interprof ACT – Effects of strategies to improve general practitioner-nurse collaboration and communication in regard to hospital admissions of nursing home residents

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Abstract*—Background: Hospital admissions can be straining events for nursing home residents with unclear benefits for their further health progress. In Germany, 30-50% of nursing home residents are admitted to hospital at least once a year up to 40% of those are considered avoidable. An improvement of the collaboration between general practitioners and nursing staff is a possible starting point to avoid hospital admissions. Therefore, the intervention package *interprof* ACT was developed in a preliminary study. The major aim of this trial is to investigate into the clinical effectiveness of *interprof* ACT. Our main hypothesis to be tested is that the implementation of *interprof* ACT reduces the cumulative incidence of hospitalizations within 12 months. In addition, the impact on quality of life and satisfaction with medical care of nursing home residents and also the interprofessional collaboration are investigated. Methods: In this multicentre, cluster-randomised controlled interventional study with 680 residents in 34 nursing homes, the 17 nursing homes of the intervention group implement the *interprof* ACT intervention package. It is tailored during an in-house kick-off meeting with all parties involved in (medical) care of the residents (nursing staff, general practitioners, nursing director, residents, relatives). In each nursing home a registered nurse acts as a change agent (called *interprof* ACT agents). Nursing homes of the control group carry out care as usual. Data will be collected at three points in times: baseline, after 6 and 12 months by extraction from resident files and in standardized interviews with nursing home residents. Concomitant a qualitative and quantitative process evaluation as well as a health-economic evaluation will be performed. Results: At this stage 656 resident in 34 nursing homes have been recruited. The *interprof* ACT intervention package has been adapted to local requirements and preferences in all 17 nursing homes of the intervention group. Data collection is completed in 30 nursing homes. Since the study is still ongoing, results for primary and secondary outcomes are currently not available. Conclusions: Perspectively, the findings from the *interprof* ACT trial should contribute to improved cooperation structures and processes of medical care which can sustainably strengthen the quality of medical care of nursing home residents.

***Index Terms*--hospital admissions; interprofessional collaboration, nursing home residents**

INTRODUCTION

In Germany around more than 800.000 persons live in a nursing home permanently [1]. Up to 50% of those nursing home residents (NHRs) experience a hospital admission at least once a year [2-4]. Of these hospitalizations more than a third is thought to be avoidable [5]. Hospitalizations often go along with health risks for the NHR [6].

General practitioners (GPs) primarily provide medical care for NHRs; the consultation normally takes place during GP´s visits in the nursing home. Since the selection of the GP in charge is at the discretion of the individual NHR, usually multiple GPs are involved in the medical care for NHRs of one nursing home, i.e., the nursing staff has to collaborate with different GPs. On the other hand, within the nursing team the responsibility for individual NHRs varies from shift to shift, so as to different nurses are involved in the medical care for one NHR, including communication with the GP. Altogether, these conditions pose several challenges to the nurse-GP

collaboration and communication in the long-term care while the quality of this collaboration has been demonstrated to be a critical determinant of decisions about NHRs' hospital admissions [7,8].

International trials evaluating interventions to improve interprofessional collaboration in the care for NHRs show inconclusive results regarding the effects on the incidence of hospital admissions [9-12]. However, interventions in these trials were not tailored to the individual nursing home needs and the underlying causal pathways remain unclear. In our previous study *interprof*, we developed and piloted six interventions to improve interprofessional collaboration in nursing homes: meetings to establish shared goals, appointment of a contact person, support in assigning pro re nata medication, use of name badges worn by GPs and nurses, mandatory availability and standardized procedures for GPs home visits [13]. Each of these interventions addresses specific barriers of the nurse-GP collaboration derived from our qualitative inquiries in the *interprof* study and was developed and piloted in repeated discussions with nurses, GPs and further stakeholders. Together, these interventions form the so-called *interprof* ACT intervention package.

In this trial we investigate to which extend the implementation of *interprof* ACT reduces the cumulative incidence of hospitalizations in NHRs within 12 months. In addition, the impact on health care utilization, quality of life and quality of interprofessional collaboration, and the economic consequences are examined, supplemented by a mixed methods process evaluation to unveil the degree of implementation and the downstream effects.

Material and Methods

The cluster-randomized controlled trial *interprof* ACT takes place in 34 nursing homes in Göttingen, Hamburg and Lübeck in Germany. The nursing homes represent the clusters which are randomly assigned to either implementation of the *interprof* ACT intervention package (intervention group) or care as usual (control group). In each nursing home, on average 20 NHRs are recruited. Detailed methods are reported in the study protocol [14]. Ethical consent was given from the respective boards in all study centers.

Participants

This trial included nursing homes which fulfilled following criteria:

- Providing care according to §71 SGB XI (long-term institutional inpatient care)
- Facility size ≥40 residents
- Written consent provided by the nursing home manager prior to randomization
- No participation in other scientific project on interprofessional collaboration

The main target group of the trial are NHRs of participating nursing homes. For inclusion, they had to meet following eligibility criteria:

- Age ≥18 years
- ≥1 GP contact in recent 3 months or ≥2 GP contacts in recent 6 months or admission to the nursing home during the precedent 6 months independently of documented GP contacts
- Written informed consent by the resident or her/his legal guardian
- Not admitted for short-term care.

Recruitment

Multiple steps were used to recruit eligible facilities and NHRs. First, nursing homes in the catchment area of each study center were contacted by letter and phone. After the nursing home manager had confirmed the participation of the facility in written by informed consent, registered nurses of this nursing home informed potentially eligible NHRs and their legal guardians about this trial and invited them to take part. This information was provided both orally and in written. In case of agreement, a member of the research team provided further information to the NHR and collected signed forms for informed consent.

For the process evaluation embedded in this trial, further target groups had to be included, among them the designated *interprof* ACT agents in the nursing homes of the intervention group (see below), registered nurses working in participating nursing homes and GPs involved in the medical care for participating NHRs.

Interventions

Nursing homes assigned to the intervention group were asked to implement the *interprof* ACT intervention package for twelve months. To facilitate this implementation, several supporting strategies are used. One major strategy is the designation of *interprof* ACT agents among the nursing staff. Directly after randomized allocation, nursing home managers of each intervention facility appointed two registered nurses as an *interprof* ACT agent and her or his substitute, respectively. The *interprof* ACT agents (and their substitutes) are responsible to initiate, organize and monitor the in-house activities required for sustainable implementation of the locally adapted *interprof* ACT interventions. Amongst others, these tasks comprise the preparation, moderation and follow-up of a kick-off meeting which should be held in each intervention facility within the first month after randomization. The aim of this meeting is to present and discuss the *interprof* ACT intervention package to and with, respectively, all groups directly involved in the medical care for the NHRs and to agree on required local adaptions in view of already existing structures and procedures for nurse-GP collaboration as well as specific needs for improvements. Participants of the kick-off meeting are thus nursing home manager, registered nurses, *interprof* ACT agent, GPs of participating nursing home residents, nursing home residents, and relatives. After the kick-off meeting, the *interprof* ACT agents had to plan the activities required for implementation of these agreed interventions and then to initiate and evaluate them. To support the *interprof* ACT agents in the implementation of their roles and tasks, members of the local study team supervised them at regular intervals during the whole follow-up period.

In nursing homes allocated to the control group, no specific interventions were to be implemented in addition to care as usual.

Data collection

Data were collected at baseline (T0, before randomized allocation), and 6 (T1) and 12 (T2) months past randomized allocation. The primary outcome is the cumulative incidence of hospital admission of NHRs within 12 months. Secondary outcomes comprise further measures of hospitalization and healthcare resource use, quality of life, inappropriate medication, mortality and adverse events. Standardized instruments are used for the collection of data on these outcomes, including psychometrically tested instruments for measuring NHRs' quality of life, inappropriate medication and resource use. Data on primary and secondary outcomes are mainly taken from NHRs' files, while quality of life is assessed via standardized interviews with the NHR or a proxy (registered nurse). Table 1 provides an overview of all outcomes measured in this trial and associated data sources and instruments.

For the process evaluation, both quantitative and qualitative data are collected from various target groups, especially NHRs, registered nurses and GPs (Table 1).

Quantitative data include the measurement of NHRs' satisfaction with the medical care received and the quality of interprofessional collaboration as perceived by the nurses and GPs. Qualitative inquiries aim to capture changes in the processes of interprofessional collaboration and medical care due to the implementation of the *interprof* ACT package. They comprise non-participatory observations and semi-structured interviews and are complemented by semi-structured written minutes of the kick-off meetings and the supervision meetings between a study team member and the *interprof* ACT agents. In the minutes of the kick-off meetings also the agreed local adaptions of the single *interprof* ACT interventions are recorded, including underlying reasons.

Data analysis

The primary analysis follows the intention to treat principle. For the analysis of the primary outcome (12 months incidence proportion of hospitalizations), a generalized linear mixed effects model with fixed effects for intervention and important prognostic factors is used. The quantitative and qualitative data of the process evaluation will be descriptively analyzed independently from each other, followed by a descriptive cross-map of the findings regarding the implementation procedures and changes in the interprofessional care and medical care. Based on this cross-validation, preliminary models of mediators and moderators affecting the downstream effects of the *interprof* ACT package on the primary outcome will be designed and explored by means of appropriate generalized linear mixed effects models. For this process data analysis, the degree and shapes of the single *interprof* ACT interventions agreed in the kick-off meetings to be locally implemented will be grouped into four categories: (i) interventions already implemented, (ii) will be implemented as originally planned, (iii) will be implemented partially/with adaptions, (iv) will be not implemented.

TABLE I.

OVERVIEW OF STUDY OUTCOMES, TIME POINTS OF DATA COLLECTION AND DATA SOURCES (T1 BASELINE BEFORE RANDOMISATION, T1 6 MONTHS AFTER RANDOMISATION, T2 12 MONTHS AFTER RANDOMISATION)

Outcomes	Time			Data Source	Instrument
	t0	t1	t2		
Nursing home resident					
Primary outcomes					
Cumulative incidence hospitalisation	x	x	x	Resident file	Standardized data extraction form
Secondary outcomes					
Hospitalisations	x	x	x	Resident file	Standardized data extraction form
Hospital days	x	x	x	Resident file	Standardized data extraction form
Inappropriate medication	x	x	x	Resident file	PRISCUS list [16]
Adverse events	x	x	x	Resident file	Standardized data extraction form
Mortality	x	x	x	Resident file	Standardized data extraction form
Medical care	x	x	x	Resident file	FIMA [15]
Quality of Life	x	x	x	Self-administered questionnaire or proxy assessment by nurses	QoL-AD-NH [17,23], EQ-5D-5L [19]
Intermediate outcome (process evaluation)					
Satisfaction with medical care	x		x	Self-administered questionnaire	Self-developed based on the ZAP scale [22]
Nurses in nursing homes (intermediate outcome for process evaluation)					
Quality of interprofessional collaboration	x		x	Self-administered questionnaire	Various standardized instruments, e.g. JeffSATIC [24] and PSAT [25]
Process of interprofessional collaboration	x	x	x	Non-participatory observations of kick-off meetings and interprofessional collaboration, semi-structured interviews	
Nursing home managers (intermediate outcome for process evaluation)					
Quality interprofessional collaboration	x		x	Self-administered questionnaire	Various standardized instruments, e.g. JeffSATIC [24] and PSAT [25]
General practitioners (intermediate outcome for process evaluation)					
Quality of interprofessional collaboration	x		x	Self-administered questionnaire	Various standardized instruments, e.g. JeffSATIC [24] and PSAT [25]
Process of interprofessional collaboration	x	x	x	Non-participatory observations of kick-off meetings and interprofessional collaboration, semi-structured interviews	

EQ-5D-5L = 5-level EQ-5D version by the EuroQol Group. FIMA = Questionnaire for Health-Related Resource Use in an Elderly. JeffSATIC = Jefferson Scale of Attitudes Toward Interprofessional Collaboration. PRISCUS list = potentially inappropriate medication for older people. PSAT = Partnership Self-Assessment Tool. QoL-AD-NH = Quality of Life-Alzheimer's disease questionnaire nursing home version. ZAP = Zufriedenheit in der Arztpraxis (patient satisfaction with outpatient medical care).

RESULTS

A total of 34 nursing homes were recruited for the *interprof* ACT trial at the three study centers Göttingen (n=8), Hamburg (n=16) and Lübeck (n=10). Half of them were randomly allocated to intervention and control group.

In all nursing homes of the intervention group, inhouse kick-off meetings were realized as planned with persons involved in the medical care of NHRs shortly after randomization. These 17 kick-off meetings were mainly facilitated by the *interprof* ACT agent and a member of the research team. During the meetings all participants discussed the six components of the *interprof* ACT intervention package and tailored them to the individual situation and needs of the respective nursing home until everyone complied.

On the congress we will explain the study design and give insight into the processes of the kick-off meeting. Moreover, we

will present an overview of different levels of intended implementation of the *interprof* ACT intervention package during this meeting.

Discussion

In this trial, interprofessional kick-off meetings emerged to be a feasible component of the implementation strategy for initiating in-house discussions on the multiple interventions to improve nurse-GP collaboration in medical care for NHRs. Further analyses of the decisions made about local adaptations of the *interprof* ACT intervention package during the kick-off meeting will provide insights into the context of implementation. These analyses will be part of the process evaluation and advance the understanding of moderating and mediating factors which are likely to facilitate sustainable large scale implementation of the *interprof* ACT package.

In general, findings of the study *interprof* ACT will deliver data on the influence of improved interprofessional collaboration on NHR`s health and utilization of health care and thus contribute to strengthen the quality of NHRs` medical care.

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