews with nursing home staff and families. The primary outcome was the number of hospitalisations for ambulatory care-sensitive conditions. An economic evaluation quantified the cost-effectiveness. Ethics approval was obtained from the Queen Square Research Ethics Committee.

Findings

We recruited sufficient nursing homes ($n = 14$), staff members ($n = 148$), family members ($n = 95$) and residents ($n = 245$). We retained a majority of those recruited. There was little evidence of engagement with the intervention. Only 16 Stop and Watch Early Warning Tool forms were completed and the care pathway was used eight times over the 6-month post-intervention period. The Stop and Watch Early Warning Tool was mentioned by staff as being useful, even when it was not used to record observations. Both nurses and care assistants said they were already doing something similar to the intervention: care assistants said they already noticed early changes and reported them to nurses; nurses told us that they already engaged in detailed assessment and often used the situation, background, assessment, recommendation technique when communicating with primary care, as they had done prior to the BHiRCH-NH study. We saw limited engagement with the tools and the activities the tools required, and there was little family involvement.

The implementation strategy was only partially effective. Five of the six intervention homes identified two Practice Development Champions who attended the 1-day training workshop. Following the workshop, one of these homes withdrew from the study. Practice Development Champions shared information about the project with their teams and found the training and monthly calls helpful. Several felt the need for additional support, whether from management or the study team. At least one home had integrated the focus on early detection of changes in residents' health into their daily resident review meeting and said they would continue to do so. Additional homes reported that they would continue to display posters about the Stop and Watch Early Warning Tool in residents' rooms and in the nurses' station.

There was no evidence to suggest that use of the three intervention tools would be sustainable outside the trial: they were not fully adopted during the trial. The low rates of hospitalisation for the four ambulatory care-sensitive conditions make this an unsuitable primary outcome measure. The secondary outcomes (e.g. out-of-hours health service use) were relatively infrequent. We found that admissions for ambulatory care-sensitive conditions could not be assumed to be a proxy for avoidable admissions. We were able to measure whether or not the intervention would be cost-effective in terms of incremental cost per quality-adjusted life-year gained. However, this does not necessarily offer practical insights into the full economic impact with respect to commissioning care. We are satisfied with the completeness of data collection, completion of documentation and return rate of questionnaires over the 6-month study period.

We met the progression criteria with respect to recruitment and data collection: we retained 70% of homes, proportions of missing data were $< 20\%$ and we collected 80% of individual-level data. Given the minimal engagement with the intervention and implementation support, we do not plan for a definitive randomised trial of this particular intervention at this stage.

In summary, this study developed and tested a complex intervention for early detection, assessment and reporting of changes in UK nursing home residents' health. We developed the intervention and support for its implementation by engaging with a wide variety of stakeholders, using multiple methods. The feasibility study in two nursing homes led to us refining the complex intervention and the support for its implementation, as well as the study procedures. The cluster randomised trial in 14 homes confirmed the effectiveness of the study procedures. We successfully recruited, retained and secured data from nursing homes, residents, staff and family carers. Despite the excellent level of recruitment and retention, the limited engagement with the intervention tools and support for their implementation lead us to conclude that a definitive trial of this intervention is not warranted.

Patient and public involvement

Patient and public involvement occurred at all stages of the project. Carer Reference Panels assisted with recruitment materials and processes, training the Practice Development Champions, analysis and interpretation, and dissemination of results.

Future steps

Future publications will describe:

- the pilot trial
- stakeholder perspectives on the intervention and its implementation.

The key areas for future research include:

- establish the extent of the problem of avoidable admissions from care and nursing homes
- gain a rich description of the care processes associated with low-admitting nursing homes, including an appreciation of any records or tools that homes already use, and identify to what extent their use is individually or organisationally driven and transferable to high-admitting homes
- establish the important contextual variables to consider in achieving early detection
- establish the resources needed to effectively support internal and external facilitation of change
- consider whether or not this intervention might be useful to residential care homes
- establish the cost to care homes and nursing homes of reducing hospital admissions
- simplify the intervention to focus solely on early warning of changes in residents' health, an approach which has recently shown promise in a quality improvement project
- engage in practice development and quality improvement projects, engaging in co-production with key players in nursing homes.

The experience of obtaining ethics approval suggests that there is a need for greater understanding about the issues that practice development and service improvement projects raise.

Conclusion

This programme has resulted in learning about effective ways to work with people with a diverse range of expertise. Our consultation included interviews and workshops with family carers whose relatives had lived in care homes, nursing home managers, nurses and care assistants, as well as primary care professionals (general practitioners and nurses) and a secondary care (geriatric) professional. We were successful in bringing these diverse perspectives and areas of expertise together to review and agree on the most promising complex intervention to ensure early detection, detailed assessment and effective communication with primary care.

We have demonstrated effective approaches to nursing home recruitment, retention and data collection, as well as effective patient and public involvement, working with family carers and a person living with dementia. Given the minimal engagement with the intervention and implementation support, we do not plan for a definitive randomised trial of this particular intervention at this stage.

It is possible that, following considerable activity in enhancing health care in care homes {e.g. see NHS England Demonstration Projects – Vanguards [The King's Fund. *Enhanced Health Care in Care Homes*. URL: www.kingsfund.org.uk/projects/enhanced-health-care-homes (accessed 20 February 2020)]}, there is now more integrated working between health services and the care home sector, meaning that the problem of avoidable hospitalisations is not as acute as previously reported.

Trial registration

This trial is registered as ISRCTN74109734 and ISRCTN86811077.

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