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RESEARCH ARTICLE

Multidisciplinary telephone conferences about medication therapy after discharge of older inpatients: a feasibility study

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Abstract

Background Studies have shown poor post-discharge implementation by the general practitioner of changes made to patients' medication during admission. *Objective* To assess the feasibility of conducting telephone conferences delivering information about changes in older patients' medications from hospital to general practitioners. *Setting* Two departments of geriatric medicine in a Danish routine healthcare setting. *Method* Older polypharmacy patients (≥ 65 years and ≥ 5 prescriptions) consecutively admitted were eligible for inclusion. Telephone conferences based on a review of these patient's medication therapy during hospital stay were arranged between a pharmacist and a geriatrician from the hospital, and a general practitioner. Interviews were conducted with pharmacists, geriatricians, and general practitioners about their perspectives on the feasibility of telephone conferences. Interviews were analyzed using systematic text condensation. *Main outcome measure* The proportion of telephone conferences conducted and perspectives on the feasibility of the study. *Results* A total of 113 patients were included and 82 patients (75%) were eligible for telephone conferences. A total of 40 (49%) telephone conferences were conducted. The main reasons for conferences not being conducted were general practitioners not wanting to participate or not returning the calls from the pharmacists. Three themes emerged from the qualitative analysis: considerations on planning and running the project, Barriers, facilitators, and implications of the telephone conference, and Actual and desirable cross-sectorial communication. *Conclusion* Telephone conferences were only possible for half of the patients. The participating general practitioners, pharmacists and geriatricians expressed varied benefit and agreed that telephone conferences were mainly relevant for complex patients.

Keywords Continuity of care · Multidisciplinary communication · Multimorbidity · Medication review · Telephone conferences

Impacts on practice

- Telephone conferences make it easier to explain reasons and argumentation for changes in medication made during hospitalization, thus making it easier for the general practitioner to get and maintain an overview of current medication therapy after discharge.
- Telephone conferences is a possible transitional pathway for better multi-professional dialogue across primary and secondary care, which enhances the clarity of roles required to improve the quality of medication therapy and e.g. prevent resumption of inappropriate medication.
- Because participants had experienced the telephone conferences as very time consuming and difficult to fit in to the

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daily clinical setting, telephone conferences should only be prioritized for complex patients.

Introduction

The transition from hospital to primary care constitutes a critical phase in older patients' medication therapy [1–4] and medication related harm after discharge is common [5]. In order to achieve a coherent and safe medication therapy in the transfer between primary and secondary care, good communication between healthcare providers is considered necessary which, however, at present is thought to be inadequate [6]. Often, reasons and argumentation for changes in medication made during hospitalization are insufficiently described in the discharge summary, making it challenging for the general practitioner (GP) to get and maintain an overview of current medication therapy [7–9]. This has been suggested to lead to poor compliance to changes made to the patients' medication during admission [10, 11]. One potential explanation could be the lack of oral communication between hospital and primary care providers [8, 12, 13]. To enable interprofessional collaboration, both primary and secondary care providers should be involved in implementing medication reviews and organizing their follow-up [14]. Direct communication between hospital and primary care occurs infrequently [9] and telephone conferences between primary and secondary care could be a solution to optimize the oral communication and take action on organizing follow-up in order to implement changes based on medication reviews.

Aim of the study

The aim of this study was to assess the feasibility of conducting telephone conferences between hospital geriatricians, hospital pharmacists and GPs after discharge of older patients.

Ethics approvals

Each included patient provided written informed consent. In terms of data protection, the study was registered at the Odense University Hospital's inventory (record no. 17/37441). Finally, the study was registered at clinicaltrial.gov (NCT03369652). The National Committee on Health Research Ethics waived to assess the study protocol.

Methods

Study design, patients and setting

This study was a feasibility study [15] conducted with patients admitted to one of the two departments of Geriatric Medicine at Odense University Hospital and Svendborg Hospital, Denmark. The study was initially set up as a controlled study with individual-level randomization, with the control group not receiving a pharmacist intervention. However, this design was abandoned due to challenges in carrying out the intervention resulting in too few telephone conferences. As such, only the feasibility of the study is reported in this paper. This is in line with recommendations for testing complex interventions with a feasibility study before designing a larger trial [16]. Patients were included if they were admitted to the Geriatric ward at one of the two hospitals, 65 years or older, using five or more prescribed drugs on a daily basis (polypharmacy patients), and spoke and understood Danish. Patients were excluded if they were unable to provide informed consent, e.g. due to cognitive impairment (dementia, delirium etc.), died during admission, were transferred to another department or in any other way missed the full intervention at discharge.

Patients were enrolled from February 16th 2018 to November 15th 2018. Demographics, medication status and residential information as well as activities of daily living assessed by Barthel Index [17] status for all patients were recorded. The patients received a patient-centered medication history and a medication reconciliation by a pharmaconomist (comparable to a pharmacy technician, although with an education of 3 years) as part of usual care during admission. If the medication history and medication reconciliation were not performed by a pharmaconomist at the time of admission, a pharmacist conducted the medication history and the medication reconciliation before the patient was enrolled in the project. This was done for approximately half of all patients.

All data were processed in the online-based Research Electronic Data Capture system REDCap [18] via Open Patient data Explorative Network (OPEN) [19].

Intervention

No pharmacist was involved in the treatment of the patients at the departments before this study. A structured, patient-centered medication review was conducted by a pharmacist corresponding to the method used in the OPTIMIST study [20, 21]. The drug related problems and suggestions were categorized by the categories from a national drug related problem database [22, 23]. The medication review was conducted after the patient was admitted, when laboratory data, e.g. kidney function were available, and the primary medical admission note was written.

After conducting the medication review, the pharmacist wrote a note in the patient's electronic health record describing the patient's current medication and medication changes since hospital admission (Fig. 1).

This note specified both dose and strength for new medications, deprescribed medications and changed medications, respectively, and was updated at patient discharge. The pharmacist checked for discrepancies between the Shared Medication Record and current medication therapy in the electronic patient record. The Shared Medication Record is a personal profile for the single patient which is integrated in the electronic medical record and provides full access to current medication, updated by the physician who last treated the patient [24]. Changes and discrepancies were communicated to the geriatrician responsible for the patient's discharge. The medication changes and the patient's medication status were sent by the pharmacist to the GP and, if relevant, to the patient's nursing home or home care along with the discharge letter. If possible, the pharmacist participated in the patient's discharge consultation.

Following discharge, the pharmacist arranged a telephone conference, if possible, between the geriatrician, the pharmacist and the GP, to discuss the patient's medication changes and hospitalization. The conclusions of the conference were documented by the pharmacist in the electronic patient record and electronically sent to the GP.

Quantitative outcomes

The main outcome was the proportion of telephone conferences conducted out of all patients eligible for telephone conferences.

Furthermore, as a process parameter of the feasibility, we evaluated the timing of the conducted telephone conferences in addition to the time spent delivering the interventions, the types of medication changes suggested by the pharmacist, the acceptance rate of the suggestions, and

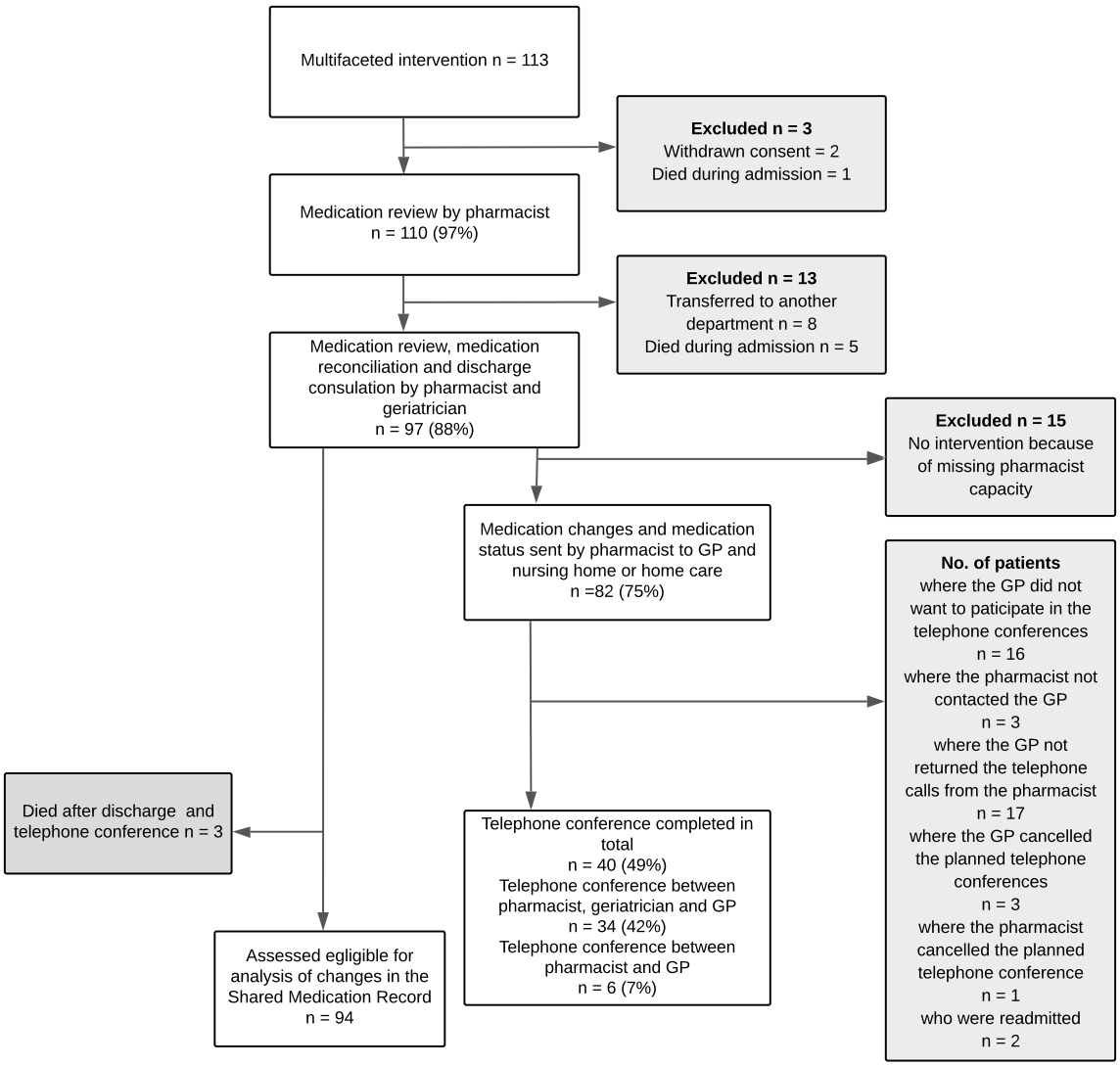

Fig. 1 Diagram of intervention and patient flow for 113 patients in the Geriatric ward at Odense University Hospital and Svendborg Hospital

the medication list evaluated by number of changes during hospitalization as well as changes in the medication list two weeks after discharge. Data for these endpoints were analyzed based on information from the Shared Medication Record and the electronic patient record. Descriptive statistics were used to analyze the quantitative outcomes.

Qualitative data

As a supplement to the quantitative outcomes, a qualitative study of the practical and professional feasibility of the study, based on the attitudes and perspectives among the geriatricians, pharmacists and GPs, was conducted.

The qualitative data of this study is reported according to COREQ [25] ("Appendix"). For evaluation of attitudes towards and perspectives on the feasibility of the study, we used a hermeneutic-phenomenological approach, which explores the perspectives of the participants about the telephone conferences openly and incorporates preunderstandings of the researchers to interpret the explored experiences [26, 27]. First, geriatricians and pharmacists were invited to participate in separate focus group interviews. For practical reasons, two participants could not enter the focus group interviews, leading to two face-to-face interviews with a geriatrician and a GP from the project group. An interviewer and a moderator conducted the interviews and took notes (authors AB and TG). TG and AB as pharmacists knew all the pharmacists from conducting the study. Furthermore, the geriatricians knew TG and AB by name, and the geriatrician and the GP in the project group had worked with TG and AB in planning of the study. Furthermore, individual telephone interviews were conducted with GPs by TG. The GPs had no former knowledge of TG. A semi-structured interview guide was developed and used to guide the interviews. The topics of the three interview guides were: suitability of the patient group, experience with the intervention, aspects of the interprofesional cooperation and use of the communication form. All interviews were audiotaped and transcribed verbatim by research assistants and hereafter double-checked for fidelity by TG or AB. The qualitative data were analyzed using systematic text condensation according to Malterud [28], which includes an overall impression of data to develop preliminary themes, identifying meaning units and sorting them into codes, condensing the content of each code, and finally synthetizing the condensates to describe the identified themes. The coding was conducted by TG and reviewed by LRN and AB and the analysis of all the interviews was discussed by TG, LRN and AB as an iterative process. Data analysis was conducted using Nvivo 11 (QSR international, Doncaster, Victoria, Australia).

Results

A total of 113 patients were included in the study. Baseline characteristics of the included patients are presented in Table 1.

The median age was 83 years (interquartile range 77–87 years) and 69 (61%) were women. In total, 16 patients were excluded, of which two patients withdrew their informed consent but agreed to enter the primary analysis, six patients died during admission, and eight patients were excluded because of transfer to another department. An additional 15 patients received no intervention at discharge because of missing pharmacist capacity and were hence not eligible for telephone conferences, resulting in 82 patients receiving the intervention at discharge (Fig. 1). Medication changes and status were sent by the pharmacist to the GP and nursing home or home care for 82 (75%) patients. A total of 40 out of 82 (49%) telephone conferences were conducted. All three professional groups; geriatrician, pharmacist and GP, were represented in 34 of the 40 telephone conferences. The main reason for conferences not being conducted (Fig. 1) were GPs stating that they did not want to participate (n = 16) or not returning calls from the pharmacists (n = 17).

Timing of the conducted telephone conferences in addition to the time spent delivering the interventions are displayed in Table 2.

Table 1 Patient characteristics of the 113 patients included at baseline. Patients were recruited in the Geriatric wards of Odense University Hospital and Svendborg Hospital

n = 113	n (%)
Women	69 (61)
Age, median (IQR)	83 (77–87)
Number of medications at admission, median (IQR)	11 (8–15)
Number of medications at discharge, median (IQR)	12 (9–16)
Residential status	
Nursery home/rehabilitation home	9 (8)
Own home living alone	69 (61)
Own home with relatives	35 (31)
Medication administration status	
Self-administrating patients	81 (72)
Patients with unit dose drug dispensing	7 (6)
Patients with help from nurse to medication management	25 (22)
Barthel Index* median (IQR)	48 (36–69)

IQR Interquartile range

*Data available for 83 patients

Medication reviews and medication changes

The clinical pharmacist conducted medication reviews for 110 of the 113 (97%) patients and suggested 136 medication changes (averaging 1.2 changes per patient). The median time spent on conducting a medication review was 20 min. The categorization of changes suggested in the medication reviews is illustrated in Table 3.

The most common category of changes suggested in the medication reviews was"Choice of drug" (n = 73; 54%).

A total of 80% and 60% of the medication changes were implemented in the Shared Medication Record at discharge by the hospital doctors and 2 weeks after discharge by the GP, respectively.

Attitudes and perspectives among geriatricians, pharmacists and GPs

Three focus group interviews were arranged, one with six pharmacists and two with two and three geriatricians from Svendborg and Odense, respectively. One geriatrician and one GP from the project group participated in separate face-to face interviews. The interviews lasted between 20 and 75 min. Of 22 invited GPs, six GPs participated in telephone interviews, which lasted between 8 and 22 min.

The themes that emerged from the interviews were: project operations, the telephone conference and cross-sectorial collaboration. Table 4 displays the themes and a selection of quotes from the interviews.

Theme 1: Considerations on planning and running the project

Benefit of the interventions

The geriatricians thought that GPs could benefit from the discharge summaries written by the clinical pharmacists, because they provided a good overview. This was supported by a GP.

The choice of the patient group

The geriatricians and clinical pharmacists highlighted that several of the included patients were too uncomplicated to discuss with the GP. According to them, the most suitable patient group would have been patients with multi-morbidity, patients with significant medication changes, cognitively impaired patients as well as the most fragile patients. Additionally, the geriatricians highlighted the importance of including terminal patients, while the pharmacists suggested the inclusion of patients with repeated admissions or those receiving certain risk medications.

The GPs highlighted the fact that they would like to have better information provided by the hospital about patients

Table 2 Timing of telephone conferences and time spent on interventions for the 110 patients in the Geriatric ward at Odense University Hospital and Svendborg Hospital

n = 110	Median (range)
No. of workdays after discharge until telephone conferences where conducted (days)	9 (1–34)
Time spent per medication review (minutes)	20 (5–120)
Time spent per sent correspondence to GP inclucluding preparation (minutes)	20 (5–60)
Time spent per telephone conference including preparation (minutes)	20 (2–90)

Table 3 Categorization of changes suggested in the medication reviews for 110 patients in the Geriatric ward at Odense University Hospital and Svendborg Hospital

n = 110	No (%)
Choice of drug (contraindication, no indication for treatment, interactions, therapeutic duplication, more optimal choice of drug, preventive treatment is missing, new indication)	73 (54)
Drug formulation (inexpedient choice of drug formulation)	5 (4)
Dose (too high/too low, wrong dosage interval, lack of monitoring)	17 (13)
Duration of treatment (too long/too short)	4 (3)
Administration (time of administration, drug not administrated, wrong drug administrated, drug abuse, the patient cannot use the drug)	7 (5)
Logistics (the drug is not accessible, mistake in the prescription, mistake in dispensing, medication reconciliation or SMR/EPR related mistakes)	13 (10)
Patient related (patient forgets to take the medicine, patient stored the medication wrong)	5 (4)
Other	12 (9)
Total	136 (–)

SMR shared medication record, *EPR* electronic patient record

Table 4 Schematic example of the steps in the analysis from meaning units to main themes

Meaning units	Condensation	Sub theme	Main theme
"But here you had the reasons for it [medication changes] and […] it was very clear, as I remember, that it was stated, something along the lines of which specific changes were done, while a standard discharge summary does not necessarily mention which three medications were changed, specifically. You kind of have to figure that out yourself, so it gave a better overview." (GP 7)	In the new discharge letter, there were reasons for medication changes listed along with specific medication changes, which you sometimes have to figure out yourself in a standard discharge summary, and it provided a better overview	The interventions	Project operation
"It [the challenge] could be with multi-morbidity, where the patient suffers from many diseases and sometimes the question is, like, how much or how little do you need to follow up on the different issues […]if we subsequently receive them [after discharge], we could end up doing many blood tests for things that should not have been checked, and you could say, that you put down a specific plan for, what to follow up on and what not to, what is being followed up at the hospital and what do we have to follow up on" (GP 2)	The relevant patient group for the project would be the ones with multi-morbidity because the question is how much you need to follow up, as we can end up doing many unnecessary blood tests, so it could be beneficial to have a focused plan	The patient group	Project operation
"But we have used you to answer questions and issues that were present; it has been nice to have a lexicon walking around [the ward]." (Geriatrician 6)	We have used you to answer present questions, and it was nice to have a lexicon available at the ward	Introduction of clinical pharmacists in the geriatric ward	Project operation
"So, in my view, the problem is mainly administrative and organizational rather than professional." (GP 1)	In my view, the problem is mainly administrative and organizational rather than professional	Barriers and facilitators	The telephone conference
"I think, that [the issues] I spoke with the GP about, are things that she [the pharmacist] might as well have talked with the GP about, there was no reason for us both to be there." (Geriatrician 5)	There was no reason for both the pharmacist and the geriatrician to be present at the consultation with the general practitioner, the pharmacist could have had the consultation alone or I could	Time and benefit	The telephone conference
"I think that, maybe, it is of importance for the medication therapy if you have a conversation where you, with words. Explain that this and this [medication] have been discontinued for this or that reason. Then I think that the risk of it [the medication] being resumed without consideration would be lower." (Geriatrician 1)	I think the risk for medication to be resumed without consideration at the general practitioner is lower if you have been told which specific medication have been discontinued and for what reason	Implications for the patient	The telephone conference

Table 4 (continued)

Meaning units	Condensation	Sub theme	Main theme
"And therefore they should align their medication lists from there [the hospital] and write the missing prescriptions, because I do not have any chance of knowing what has happened in there [the hospital], specifically if the answer comes a little later. So there is that, and then there is the good nurse who says [to the patient], on their way out, that they can just go to their general practitioner and get it fixed, those I also reject. But I've had some [cases] where I just thought 'this isn't good enough'." (GP 6)	The hospital should align their medication lists and write the missing prescriptions, because I do not have any chance of knowing what has happened in the hospital, especially if the discharge letter comes a little later. There is the good nurse, who says to the patient on their way out that they can just go to their general practitioner and get their prescription, but I reject those	Discharge letters and the shared medication record	Cross-sectorial collaboration
"Generally, my position is that I am positive towards this collaboration around complex patients." (GP 3)	I am positive towards collaboration around complex patients	Cross-sectorial telephone communication	Cross-sectorial collaboration
"No, I think, generally, that people are positive if you contact them, and I hope that we are as well, when we are contacted here sometimes. It's not something to be used at any time, the telephone, I mean, neither are electronic correspondence messages, unless it's something you can't solve yourself, because we're all busy. But I do think that we are good at helping each other, mostly." (GP 3)	In general, I think people are positive if you contact them, and I hope that we are as well, when we are contacted here sometimes. I think that you should not use the telephone or electronic correspondence messages at any time, unless it is something that you cannot solve yourself, because we are all busy. I think we are mostly good at helping each other	Choosing a path of communication across primary and secondary care	Cross-sectorial collaboration

with multi-morbidity, complex patients, and patients for whom the GP found it difficult to make a future plan.

Introduction of clinical pharmacists in the geriatric ward

The geriatricians emphasized that the pharmacists supported the cooperation in the ward, as they were available and made sure that the medication process was under control. The geriatricians found that the clinical pharmacists had pointed out some important medication errors. The geriatricians also thought that they could benefit from the clinical pharmacists' knowledge in the doctors conference when they discuss the patients' medication. The geriatricians had been pleased with having the clinical pharmacists in the ward because it gave them the opportunity to ask the pharmacists about many things.

The geriatricians did not recall that the pharmacists dealt with many of the patients and they acknowledged that the pharmacists spent a long time arranging telephone conferences. The clinical pharmacists did not feel that they could show their full potential in the project, because they spent so much time on including patients and scheduling telephone conferences with GPs, and therefore did not get to perform many medication reviews.

Theme 2: Barriers, facilitators, and implications of the telephone conference

Barriers and facilitators

The geriatricians thought that the telephone conferences did not work, because it was too challenging to make a fixed appointment in a busy workday. The clinical pharmacists stated that it could be difficult for both geriatricians and the GPs to find the time and resources for the conferences. According to the GPs, the inflexible appointments meant that they had to take the time off of their patients, and it was not easy to fit in the daily schedule. According to the geriatricians, it is a barrier that general practice and hospitals are organized so differently. Geriatricians, pharmacists and GPs expressed surprise about the fact that it was so difficult to schedule a phone call.

Time and benefit

Both geriatricians and pharmacists thought that there was a significant waste of time in relation to the telephone conferences compared to the benefit from them, and the geriatricians felt that they were too busy for the telephone conferences. The geriatricians thought that it was unnecessary for both the geriatrician and pharmacist to participate in the conversation when it concerned uncomplicated patients. Both geriatricians and pharmacists had experienced good telephone conferences, in which the GP expressed to be satisfied with the conference, and that they benefited from the conference.

Implications for the patient

Overall, the geriatricians felt that the telephone conferences did not have major implications for the patient. While some conferences might have helped the patient a little, it did not save lives. One geriatrician expressed that a patient was re-admitted, even though a telephone conference was conducted, because the patient suffered from other conditions that were not brought up. Sometimes the telephone conference revealed that the patient had not gone for follow-up, or that they should be referred to the outpatient clinic, but it was not medication-related. The geriatricians thought that an explanation in a telephone conference could reduce the risk of medication being resumed without consideration by the GP.

Theme 3: Actual and desirable cross-sectorial communication

Discharge letters and the shared medication record

A GP thought that the hospital, sometimes, disclaimed the responsibility by telling the patient, that they could consult their GP regarding a problem, where there was not really much they could do. Sometimes the GPs are unhappy with the fact that patients come to them for prescriptions for which the treatment responsibility lies with the hospital.

Cross-sectorial telephone communication

The geriatricians thought that the telephone conference could help advance the collaboration, because it was then clearer that the hospital and general practice worked together. GPs are, as a rule, positive towards telephone conferences from the hospital, e.g. concerning complex patients. However, there had to be a stated purpose with the phone call.

Choosing a path of communication across primary and secondary care

GPs thought that it would be easier to communicate via the telephone, if you were to have a discussion, whereas electronic correspondence messages were particularly useful for specific, non-urgent questions that could be answered relatively easily. According to GPs, it becomes too difficult to answer clarifying questions through written communication, because it is easier to understand and find answers together

by talking. However, both paths of communication should only be used when it's relevant, according to GPs.

Discussion

In this study we tested a multifaceted intervention by establishing telephone conferences to hand over information about changes to geriatric patients' medication from hospital geriatrician and pharmacist to the patients' GP. Our findings suggest that this is possible for half the patients eligible for a telephone conference, although time consuming and difficult to fit into daily practice, and that prioritization and selection of the right patients is important.

From our findings we believe that the GPs could benefit from the discharge summary from the pharmacists but the gold standard aiming to improve patient handovers from hospital to primary care is multifaceted.

Medication reviews and medication changes

In this study, 110 of 113 (97%) patients received a medication review, which indicates that a medication review is possible under the given circumstances, and shows that this structured method is feasible. The time spent on conducting a medication review (median 20 min) is a reasonable time frame and in accordance with the findings of a prior study, that reported a mean of 26 min [20]. The acceptance rate of 80%, which is high compared to previous literature [29], implies that the findings are clinically relevant.

A total of 80% and 60% of the medication changes suggested by the clinical pharmacists were implemented in the Shared Medication Record at discharge and two weeks after discharge, respectively. This correlates with the findings in two other studies where 83% and 64% [10, 30] of the medication changes were implemented when the patients were transferred from hospital to primary care. There can be different reasons for discontinuation of the prescriptions two weeks after discharge, e.g. the patient may have consulted the GP who made further changes in the patient's medication, the patient disagreed with the treatment plan from the hospital geriatrician, or the condition of the patient might has changed. Without conducting a telephone conference, it is difficult to know if the GP agreed or disagreed with implementing the changes because of the patient's condition and history.

Attitudes and perspectives among geriatricians, pharmacists and GPs

Our findings suggest that the different organization of hospital and primary healthcare and coordination between these is one of the main barriers to implementing cross-sectorial telephone conferences, e.g. difficulties in scheduling an appointment across the primary and secondary care in a busy workday. Furthermore, summer vacation was the main reason for the relatively high number of weekdays (median = 9) between patient discharge and the conducted telephone conferences. Holleck et al. [31] also mention the time frame of the telephone conferences and GPs' vacations as challenging, and found that only 39% of the GPs in their study wanted an automatic follow-up appointment within two weeks of discharge.

Different organization and procedures across primary and secondary care are difficult to change, but it is required, according to our findings, in order to establish quick cross-sectorial contact. Phipps et al. report that there are a number of technical and organizational challenges to medication management, and that meeting these challenges involves decision-making, planning and team coordination [32].

The geriatricians in our study believed that the GPs could benefit from the discharge summary from the pharmacists because it provided a good overview of the changes made in the patient's medication. This view was supported by some GPs. However, the gold standard aiming to improve patient handovers from hospital to primary care is multifaceted [33]. As an example, a randomized controlled trial assessing the impact of a 'pharmacist transition coordinator' on medication management and health outcomes in older adults undergoing transfer from a hospital to a long-term care facility, reported improved aspects of inappropriate use of medications across primary and secondary care [34]. This intervention included medication-management transfer summaries from hospitals, coordinated medication reviews by accredited community pharmacists, and case conferences with general practitioners and pharmacists [34]. Another example reported on the use of a structured medication reconciliation form, in many ways similar to our discharge summary, as an example of good practice in relation to primary healthcare providers' adherence with medication adaptions and recommendations [35]. This complies with the requests from the GPs for reasons and explanations for medication changes and recommendations according to the results from a qualitative Danish study [8].

Both geriatricians and GPs concluded that it could be necessary to talk about patients' medication therapy across primary and secondary care in order to ensure continuity, but it is only relevant to conduct a telephone conference when the patients are cognitively impaired, complex, multimorbid, frail, or if there have been complicated changes in their pharmacological treatment. This is in accordance with previous studies where GPs found that telephone conferences were useful and that the best cases to discuss were the complex patients [36, 37]. Another study also concludes that information at discharge should be tailored to the individual needs of the patient [38].

Strengths and limitations

The main strengths of this study are the development of the multifaceted intervention and the mix of quantitative and qualitative data that supplement each other in order to assess the feasibility of the intervention and the attitudes and perspectives in relation to it. Another strength of this study is the fact that all interviews were reviewed and double-checked for fidelity by two authors. Finally, the analysis was performed using an established method for synthesizing qualitative data [28].

The study also has several weaknesses. First, the randomization of the planned RCT was not completed due to the challenges in providing an adequate amount of telephone conferences. Second, the telephone interviews were relatively short which could mean that the data generated was not as rich as they could have been. However, this reflects very well the busy daily setting of the GPs and is also one the reasons why only six of the 22 invited GPs participated in telephone interviews. Many of the participants in focus group interviews knew TG and AB beforehand, and TG and AB were thus aware of the possibility for more unspoken perspectives. However, it was underlined in the beginning of each interview that the participants could speak freely and not worry about upsetting TG or AB. It was our impression that all participants did speak freely as they all mentioned negative things about the study as well as positive things.

Another limitation is the fact that patients with severe dementia and delirium were not represented in our population because of the requirements for informed consent. Future research should assess whether patients with dementia or cognitive impairment could benefit from a telephone conference because of the diminished capability of bringing a message across primary and secondary care on account of their diagnosis. Unfortunately, we did not register how many of the patients who had medication changes implemented after a completed telephone conference. This could also be a topic of future research. As the electronic patient record system is only designed for one-way communication, it is not ideal for handling complex questions or dialogue, and other communication systems might have to be developed and tested.

Conclusion

Telephone conferences between geriatricians, GPs and pharmacists were possible for half of the patients. The geriatricians, pharmacists and GPs agreed that telephone conferences were only relevant and useful when the patients were complex. Under the given circumstances in the present clinical Danish setting, it was difficult to establish a telephone conference between geriatrician, pharmacist and GP due to practical issues, timing and prioritizing.

Appendix: Additional information on reporting according to the consolidated criteria for reporting qualitative research (COREQ)

Domain 1: Research team and reflexivity	
Personal characteristics	
Interviewer/facilitator	Trine Graabæk (TG) and Alaa Burghle (AB). TG was the interviewer in the two focus groups with geriatricians and all telephone interviews with general practitioners and the facilitator in the focus group with pharmacists and interviews with geriatrician and general practitioner from the project group. AB was the interviewer in the focus group with pharmacists and interviews with geriatrician and general practitioner from the project group and the facilitator in the two focus groups with geriatricians. There was no facilitator during the telephone interviews
Credentials	PhD, MSc. Pharm. (TG) and MSc. Pharm. PhD student (AB)
Occupation	Health services researcher (TG and AB)
Gender	Female (TG and AB)
Experience and training	TG has previously carried out some semi-structured interviews and focus group interviews in both hospital and community settings. TG trained AB during the first focus groups for AB to be able to carry out the last focus group as an interviewer
Relationship with participants	

Relationship established	Both TG and AB were known before the project start by the pharmacists participating in focus group. The geriatricians were familiar with the names of TG and AB but had never met them before the interview. The geriatrician and the general practitioner in the project group had worked with TG and AB from the planning of the study. The general practitioners were contacted by telephone and had no previous knowledge of TG
Participant knowledge of interviewer	TG and AB were aware of the possibility for more unspoken perspectives, as many of the participants knew TG and AB beforehand. However, it was underlined in the beginning of each interview that the participants could speak freely and not worry about upsetting TG or AB. It was our impression that all participants did speak freely as they all mentioned negative things about the study as well as positive things
Interviewer characteristics	Both TG and AB tried to be open towards any opinion represented by the participants and did never state that something was right or wrong
Domain 2: Study design	
Theoretical framework	
Methodological orientation and theory	For evaluation of attitudes towards and perspectives on the feasibility of the study, we used a hermeneutic-phenomenological approach, which explores the perspectives of the participants about the telephone conferences openly and incorporates preunderstandings of the researchers to interpret the explored experiences. The analysis was performed by systematic text condensation according to Malterud (see methods section)
Participant selection	
Sampling	Purposive sampling
Method of approach	TG or AB sent email invitations to geriatricians and pharmacists and the geriatrician and general practitioner from the project group. General practitioners were contacted by TG via telephone
Sample size	In total 19 healthcare professionals: 6 pharmacists, 5 geriatricians, 1 geriatrician and 1 general practitioner from the project group and 6 general practitioners
Non-participation	All invited pharmacists participated. The geriatricians who were at work at the day of the interview were asked to participate, therefore we do not know how many geriatricians involved in the project did not participate in focus groups. Of the 22 invited general practitioners, 16 did not participate. Two of the 16 non-participating general practitioners rejected the invitation due to not having time for the interview. The receptionists at the remaining 14 general practitioners, promised to contact TG if the general practitioner wanted to participate. None of them made further contact
Setting	
Setting of data collection	Odense University Hospital and Svendborg Hospital
Presence of non-participants	None
Description of sample	The participants had all been involved in the project with telephone conferences between pharmacists, geriatricians and general practitioners
Data collection	
Interview guide	The semi-structured interview guide consisted mostly of open-ended questions. The interview guide was not piloted
Repeat interviews	No interviews were repeated
Audio/visual recording	Interviews were audio recorded. The transcription was carried out by two research assistants, and the transcripts were checked for accuracy according to the audio records by TG or AB
Field notes	The facilitator made field notes during the interviews
Duration	The interviews had a duration of 8–75 min
Data saturation	Data saturation was not discussed. However, it is presumed that sufficient data was collected to reveal the themes in the analysis

Transcripts returned	No transcripts were returned to participants for comments
Domain 3: Analysis and findings	
Data analysis	
Number of data coders	One (TG)
Description of coding tree	Codes were grouped in code groups, which were organized in subthemes and arranged in main themes
Derivation of themes	Themes were derived inductively from the collected data
Software	NVivo 11 (QSR International, Melbourne, Australia)
Participant checking	Participants did not provide feedback on the findings
Reporting	
Quotations presented	In order to illustrate the findings, quotations are presented in the paper along with the identification of the participant
Data and findings consistent	There is consistency between the data presented in the paper and the findings
Clarity of major themes	Major themes (main themes) are clearly presented in the paper
Clarity of minor themes	Minor themes (subthemes) are clearly presented in the paper

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Conflicts of interest Lene V. Ravn-Nielsen, Alaa Burghle, Palle M. Christensen, Faruk Coric, Trine Graabæk, Fjóla Karlsdóttir, Jolene P. Henriksen, Jens-Ulrik Rosholm and Anton Pottegård report no conflicts of interest.

References

1. Midlov P, Bergkvist A, Bondesson A, Eriksson T, Hoglund P. Medication errors when transferring elderly patients between primary health care and hospital care. Pharm World Sci PWS. 2005;27(2):116–20.
2. Christensen HR, Krølner BK. Medication problems in connection with transferral between sectors. UgeskrLaeger. 2009;171(10):808–11.
3. Kripalani S, Jackson AT, Schnipper JL, Coleman EA. Promoting effective transitions of care at hospital discharge: a review of key issues for hospitalists. J Hosp Med. 2007;2(5):314–23.
4. Coleman EA, Smith JD, Raha D, Min S. Posthospital medication discrepancies: prevalence and contributing factors. Arch Intern Med. 2005;165(16):1842–7.
5. Parekh N, Ali K, Page A, Roper T, Rajkumar C. Incidence of medication-related harm in older adults after hospital discharge: a systematic review. J Am GeriatrSoc. 2018;66(9):1812–22.
6. Vermeir P, Vandijck D, Degroote S, Peleman R, Verhaeghe R, Mortier E, et al. Communication in healthcare: a narrative review of the literature and practical recommendations. Int J ClinPract. 2015;69(11):1257–67.
7. Lehn SF, Zwisler A-D, Pedersen SGH, Gjørup T, Thygesen LC. Patient-specific versus organisational barriers to program adherence: a multivariate analysis. Int J Integr Care. 2019;19(1):7.
8. Strehlau AG, Larsen MD, Søndergaard J, Almarsdóttir AB, Rosholm J-U. General practitioners' continuation and acceptance of medication changes at sectorial transitions of geriatric patients—a qualitative interview study. BMC FamPract. 2018;19(1):168.
9. Kripalani S, LeFevre F, Phillips CO, Williams MV, Basaviah P, Baker DW. Deficits in communication and information transfer between hospital-based and primary care physicians: implications for patient safety and continuity of care. JAMA. 2007;297(8):831–41.
10. Larsen MD, Rosholm JU, Hallas J. The influence of comprehensive geriatric assessment on drug therapy in elderly patients. Eur J ClinPharmacol. 2014;70(2):233–9.
11. Redmond P, McDowell R, Grimes TC, Boland F, McDonnell R, Hughes C, et al. Unintended discontinuation of medication following hospitalisation: a retrospective cohort study. BMJ Open. 2019;9(6):e024747.
12. Allen J, Ottmann G, Roberts G. Multi-professional communication for older people in transitional care: a review of the literature. Int J Older People Nurs. 2013;8(4):253–69.
13. Jones CD, Vu MB, O'Donnell CM, Anderson ME, Patel S, Wald HL, et al. A Failure to communicate: a qualitative exploration of care coordination between hospitalists and primary care providers around patient hospitalizations. J Gen Intern Med. 2015;30(4):417–24.
14. Walraven B, Ponjee G, Heideman W, Çarkit FK. Medication reviews in hospitalized patients: a qualitative study on perceptions of primary and secondary care providers on interprofessional collaboration. BMC Health Serv Res. 2020;20(1):902.
15. Eldridge SM, Chan CL, Campbell MJ, Bond CM, Hopewell S, et al. CONSORT 2010 statement: extension to randomised pilot and feasibility trials. Pilot Feasibility Stud. 2016;2(1):64.
16. Bowen DJ, Kreuter M, Spring B, Cofta-Woerpel L, Linnan L, Weiner D, et al. How we design feasibility studies. Am J Prev Med. 2009;36(5):452–7.
17. Law M, Letts L. A critical review of scales of activities of daily living. Am J OccupTher. 1989;43(8):522–8.
18. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)–a metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform. 2009;42(2):377–81.
19. OPEN—University of Southern Denmark, SDU [Internet]. SDU. [cited 2019 Oct 24]. Available from: https://www.sdu.dk:443/en/om_sdu/institutter_centre/klinisk_institut/forskning/forskningsenheder/open.
20. Ravn-Nielsen LV, Duckert M-L, Lund ML, Henriksen JP, Nielsen ML, Eriksen CS, et al. Effect of an in-hospital multifaceted clinical pharmacist intervention on the risk of readmission: a randomized clinical trial. JAMA Intern Med. 2018;178(3):375.
21. Graabæk T, Bonnerup DK, Kjeldsen LJ, Rossing C, Pottegård A. Pharmacist-led medication review in an acute admissions

unit: a systematic procedure description. Eur J Hosp Pharm. 2015;22(4):202–6.
22. Kjeldsen LJ, Birkholm T, Fischer H, Graabæk T, Kibsdal KP, Ravn-Nielsen LV, et al. Characterization of drug-related problems identified by clinical pharmacy staff at Danish hospitals. Int J Clin Pharm. 2014;36(4):734–41.
23. Kjeldsen LJ, Birkholm T, Fischer H, Graabæk T, Hansen MK, Kibsdal KP, et al. A national drug related problems database: evaluation of use in practice, reliability and reproducibility. Int J Clin Pharm. 2014;36(4):742–9.
24. Munck LK, Hansen KR, Mølbak AG, Balle H, Kongsgren S. The use of shared medication record as part of medication reconciliation at hospital admission is feasible. Dan Med J. 2014;61(5):A4817.
25. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care. 2007;19(6):349–57.
26. Laverty SM. Hermeneutic phenomenology and phenomenology: a comparison of historical and methodological considerations. Int J Qual Methods. 2003;2(3):21–35.
27. Malterud K. Theory and interpretation in qualitative studies from general practice: Why and how? Scand J Public Health. 2016;44(2):120–9.
28. Malterud K. Systematic text condensation: a strategy for qualitative analysis. Scand J Public Health. 2012;40(8):795–805.
29. Graabaek T, Kjeldsen LJ. Medication reviews by clinical pharmacists at hospitals lead to improved patient outcomes: a systematic review. Basic ClinPharmacolToxicol. 2013;112(6):359–73.
30. Rouch L, Farbos F, Cool C, McCambridge C, Hein C, Elmalem S, et al. Hospitalization drug regimen changes in geriatric patients and adherence to modifications by general practitioners in primary care. J Nutr Health Aging. 2018;22(3):328–34.
31. Holleck JL, Gunderson CG, Antony SM, Gupta S, Chang JJ, Merchant N, et al. The 'hand-in' project: jump-starting communication between inpatient and outpatient providers. South Med J. 2017;110(11):694–8.
32. Phipps DL, Morris RL, Blakeman T, Ashcroft DM. What is involved in medicines management across care boundaries? A qualitative study of healthcare practitioners' experiences in the case of acute kidney injury. BMJ Open. 2017;7(1):e011765.
33. Hesselink G, Schoonhoven L, Barach P, Spijker A, Gademan P, Kalkman C, et al. Improving patient handovers from hospital to primary care: a systematic review. Ann Intern Med. 2012;157(6):417–28.
34. Crotty M, Rowett D, Spurling L, Giles LC, Phillips PA. Does the addition of a pharmacist transition coordinator improve evidence-based medication management and health outcomes in older adults moving from the hospital to a long-term care facility? Results of a randomized, controlled trial. Am J GeriatrPharmacother. 2004;2(4):257–64.
35. Dumur J, Chassagne P, Gbaguidi X, Csajka C, Chassagne P, Lang PO. Using a structured reconciliation medication form improves medication transition from hospital to community care and primary care physicians' adherence with medication adaptations and recommendations. EurGeriatr Med. 2019;10(1):141–6.
36. Mitchell G, Cherry M, Kennedy R, Weeden K, Burridge L, Clavarino A, et al. General practitioner, specialist providers case conferences in palliative care–lessons learned from 56 case conferences. AustFam Physician. 2005;34(5):389–92.
37. Allen J, Ottmann G, Brown R, Rasmussen B. Communication pathways in community aged care: an Australian study. Int J Older People Nurs. 2013;8(3):226–35.
38. Borgsteede SD, Karapinar-Çarkit F, Hoffmann E, Zoer J, van den Bemt PMLA. Information needs about medication according to patients discharged from a general hospital. Patient EducCouns. 2011;83(1):22–8.