Exploring the value of a multidisciplinary-led medication review for elderly individuals at a long-term care facility performed by four different health-care professions in an equal and closely integrated collaboration

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Abstract

Background: The increasing population of elderly individuals led to an increasing number of polypharmacy patients. Polypharmacy increases the risk of adverse drug reactions and hospitalization. One means to combat polypharmacy involves performing medication reviews, which can be conducted by different methods and stakeholders. Objective: The study objective was to explore the value of involving different health-care professions in medication reviews at an equal and closely integrated collaborative physical meeting for elderly individuals at a long-term care facility. A specific focus was to explore the contributions and opinions of the different health-care professionals regarding the medication review process. Materials and Methods: A single case study was applied to perform an in-depth study of a group of health-care professionals performing medication reviews in collaboration. Hence, the study was performed in two settings: 1) the practical execution of medication reviews at a long-term care facility in an interprofessional team and 2) qualitative semi-structured interviews conducted to explore the forms of work done by different professional groups in performing an interdisciplinary medication review. Results: Forty-nine residents from a long-term care facility were included in the study and were offered a medication review. In total, they reported 573 prescriptions, for which 150 changes were recommended by the interprofessional team. At the 3- and 8-month follow-ups, 30.0% and 49.5% of the accepted recommendations had been implemented, respectively. According to the interview, the results reveal that the interdisciplinarity of the interprofessional team was perceived as a great advantage to the results of the medication reviews. Conclusion: The results suggest that performing medication reviews in interprofessional collaboration improves the perceived quality of such reviews with a more complete picture of the residents and their medications, leading to more personalized recommendations and resulting in optimized medication reviews for the individual patients.

Keywords: Caregiving Staff, general practice, general practitioner, health-care professional, interprofessional, interprofessional team, long-term care facility, medication review, medicine review, pharmacists, polypharmacy

Introduction

The proportion of elderly is increasing and will continue to increase significantly. As there is an increased incidence of chronic diseases with increasing age, daily treatment with
Performing medication reviews, that is, the structured and critical review of a patient’s drug treatment, is especially relevant for patients in primary care at long-term care facilities because they are known to have multiple chronic conditions requiring complex drug treatment due to the complexity of the diseases. However, a recurring challenge in terms of conducting medication reviews lies in the discrepancy between the workload of deriving recommendations of medication changes and often incomplete implementation rates resulting in a lack of intervention efficacy. To reduce the workload of the general practitioners (GP) and to achieve an improved effect of medication reviews by including inputs from health-care professionals, the importance of involving different health-care professionals has recently been highlighted. A study exploring the collaboration between GPs and pharmacists in the context of optimizing medications for patients with multimorbidity found that GPs felt that pharmacists could reduce their workload by taking on routine prescribing tasks. A systematic literature review exploring the benefits of including pharmacists into general practices found that the inclusion of pharmacists benefited both GPs and patients by improving medication safety, mainly through resolving medication-related problems, but also improving the timeliness of completion of medication reviews. Furthermore, introducing interprofessional teams of diverse health-care professionals, for example, primary care physicians, pharmacists, and home care specialists, focused on different aspects of medication may also lead to an optimized medication review. A few studies have shown that medication reviews prepared by an interprofessional team may increase medication safety. However, the communication between the team members involved in these studies was not optimal, as it only took place in writing.

In this study, a new multidisciplinary-led medication review method performed by four different health-care professions in a closely integrated collaboration with a more extensive interaction between the team members than exchanging written materials is proposed as a means to optimize the medication review process, including the subsequent implementation phase. Therefore, the objective of this study was to explore the value of involving different health-care professionals when performing medication reviews in a physical meeting for elderly at a long-term care facility. Specific focus was on exploring the contributions and opinions of different health-care professionals regarding the medication review process.

### Materials and Methods

#### Design

To understand how extended interaction within a team of different health-care professionals performing medication reviews for elderly at a long-term care facility could optimize the medication review process, a single case study design was applied. A single case study allows for an in-depth exploration of, for example, new phenomena (such as new types of interaction within an interprofessional team conducting medication reviews) to question and elaborate on existing knowledge and theories.

The case study involved two settings: a practical medication review setting and an interview study setting as follows:

1. The first setting was at a long-term care facility located in the Capital Region of Denmark, where medication reviews were planned, conducted, and evaluated. The medication reviews were performed by an interprofessional team including physicians, nurses, nursing helpers, and a pharmacist [Table 1]. The results from the medication reviews in relation to recommended and accepted medication changes are only briefly outlined in this paper, as the primary focus was on interprofessional team interaction in relation to the medication review process.

2. The second study setting involved a qualitative semi-structured interview of the participants of the interprofessional medication review team, where the interactions, contributions, and opinions of the group were explored.

#### Composition of the interprofessional team

The interprofessional team that performed the medication reviews (cf. setting 1) and participated in the interview study (cf. setting 2) consisted of health-care professionals connected to the long-term care facility and to a regional research unit of the Department of Clinical Pharmacology at Copenhagen University Hospital Bispebjerg (CUHB). The following professionals from the long-term care facility participated in the team: GP of the residents, the quality and development nurse (QD nurse), facility nurses, and the contact persons of the residents, that is, nursing staff helpers. The GP was financially compensated for his participation. The following professionals from CUHB participated: a consulting GP (cGP) and a pharmacist [Table 1].

#### Medication review method

Residents of at least 65 years of age residing in the long-term care facility and assigned to the GP were included in the study. Residents who participated in similar studies were excluded.

Each resident’s medication list was reviewed by the interprofessional team. An overview of the medication review workflow and the responsible participants of the interprofessional team is presented in Figure 1.

The results of the practical medication review execution, for example, the number of suggested medication changes, number of accepted medication changes, etc., were entered into Research Electronic Data Capture (REDCap), a secure web-based data collection tool designed to store and manage...
Table 1: Overview of the participants of the interprofessional team, their roles, and the included interviewees

| Interprofessional team participant | Education level | Role                                                   | Number of participants included in the interprofessional team | Number of participants included in the interview study |
|-----------------------------------|-----------------|-------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------|
| GP                                | Master and specialist doctor | Prescription authority over residents                | 1                                                             | 1                                                     |
| QD nurse                          | Bachelor        | Leader of nursing staff                               | 1                                                             | 1                                                     |
| Facility nurses                   | Bachelor        | Nurses of the residents                               | 2                                                             | 0                                                     |
| Nursing staff helpers             | Vocational student exam | Contact persons of the residents                      | 8                                                             | 2                                                     |
| cGP                               | Master and specialist doctor | Member of the research unit responsible for medication review preparation and evaluation | 1                                                             | 1                                                     |
| Pharmacist                        | Master          | Research unit leader responsible for medication review preparation and evaluation | 1                                                             | 0                                                     |

Interdisciplinarity

All participants of the interprofessional team were committed to and engaged in the working process, which made it useful and inspirational.

Results

Medication review results

An overview of the medication review results is presented in Figure 2.

Approximately 80% of all accepted medication changes involved deprescribing, that is, discontinuation (55%) and dose reduction (25%). The least commonly used types of accepted medication change recommendations were the addition of drugs (8%), increased dosage (5%), a change in drugs used (5%), an adjustment of dosing time (1%) and adjustment of the number of doses (1%).

The caregiving staff contributed knowledge on each resident's medication preferences, severity of symptoms, adverse events, actual use of over-the-counter and as-needed drugs, and food and toilet habits.

Interview results

Interviews lasting between 19 and 38 min were conducted. We interviewed two contact persons, the QD nurse, the GP, and the cGP. The two facility nurses from the interprofessional team were no longer working at the long-term care facility when the interviews were performed and did not participate in the interviews. However, the QD nurse acted as a representative of the facility nurses.

Four themes and eight subthemes were derived from the analysis. Interview themes, subthemes, and quotes are presented in Table 2. The coding process of the interview analysis adhered to the Consolidated Criteria for Reporting Qualitative Research (COREQ).

Interdisciplinarity

All participants of the interprofessional team were committed to and engaged in the working process, which made it useful and inspirational.
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| Preparation of the medication review |
|--------------------------------------|
| The cGP and pharmacist prepared the medication review by reviewing the submitted medication list in relation to the residents’ ages, functional levels, diagnoses, and contraindications and interactions between drugs used as well as based on regional and national medicine guidelines. |

| Medication review meeting and execution |
|----------------------------------------|
| The interprofessional team met in person and conducted the medication review, taking approximately 10-15 min per resident. Any recommended medication changes were presented by the cGP and pharmacist and discussed in collaboration with the team until agreement was achieved. |

| Subsequent discussion of recommended medication changes |
|--------------------------------------------------------|
| The GP, team nurses, and contact persons discussed any recommendations for medicine changes with the residents. |

| Recording of accepted medication review changes from the GP |
|-----------------------------------------------------------|
| The cGP and pharmacist. The types of recommended medicine changes were categorized as discontinuation, dose reduction, dose increase, a change of drug, an adjustment of the time of administration, starting a new drug treatment, and pill burden reduction (the number of tablets). |

| Three-month follow-up for implementation of rate evaluation |
|-----------------------------------------------------------|
| The pharmacist reviewed the medication lists to evaluate the degree of implementation. The follow-up period of 3 months was chosen to leave enough time to observe an effect before the residents’ health had deteriorated to a degree that would outweigh any effect of a medication review, as it was assumed that the residents were frail and elderly. |

| Introduction of written record of recommended medication changes |
|----------------------------------------------------------------|
| The pharmacist prepared a written record of recommended medication changes that was provided to the facility nurses, contact persons, and GP of the long-term care facility to give an overview of the process and a list of what had not yet been implemented. |

| Eight-month follow-up for implementation rate evaluation |
|--------------------------------------------------------|
| The pharmacist reviewed the medication lists of the residents to evaluate the degree of implementation of the recommended and accepted medication changes. The follow-up period of 8 months was chosen, as it was assumed that complete implementation had been achieved by this point. |

**Figure 1:** Overview of the medication review workflow and the responsible participants of the interprofessional team. cGP = consulting GP; GP = general practitioner

**Involvement of caregiving staff**

The cGP, GP, and QD nurse stressed the importance of involving caregiving staff when reviewing medications and emphasized the usefulness of resident observations shared by the caregiving staff due to their in-depth knowledge about their residents’ regular consumption of over-the-counter and needed medications. The
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Communication and collaboration during the meetings

Even though all participants liked the work atmosphere at the interprofessional team meetings, there were different perceptions of the degree of successful communication and collaboration.

Communication

Both the GP and eGP noted that they were conscious about their communication because of the different professions involved and the professional language used in the interprofessional team.

The QD nurse, GP, and eGP felt that the interprofessional team meetings created a safe space where everyone could speak and ask questions regarding potentially inappropriate drugs on the medication list. The eGP emphasized that the caregiving staff were not scared to speak their minds.

However, one of the contact persons did not feel that they had contributed as much as they wanted, as they did not always understand the discussions at the meetings and did not want to ask unintelligent questions.

Collaboration

One contact person felt their education was worthless, but the other contact person felt that everyone had something to say regardless of their professional background. They both felt that it made sense to participate in the interprofessional team meetings.

The QD nurse expressed her joy from working closer with the GP and that she, after the project, had a better understanding of the GP's approach to the residents' medication. The eGP, GP, and QD nurse mentioned that the workflow became more efficient as the interprofessional team became more accustomed to working together. The eGP explained that the confidentiality developed through the meetings and the shared professionalism of the GP and eGP made their collaboration easy and hassle-free.

cGP reported that the staff’s observations and knowledge about the residents provided valuable information that she had missed in similar projects.

Both contact persons felt that their contributions were appreciated and welcomed by the interprofessional team. They described their contribution as involving providing observations about the residents and their preferences. One of the contact persons reported experiencing an increased professional confidence after joining the project.

Number of prescriptions

Total \( n = 573 \) On average per resident \( n = 11.7 \)

Interprofessional team meetings

Number of meetings \( n = 6 \)

Duration (initially 30 min, reduced to 15 min per resident)

Number of recommended medication changes

Total \( n = 150 \) On average per resident \( n = 3 \)

Most frequently accepted medication change recommendations

Total \( n = 138 \) (92%) Discontinuation (55%) Dose reduction (25%) Addition of drugs (8%)

Five residents had died Accepted recommendations of remaining residents \( n = 117 \) Implemented \( n = 35 \) (30.0%)

Medication change recommendations at 8-month follow-up

Nine residents had died Accepted recommendations of remaining residents \( n = 107 \) Implemented \( n = 53 \) (49.5%)

Figure 2: Overview of the medication review results
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Interdisciplinarity

Involvement of caregiving staff

"Well, I think it was just fantastic that the nursing staff was involved. I think they had many relevant observations and it was evident that they knew their patients very well" (cGP)

Involvement of residents

"Yes, but this resident involvement requires that the resident is cognitively functioning and can understand what is going on. In addition, it would also place heavy demands on us as professionals to communicate in a decent way" (cGP)

Communication and collaboration during meetings

"I actually think the caregiving staff were pretty good at asking about things. What does it mean, and I hope that was an expression of security too, right?" (cGP)

Collaboration

"Well, the process became continuously faster due to the repetition of some things, e.g., PPI. Therefore, we didn't have to repeat everything about the medications" (GP)

Use of resources

"We check the resident's medication once a year with our GP. At least we should" (A contact person)

Attitudes toward medication changes

"However, we have residents here, where if we go in and tell them this [that their medicine needs to change], their whole world collapses because there are side effects of reducing some medications when given for many years" (QD nurse)

Improving the implementation rate

"It [the written record of recommendations] helped us [even though] we and the GP had ourselves made notes. However, perhaps none, I think, he might not have saved [what he wrote down]. However, the project steering group [the cGP and pharmacist] presented it [the written record] just like that. This is it!" (QD nurse)

Improving the project

"We had prepared the long-term care facility staff for what it was about, but they were still somewhat fumbling and insecure in the beginning. However, the question is, could we have prevented some of it by giving more information about who we were and what we wanted to do?" (cGP)

Implementation difficulties

At the 8-month follow-up, only 49.5% of the accepted medication recommendations had been implemented. Therefore, all interviews included questions about implementation difficulties.

Use of resources

The cGP and QD nurse described the project as time-consuming and cumbersome. The QD nurse believed the low implementation rate was due to a lack of time left for the GP to implement the medication recommendations. The GP thought that a level of 49.5% was a good implementation rate. He described how he prioritized his time, which left no time to implement all medication recommendations he had agreed upon. The GP, QD nurse, and contact persons explained that the GP intended to go through all the residents’ medications once a year, but that this sometimes did not happen.

Attitudes toward medication changes

One contact person believed that the low implementation rate was a consequence of recommendations, which turned out to be unnecessary. The GP said that sometimes the residents or himself did not agree on the recommendations even though he accepted them at the interprofessional team meeting. Both the QD nurse and the GP explained that some of the residents were resistant to any change in their medications. The other contact person believed that the low implementation rate was due to no effort being dedicated to the implementation process.

Improvements

Since this study focused on improving the implementation rate, questions about this process were addressed.

Improving the implementation rate

There was agreement among the cGP, GP, and QD nurse that the written record of medication change recommendations should have been distributed immediately after the medication review. The GP’s approach to implementation was not structured, and he implemented what he remembered when he consulted his residents. The written record thereby aided him in remembering the recommendations. The cGP and the QD nurse believed that a more directed follow-up meeting with the GP held by the pharmacist would have improved the implementation rate. The QD nurse pointed out that the GP might have prioritized the implementation process more if he had been paid more for both the medication review and the implementation process.

Discussion

To obtain an in-depth, practical investigation of medication reviews performed by an interprofessional team in a real-life setting, an exploratory single case study research design was applied. We aimed to build an initial understanding of the interplay between the participants of an interprofessional team. It must be emphasized that this study is based only on the study of one interprofessional team at one long-term care facility. It is not our intention to generalize from this single case study. However, it has been important to consider whether the method was feasible to use by GPs and had the potential for upscaling in a primary care setting.

The results showed that the involvement of caregiving staff in the interprofessional team was perceived as of great value because the caregiving staff had in-depth knowledge about their residents. The participants of the interprofessional group contributed different knowledge and perspectives that gave a more complete...
account of the residents and their medications, leading to more personalized recommendations [Table 2].

Even though general collaboration in the interprofessional team was assessed appropriately, the participants of the interprofessional team evaluated the communication dynamics differently. Both the GP and the cGP dedicated much effort to their communication, but one of the contact persons did not always understand the discussions at the meeting and felt hesitant to ask questions.

Previous studies have emphasized that information sharing, professional understanding, and trust between health professionals are elements central to safe and effective medication care.[10] Furthermore, a study exploring the deprescribing of medications and management of polypharmacy from the perspectives of nurses in home care settings identified inadequate partnership and ineffective collaboration between interprofessional health-care providers as major barriers to safe deprescribing.[23] Another study exploring the collaboration between GPs and pharmacists in the context of optimizing medications for patients with multimorbidity found that a good working relationship between the GP and the pharmacist, where each profession understood the other’s skills and expertise, was key.[11] Therefore, trust and interdependence in interprofessional teams of health professionals are foundational to enabling the depth of collaboration and sharing of knowledge needed to provide medication reviews of high quality.[26]

The findings of this study in relation to the results of previous studies underline the importance of good communication and collaboration in interprofessional teams to improve medication management for residents at long-term care facilities.

Another study of interprofessional medication reviews also assessed caregiving staff as very important to such teams, as such staff can report changes in patient status, side effects, compliance, and so on immediately.[27] However, this requires that caregiving staff and contact persons are introduced to their role in interprofessional team meetings.

By the last follow-up, 49.5% of the accepted recommendations had been implemented [Figure 2], which was both less than expected and less than that seen in other medication review projects.[27,28] This was explored further in the interviews, where we found three main explanations for the low implementation rate: a negative attitude toward medication changes from the residents, a lack of dedication to the implementation process, and a lack of time for the GP to implement the medication change recommendations. These barriers have been reported in the literature, where the implementation of recommendations from medication reviews was found to be time-consuming and difficult to use in clinical practice in a mental health setting.[29]

It was suggested that the written record of the recommendations should have been distributed shortly after the meeting, as this record helped the GP and the caregiving staff remember the accepted recommendations.

The lack of effort exerted in the implementation process might have occurred because responsibility for this part of the study was not clearly defined and aligned in the interprofessional team. The participants of the interprofessional team agreed that the GP was responsible for the implementation of the recommended medication changes, as he assumed treatment and direct prescription responsibilities for the residents [Table 1]. However, the GP was not fully aware of his role and had not prioritized implementation in his clinical practice. An important improvement to this project, which has likewise been found in previous studies, would involve ensuring that GPs are aware of their new role and recognize the need for a change in professional roles and practices.[20,24]

Another way to improve the implementation rate could be to reduce the GP’s workload. This could be done by the GP delegating implementation to other members of the interprofessional team.

**Conclusions**

In conclusion, this study shows how performing medication reviews in an interprofessional team at a long-term care facility can improve the perceived quality of medication reviews. The participants of the studied interprofessional team contributed different knowledge and perspectives that gave a more complete account of the residents and their medications, leading to more personalized recommendations. The benefit of involving caregiving staff was also highlighted by their in-depth knowledge of their residents, which could be utilized much more in a medication review process in future projects.

However, it is important to keep communication at a level that is satisfactory for each member of an interprofessional team and ensure that team participants are aware of their roles.

In summary, it was assessed that the present medication review model was well-functioning in the collaboration between general practice and nursing homes and should be tested on a larger scale in the future. This calls for further studies to assess how an interprofessional team-based medication review method could improve medication review outcomes and implementation processes in a larger scale.

**Ethics approval**

This project was approved by the Danish Data Protection Agency (I-Suite no 05564). According to Danish law, approval from the Danish Council on Ethics was not required and could not be obtained for this study, as we only recommended changes to medications. The GP decided which changes to accept and implement as part of his normal care for the residents. Each resident at the long-term care facility gave informed consent.
to be enrolled in the project. Each participant involved in the interview study gave informed consent to participate.

Authors’ contributions
Conceptualization: CV, DAD, and AM; methodology: CV, DAD, and AM; software: AM; validation: AM, SF, DAD, and CV; formal analysis: SF, DAD, and AM; investigation: AM; data curation: SF and AM; writing – original draft preparation: SF; writing – review and editing: AM, SF, DAD, and CV; visualization: SF; supervision: CV; project administration: AM, CV. All authors have read and agreed to the published version of the manuscript.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published, and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Key points
• To our knowledge, it has not yet been studied how a multidisciplinary-led medication review performed by four different health-care professions could optimize the medication review process and implementation phase.
• In this study, performing medication reviews in interprofessional collaboration improves the perceived quality of medication reviews with a more complete account of the residents and their medications, leading to more personalized recommendations and resulting in optimized medication reviews for individual patients.
• The tested model was feasible to use and is considered scalable in primary care to other GPs and nursing homes.

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Conflicts of interest
There are no conflicts of interest.

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