A multifaceted intervention to REduce Antimicrobial prescribing in Care Homes (REACH): a non-randomised feasibility study and process evaluation

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Scientific Summary

Background

The most frequent acute health care intervention which care home residents receive is prescribing of medications. There are serious concerns about the quality of prescribing generally, and antimicrobial prescribing in particular, with such facilities being described as an important 'reservoir' of antimicrobial resistance (AMR). A cluster randomised controlled clinical trial (RCT) conducted in Canadian care homes demonstrated that a multi-faceted intervention was effective in reducing the number of courses of antimicrobials prescribed for urinary tract infections (UTIs) in intervention homes compared with control homes. No significant differences were found between intervention and control sites in terms of total antimicrobials, admissions to hospitals and mortality. This study sought to adapt and extend this approach to include respiratory tract infections (RTIs) and skin and soft tissue infections (SSTIs) in United Kingdom (UK) care homes.

Study aims

Our primary aim was to evaluate the feasibility and acceptability of a multifaceted intervention on prescribing for infections in a non-randomised feasibility study in care homes. To achieve this aim, we had a number of underpinning objectives:

1. To recruit six care homes: three in Northern Ireland (NI) and three in the West Midlands, England
2. To adapt and develop an intervention (a decision-making algorithm and small group interactive training) originally developed and implemented in Canadian care homes
3. To deliver training in respect of the intervention in the care homes and associated general practices
4. To implement the intervention in the six feasibility homes and collect relevant data
5. To undertake a detailed process evaluation of the non-randomised feasibility phase and test data collection procedures

6. To undertake a survey in a sample of homes to assess interest in participation in a larger future study

Methods

The REACH study was a non-randomised feasibility study that employed a mixed methods design, with normalisation process theory as the underpinning theoretical framework. The study consisted of four interlinked phases, followed by a survey in a sample of care homes from NI and the West Midlands to gauge interest in a larger study. Ethical approval was received prior to the start of the study (REC Reference 16/NI/0003).

Recruitment of care homes

We aimed to recruit a sample of six care homes with two nursing homes and one residential home in each area. REACH Champions were identified in the homes; these were staff who would promote the use of the intervention and provided additional training if required.

The basic inclusion criteria were homes:

- with/without nursing care, providing 24 hour care for residents aged 65 years old and over
- with a minimum of 20 (permanent) residents
- associated with a small number of general practices (up to four per home providing care for a minimum of 80% of residents within a home)
- with an exclusive arrangement with one pharmacy for dispensing medications

The recruitment process was conducted during April-June 2016.

Adaptation of the decision-making algorithm and training phase.

The original Canadian intervention consisted of a decision-making algorithm focusing on urinary tract infections (UTIs) and a training package. We undertook rapid screening of the literature in relation to the management of UTIs, plus respiratory tract infections (RTIs and SSTIs) to update the decision-making algorithm produced for the previous study. We

conducted a consensus group, using the Nominal Group Technique, to obtain the views of selected healthcare professionals on the updated decision-making algorithm. We also presented the updated decision-making algorithm to key stakeholders including care home staff, family members and general practitioners (GPs) via focus groups and semi-structured interviews. Topic guides were informed by normalisation process theory and analysed using constant comparison. The process was also informed by continual iterative internal review and analysis within the research team. A training programme was developed based on the on-going adaptation of the decision-making algorithm, and the approach taken in the original Canadian study. It incorporated aspects of didactic instruction on AMR, along with more interactive elements such as applying the decision-making algorithm to case studies, and how to communicate with GPs using the Situation-Background-Assessment-Recommendation (SBAR) tool. Two versions of the training programme were developed to meet the needs of different types of staff within the participating homes.

Implementation of the intervention.

Training sessions were organised and conducted in the six participating care homes. We developed and used specific data collection forms to assess characteristics of the participating homes, including demographic information of residents; whether the decision-making algorithm was used; details of hospital services used; contacts with health and social care professionals; and adverse events. These data were analysed using descriptive statistics. We created a standard operating procedure to allow associated pharmacies/practice-based dispensaries to download dispensing data related to antimicrobial prescribing for 12 months prior to intervention implementation, and during the 6 month implementation period. Dispensing data were converted to Defined Daily Doses (DDDs) using standard methodology. We also calculated the number of prescriptions dispensed for all antimicrobials prescribed. The data were used to estimate an intra-class correlation co-efficient (ICC) that could be used in a future trial. Data were also collected on relevant resources and costs involved in the set-up of the REACH intervention. The most recently published unit costs in health and social care were used for costing the time input of staff in the analysis. For events such as hospitalisations and deaths, we also explored the

feasibility of retrieving anonymised resident level data (aggregated up to home) from large centralised databases such as NHS Digital in England and the various relevant agencies in NI. Analysis of any available administrative data was descriptive in nature.

Process evaluation.

We used a mixed methods approach, combining qualitative and quantitative data. We were particularly interested in context, the reach of the intervention, the dose delivered and dose received. Analysis of qualitative data was guided by the components of normalisation process theory, notably making sense (coherence); engagement and commitment (cognitive participation); facilitating the use of the intervention (collective action); and the value of the intervention (reflexive monitoring). Quantitative data were analysed descriptively.

Survey of homes

A postal survey was undertaken in a sample of homes in NI (n=446) and the West Midlands (n=1040) to assess interest in participation in a larger future study. Two mailings were undertaken (January 2018), and responses were entered into and analysed using SPSS.

Results

Recruitment of homes

We recruited a sample of six care homes with two nursing homes and one residential home in each area. The number of beds ranged from 32-62 with occupancy almost at 100% in all homes. In NI, more GP practices provided care to the homes while in England, each participating home was served by one practice, respectively. Homes varied in ownership with three being part of a chain and the remaining three being owned by single proprietors.

Adaptation of the decision-making algorithm and training phase

Following the rapid literature review, 8 papers/guidelines were used to inform the adaptation of the intervention. The consensus group (September 2016), focus groups

(September-October 2016) and interviews (January-March 2017) led to refinement of the algorithm in respect of key symptoms, consideration of residents with dementia and the maximum time to wait before referral to a GP. The revised algorithm, with one pathway for each infection, was categorised on the basis of initial assessment of the resident, observation of the resident, and action by care home staff. Temperature was considered as an important symptom, but staff from care homes without nursing reported that they were not allowed to measure temperature as this was seen as a nursing task. Training utilised a blended learning approach incorporating a visual presentation (Powerpoint®) and supporting documentation (study handbook). Staff had the opportunity to rehearse the use of the decision-making algorithm and communication skills using case studies and the SBAR tool. They were also given an overview of the data collection forms. A video of the training material was produced and provided to care homes on a DVD, flash drive and via an online platform to facilitate ongoing training.

Implementation of the intervention

A total of 87 staff from within the six care homes received training from the REACH team who delivered 21 training sessions over 35 hours. Training was well-received by staff who reported that the content was relevant and of high quality. Following management agreement, further training on temperature measurement was undertaken in care homes without nursing. The decision-making algorithm form was used 81 times and the outcome was varied. Hospital services used were largely in relation to outpatient appointments and were not associated with infections. The contacts with other health and social care professionals were primarily with nurses outside the care homes. Adverse event data were very difficult to collect as it was impossible to judge if any event reported could be attributed to the intervention. Community pharmacy/dispensary data revealed that there was a decrease in the total number of prescriptions dispensed for antimicrobial post-implementation (n=334) compared to pre-implementation (n=383), representing a 13% reduction; this was also reflected in the DDDs pre-implementation (DDDs=2848) compared

to post-implementation (DDDs=2559), which equated to a 10% reduction. Some antimicrobial prescribing may have been for prophylaxis of UTIs which was not a specific target for the intervention. The ICC was 0.11 (95% CI; 0.00, 0.24) at baseline, 0.05 (95% CI; 0.00, 0.13) post-implementation, and overall, 0.09 (95% CI; 0.00, 0.24). Resource use and costing revealed that from a societal perspective, the mean cost per home was £1239 (£33 per resident). It was not possible to obtain any administrative data for the participating care homes in England from NHS Digital. Limited data were available from equivalent agencies in NI in terms of being able to enumerate the number of residents in each home through the use of an algorithm that used the care home name, address information and Unique Property Reference Number. The numbers extracted by this method appeared to slightly under-estimate resident numbers in comparison to data collected directly from homes. It was not possible within the given timescale to extract data on hospitalisations and deaths of residents.

Process evaluation

From both the pre- and post-implementation focus groups and one-to-one interviews, it was clear that there was varying knowledge and understanding of AMR ['making sense' (coherence)]. Staff noted that the decision-making algorithm was useful in the care home but were unsure if it would change how GPs prescribed. The analysis revealed that 'engagement and commitment' (cognitive participation) was generally high. Care home managers felt that being involved helped to empower the staff to increase their knowledge for the benefit of the residents. In 'facilitating the use of the REACH intervention' (collective action), there was evidence that many staff were implementing the decision-making algorithm but others were not. The staff were very willing to provide feedback on the decision-making algorithm, particularly with regard to some of the symptoms that had been included following the adaptation and development phase. There was tension between an evidence-based approach highlighted in the literature and ingrained practice. The 'value of the intervention' (reflexive monitoring) reflected a more negative outcome than in the other constructs. Whilst most believed the approach was a good idea, operationalising it was more

problematic. The workload issue of time associated with intervention implementation and documentation was highlighted.

Survey

A response rate of 26% (n=160) was obtained. From those who responded, 83% (80% NI homes and 88% English homes) indicated that they would welcome a larger study. Concerns were expressed regarding time commitment and the need to involve GPs and family members.

Conclusions

Based on our findings, we draw the following conclusions:

1. We have demonstrated feasibility in respect of recruitment, data collection and implementation of the intervention, although challenges remain with respect to accessing centralised administrative data and data collection burden for staff
2. Stakeholder involvement in the adaptation and development of the intervention was challenging, but also valuable as it provided an important perspective and may have engendered a sense of ownership of the intervention, particularly within care home staff
3. The intervention appeared to be broadly acceptable to care home staff, and could be integrated into everyday practice.

This was a feasibility study to assess various elements of research methodology and possible progression to a larger trial, so implications for practice at this stage are somewhat limited. However, the following points should be considered:

- Training for care home staff was an important aspect of this feasibility study. Being able to integrate training into everyday practice and shift patterns was a challenge in the study, and would also appear to be difficult outside a research context. More generally, care home organisations should consider how best to provide and facilitate

training events and opportunities to their staff to ensure their practice is up-to-date and evidence-based.

- It was accepted practice in care homes without nursing not to measure temperature; this would have been challenging for the implementation of the intervention. However, we obtained agreement from the management of such homes to allow us to train staff to undertake this task during the course of the study. Allowing this to be part of everyday practice in care homes without nursing would be beneficial for staff (and indeed residents) outside the research context.

As a result of this feasibility study and process evaluation, we have demonstrated that we can recruit homes, oversee implementation and collect data. However, there are a number of key issues that need to be highlighted to allow a future study to proceed:

1. Obtaining resident-level data from care homes and other sources. Consideration to obtaining individual consent or employing an 'opt-in' approach may be the best course of action in order to obtain the data that would be needed for a definitive trial. General use of administrative data sources is being advocated by research funding bodies, but the experience of this research team was that this was not feasible.
2. The content and focus of the intervention may need to be reviewed in light of antimicrobial use for prophylaxis in the case of UTIs.
3. Although we had opted to use DDDs as the outcome in respect of prescribing, there is debate in the literature as to what is the most appropriate outcome. Further consideration and guidance should be produced in respect of the most appropriate outcome measure to assess the effects of antimicrobial stewardship interventions, with a focus on a 'prescribing outcome'.

Study registration

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