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PROTOCOL

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Dementia specific care structures in nursing homes—Study protocol of a telephone-based survey study in a nationwide random sample

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Abstract

Aim: To describe a study protocol for a survey study in German nursing homes that (1) plans to enhance a typology of care units (2) and investigates the association between different care unit types and the provision of dementia-specific interventions based on a stratified randomized sample.

Background: Many nursing homes in Germany provide Dementia Special Care Units. Existing definitions often do no justice to the complexity of their context. In this study, we define context as structural and organizational variables. It is necessary to define an empirical based set of indicators to characterize care units with respect to dementia care.

Design: Observational survey study with a cross-sectional design.

Methods: We will use a stratified random nationwide sample of 160 German nursing homes. Stratification variables are federal state and the existence of a Dementia Special Care Unit. The sampling frame from which the participating nursing homes are selected is a list with the total population of German nursing homes (n = 11.658). Data will be gathered on the level of the nursing homes and one of their care units via computer-assisted telephone interviews with a standardized questionnaire. The distribution of the assessed variables (contextual characteristics) will be described in absolute and relative frequencies for the whole sample in the first step in order to describe dementia-specific care structures. In the second step, factor analysis of mixed data (FAMD) with hierarchical clustering (HC) will be applied to analyze relationships between variables. The study was ethically approved in October 2018.

Discussion: The typology can be used in future studies to define the context of care units in nursing homes. This may improve the interpretation of findings from future studies that investigated interventions in nursing homes.

Impact: The typology will visualize and describe the complexity of contextual characteristics of several care units.

KEYWORDS
dementia care, dementia special care units, dementia specific care structures, nursing, nursing home, typology

1 | INTRODUCTION

In Germany, almost one million people contemporarily live in nursing homes (Statistisches Bundesamt, 2019). Compared to international findings, people with dementia are supposed to be the largest group of residents in nursing homes (Schäufele et al., 2013): 51.8% of all residents have a diagnosis of dementia (Hoffmann et al., 2014). Since caring for residents with dementia is an ongoing challenge (Ray & Mittelman, 2017), the question how dementia care is organized in nursing homes and how this may impact outcomes is relevant to nursing research and practice.

Nursing homes offer day care but especially long-term care and respite care in Germany. Usually, nursing homes consist of one or more care units as a living area for residents. Residents share this living area in common with the exception of the residents' rooms (Sloane et al., 2002). In addition to usual care units, many nursing homes implemented Dementia Special Care Units (DSCUs), because of the high prevalence of dementia. In 1980, DSCUs were originally developed in the United States; meanwhile, they are implemented in many nursing homes in developed countries (Holmes et al., 2000). DSCUs differ primarily from other care units with respect to their residents: most residents have a diagnosis of dementia and severe cognitive impairment (Palm, Bartholomeyczik, et al., 2014). Many of them show severe symptoms of the disease (e.g., behavioral and psychiatric symptoms and problems with spatial or temporal orientation). In nursing homes that do not offer a DSCU, residents with and without dementia are living together in usual care units. These units are not expected to respect and fulfil primarily the needs of people with dementia but of all residents living there. However, neither a consistent definition of DSCUs (Joyce et al., 2018) nor obvious differences between DSCUs and traditional care units exist today (Kok et al., 2013). This might be a reason why DSCU evaluation studies failed to produce clear results, regarding which features of DSCUs improve residents' outcomes, which resources and which particular environment in a separate care unit are needed (Kok et al., 2013; Lai et al., 2009; Holmes et al., 2000). Therefore, we need to investigate the contextual characteristics of different care unit types, but also their association with the implementation of dementia-specific interventions in Germany.

The diversity of DSCUs in nursing homes is an important issue for dementia care research, because the characteristics of an institution shape the context of care. The context composes several characteristics that interact and influence not only the interventions but also its implementation. Understanding the complexity of the context is critical in order to investigate the effect of complex interventions (Pfadenhauer et al., 2017). We define context as structural and organizational variables and policies for person-centred care. The planned study refers to the prevailing Throughput-Model (Schrappe & Pfaff, 2017) with the definition of four context levels that built the base for the differentiation of the expected care unit types: the residents of nursing homes, the professionals, the organization and the system. We expect that these contextual characteristics are relevant to explain mechanisms of complex interventions and outcomes of care of people with dementia.

This study protocol describes (1) the process of validating and enhancing a former typology of care units in German nursing homes and (2) the investigation of the association between different care unit types and the provision of dementia-specific interventions for person-centred care.

2 | BACKGROUND

To improve the quality of life and well-being of residents in nursing homes, the previously prevailing care model does not longer meet the needs of residents, as it focuses mostly on physical and basic care (Verbeek et al., 2011), whereas the importance of psychosocial care is more and more emphasized. Nursing homes increasingly endeavor to develop a person-centred culture that focuses on the individual and their psychosocial needs. As such, one could argue that the Culture Change Model (Miller et al., 2010) also is increasingly being used in Germany. For instance, daily routines should be more in line with residents' preferences, so that the space is perceived more as home than an institution. This shift involves an effort to make care facilities more home- and person-centred by changing the physical environment, organizational structure, values and norms (Zimmerman et al., 2014).

The concept of person-centredness is essential in the Culture Change Model (Van Haitsma et al., 2020). Person-centredness is declared as the gold standard in care for people with dementia (Sjögren et al., 2013). It focuses on promoting shared-decision making and actively shaping the relationship between staff and residents, as well as on an orientation towards strengths and resources (Kitwood, 2019; McCormack et al., 2011). With the implementation of person-centred care, clinical guidelines expect nursing homes to implement psycho-social, non-pharmacological interventions for people with dementia to reduce the use of psychotropic drugs for the treatment of dementia-related behavioral symptoms (APA Workgroup on Alzheimer's Disease & other Dementias, 2007; Jutkowitz et al., 2016). According to the latest systematic review, non-pharmacological interventions to reduce neuropsychiatric symptoms include, for example, music therapy, Dementia Care Mapping and improvement of communication skills of the staff (Livingston et al., 2018).

A dementia-sensitive physical environment (Kuliga et al., 2021), workplace characteristics and a learning culture impact on the implementation of person-centred care in the variety of individual

workplaces (McCormack et al., 2011). Policies are relevant tools to implement complex interventions—such as person-centred care—into practice (Burgers et al., 2013), to ensure improvement in the quality of care (Vikström et al., 2015), in cost-effectiveness and in patient outcomes (Sciarra, 2012). Recently, Røen et al. (2018) indicated that DSCUs are linked to higher levels of person-centred care, depending on the care unit size and the staff/resident ratio (assessed with the Person-centred Care Assessment Tool).

Over the past decades, numerous nursing homes have implemented DSCUs. Their concepts are heterogeneous with respect to residents, the architecture (Fahsold et al., 2020), the organization and the care philosophy. With the exception of four German federal states (Berlin, Hamburg, Baden-Württemberg, Hessen), no uniform requirements on the level of the federal state exist in Germany. In the other German federal states, the requirements for dementia care units are negotiated between the cost bearers and the nursing homes. Different regulations on the level of the federal states, the municipalities and the nursing homes exist: the implementation of a DSCU is mainly decided by the nursing homes or their supporting organization. The nursing home directors decide how to operationalize theoretical dementia care concepts and which characteristics of DSCUs can be implemented. Operationalization and implementation depend on several components such as financial and human resources, architecture of the nursing home, personal preferences of the management board and the nursing home law. In usual care units, the implementation of dementia care features is not regulated at all, so heterogeneity is even larger than in DSCUs. These regulations illustrate the diversity of DSCUs in Germany (Bergmann et al., 2020).

Researchers from the United States proposed that valuable DSCU research needs contributions to improve basic definitions and develop typologies to further identify the variability among DSCUs (Sloane et al., 1995). Whereas in the United States DSCU typologies have therefore been developed (Degenholtz et al., 2006), valid definitions are missing in Germany (Bergmann et al., 2020; Palm, Bartholomeyczik, et al., 2014). Therefore, neither DSCUs nor any usual care units are standardized and comparable.

In a previous study, we explored contextual data from a convenience sample of 103 care units of 51 nursing homes, to identify care unit types that vary in their contextual characteristics (Bergmann et al., 2020). We identified 31 significant variables that described three types of care units: 'house community', 'DSCU' and 'usual care' (Bergmann et al., 2020). However, the developed typology did not capture the complexity of the context in care units because the distribution of the participating nursing homes in the sample did not correspond to the given distribution of nursing homes in Germany. Therefore, the results are not representative of and not transferable to German nursing homes in general. The developed typology also did not contain any variables about the implementation of person-centred care and the delivery of dementia specific interventions.

The planned study is set-up to overcome this limitation by applying a randomized, stratified nationwide sample for German nursing homes.

3 | THE STUDY

3.1 | Aims

The primary aim of the study is to enhance the former developed typology of nursing homes in Germany (Bergmann et al., 2020) in a randomized, stratified nationwide sample that is representative of nursing homes in Germany and to investigate the association between different care unit types and the provision of dementia-specific interventions for person-centred care. With these results, the study aims to describe dementia-specific care structures.

Research questions to be answered are as follows:

- Which contextual characteristics are associated with each other?
- Which type solution can be developed from the current study?
- To what extent are contextual characteristics related to our a-priori assumptions based on the previous typology and literature?
- Which contextual characteristics are most significant for their respective types?
- Are there differences between care unit types with respect to the implementation of non-pharmacological interventions to manage neuropsychiatric symptoms in dementia?

Research questions of the primary study aim derive following questions to describe dementia-specific care structures:

- How many nursing homes provide a DSCU?
- Do DSCUs differ with regard to the environment and architecture from other care units?
- Are differences in the financing of care units associated to the resident case mix and the staff?

3.2 | Design

The survey study is an observational study with a cross-sectional design in a stratified randomized nationwide sample of nursing homes.

3.3 | Setting

Data will be collected via computer-assisted telephone interviews, using a standardized questionnaire. To guarantee a constant interview quality, the interviews will be conducted by one researcher. The recruitment of nursing homes and data collection is planned for April until August 2020. Due to the COVID-19 pandemic and the situation in the nursing homes, data collection will be prolonged until December 2020.

3.4 | Sampling and data collection methods

The study is based on a stratified random nationwide sample of German nursing homes with and without DSCUs. Data will be

gathered on the level of the nursing homes and one of their care units. To select the random sample and recruit nursing homes, a methodology that was previously developed to gather a random sample of nursing homes in Australia is applied (Fielding et al., 2016), as follows:

The sampling and data collection will be executed in three steps. In step one, the stratified random participant lists of nursing homes will be generated. The participants will be drawn from a list purchased by a private data provider (Pflegemarkt.com, 2021) that includes the total population of nursing homes in Germany (sampling frame n = 11.658). This list contains addresses and contact details from nursing home administrators and the responsible nurse managers as well as information about dementia special care. In addition, contextual data of nursing homes, for example, size, provision of short-term care, are provided in the list. Stratification will be conducted based on the federal state and the characteristic 'NH provides a Dementia Special Care Unit' and 'NH does not provide a Dementia Special Care Unit', respectively. Based on the list of pflegemarkt.com, it is expected that at least 20% of nursing homes in Germany have a DSCU (n = 32). As 10 units per federal state will be recruited, eight without a DSCU per federal state will be selected. Therefore, two nursing homes with a DSCU per federal state will be selected.

The stratified lists will be randomly sorted with the R statistical software (R Core Team, 2020). The nursing homes will be contacted starting at the top of the list and working down until a minimum number of n = 10 nursing homes per federal state are recruited.

In Step 2, the nursing homes will be initially contacted by mail and subsequently by phone. A personal letter introducing the purpose, aim and the researchers undertaking the study and an attached participant information sheet as well as a declaration of consent will be sent to the nursing home administrators by postal and digital service.

After sending the emails, the administrators or their representatives will be contacted by one researcher to ask if they are interested to participate in the study. If so, an appointment will be made for the telephone survey. Before conducting the interview, participants will be required to sign a consent form and return it to the research institute. During the first phone call, information will be gathered about the number of care units provided in the nursing home.

Based on the information gathered in the first phone call, one care unit in each nursing home for data collection will randomly be selected. In nursing homes with a DSCU, data about these units will be collected. In general, the nursing homes without a DSCU provide various care units, from which one care unit will be selected randomly with a dice by the interviewer. In case a nursing home administrator rejects to participate, the next nursing home on the randomization list will be selected. Participants will be informed about the selected unit before data collection per email.

In Step 3, the telephone surveys will be conducted.

The sampling and data collection methods are illustrated in Figure 1.

3.5 | Strategies to improve recruitment rate/recruitment

The applied recruitment method with a pre-contact that includes a personalized invitation and a phone call has been shown to increase response rates (Pit et al., 2014; Schnell et al., 2013). The recruitment rate will be monitored throughout the entire recruitment phase and influences how many nursing homes are contacted.

Another crucial aspect influencing the success of the selected recruitment procedures is the time participants need to complete the questionnaire (Jepson et al., 2005). Therefore, it is aimed to keep the interview as short as possible. As an incentive to participate, the nursing homes will receive the results in form of a user-friendly report that gives an overview of the most important results.

3.6 | Participants

Nursing homes will be included if they are licensed care facilities with a supply contract (§71 SGB XI) and provide nursing care all-day. Nursing homes will be excluded if they

- provide exclusively short-term care,
- are a hospice,
- are nursing homes for people with disabilities,
- appear twice in the list, and
- are closed for various reasons over the period of data collection.

Interview participants will be nursing home administrators, nursing home managers or the care unit managers.

3.7 | Data measurement

Data will be collected with a standardized questionnaire, consisting of four parts and a total of 53 items. The first part assesses structural and organizational data of the nursing homes and its care units (German nursing home structure questionnaire). The second part assesses data on the care unit selected for the study (German care unit context questionnaire). The third part assesses information on policies regarding the implementation of dementia-specific interventions and the implementation of person-centred care (Dementia policy questionnaire). The fourth part, consisting of six items, collects data about the professional function of the respondent. Since data collection takes place during the COVID-19 pandemic, the questionnaire was extended by additional questions. These ask whether processes or structures have been changed or are restricted due to the COVID-19 pandemic.

The standardized questionnaire in the German language can be found in Supporting Information S1 and S2.

To describe the nursing homes, the German nursing home structure questionnaire that consists of five items ask for full-time

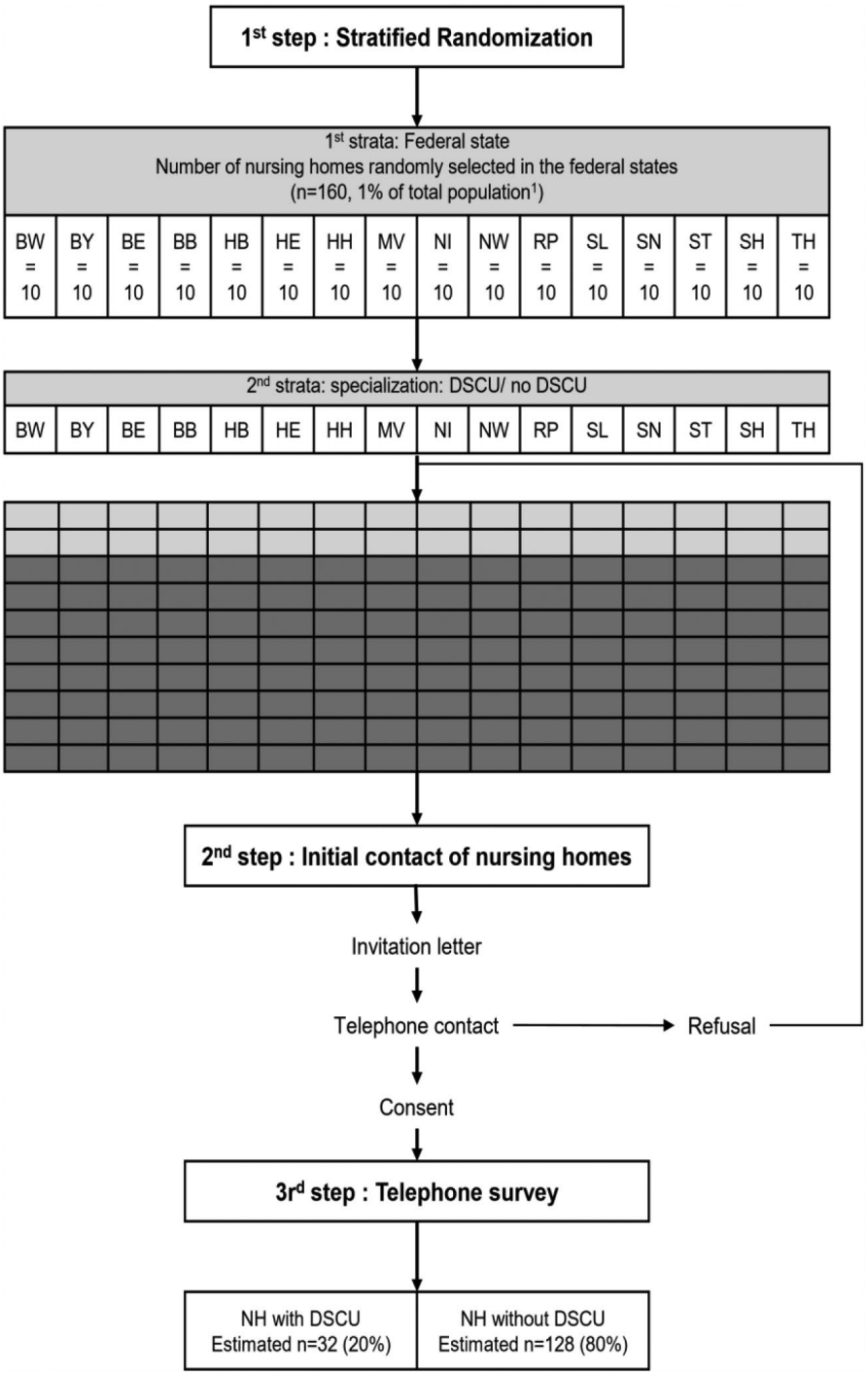

FIGURE 1 Overview of planned recruiting and data collection. [1]The total population of nursing homes is 11.658 in 2020 (Pflegemarkt.com, 2021). BW, Baden-Württemberg; BY, Bayern; BE, Berlin; BB, Brandenburg; HB, Bremen; HE, Hessen; HH, Hamburg; MV, Mecklenburg-Vorpommern; NI, Niedersachsen; NW, Nordrhein-Westfalen; RP, Rheinland-Pfalz; SL, Saarland; SN, Sachsen; ST, Sachsen-Anhalt; SH, Schleswig-Holstein; TH, Thüringen. ■ Nursing home without DSCU; □ Nursing home with DSCU

positions for nurses and the number of care units per nursing home with categorical response option. For each care unit, the names of designated area as provided from their perspective as an open response option will be collected. It will be asked whether these are DSCUs or not as a dichotomous item response format. Variables of these items are shown in Table 1.

Most of the questions on the nursing home level have been taken from the official questionnaire used by the Medical Review Board of the Statutory Health Insurance Funds for regular quality controls (Medizinischer Dienst des Spitzenverbandes Bund der Krankenkassen e.V. & MDS, 2018). The questions are therefore expected to be known by the participants and no problems in answering are expected.

The 28 items of the 'German care unit context questionnaire' cover five areas that are in line with the context levels of health services research: residents, professionals, organization and system. Items have been taken from different established instruments: most of them were already used in previous studies and deemed content valid and feasible (). Items focusing on the professional level are based on a questionnaire that was developed by a German working group of nursing home providers and cost bearers, in order to describe the structure of care units (Arbeitsgemeinschaft der

TABLE 1 Overview of organizational variables of the German nursing home structure questionnaire

Variable	Response option
Planned full-time positions for nurses	Open response option
Existing full-time positions for nurses	Open response option
Number of care units per nursing home	Open response option
Name of care units	Open response option
Intended purpose of care units: dementia specific care	Yes/no

Pflegekassenverbände in Bayern, 2002, 2017). Only few items focusing on organizational level and residential level from international questionnaires were considered as feasible in the German context in this study and are applied if reasonable (Fleming & Bennett, 2015; Sloane et al., 2002).

Questions about the care unit cover the topics architecture, financing, staff, residents and meal serving in the care unit: these single items will be assessed with manifest indicators. To facilitate a quick administration, the item response format is mainly dichotomous. Items assessing numbers of residents include open response options.

The variables of the 'German care unit context questionnaire' items and their categorical answers are shown in Table 2. Because care units are defined differently in Germany, at the beginning of the interview, participants will be required to define the care unit in their nursing home.

The 'Dementia policy questionnaire' is divided into two parts. The first part is based on 12 items of the Assessment of Policies for Person-Centred Management of BPSD from Resnick et al. (2020) which assesses the existence of clinically relevant policies in nursing homes. The reliability of the original instrument with internal consistency for item reliability of .85 and intra-class correlation for inter-rater reliability of .88 is satisfactory. The Rasch analysis supports validity with acceptable INFIT statistics for all but two items (Resnick et al., 2020). Items of the assessment were evaluated with regard to transferability to the German context of nursing homes with the help of a German expert panel. Items were translated if at least 80% of the experts considered it transferable to the German context. The translation of transferable items and the cultural adaption was carried out by two researchers with expertise in dementia care and linguistic skills in the German and English language. The second part is based on additional seven items that focus on dementia-specific, non-pharmacological interventions in nursing homes to prevent and manage neuropsychiatric symptoms. Items that measure these interventions based on recommendations of a current review for dementia prevention, intervention and care (Livingston et al., 2018) were developed for this study. The items will be assessed as single indicators with either dichotomous or multinomial answers. To check out validity of the domains and comprehensiveness of the items (World Health Organization, 1998), the overall standardized questionnaire was pretested with four nursing home administrators. The variables of the 'Dementia Policy Questionnaire' items are shown in Table 3.

3.8 | Study size

It is planned to include a sample of n = 160 nursing homes. The stratifying sampling procedure will be conducted disproportional regarding the stratifying variable federal state. This decision was made because the federal states vary enormously regarding their size (the largest federal state has 1600 nursing homes and the smallest 104). Regarding the stratifying variable DSCU/ no-DSCU, a proportional sampling will be conducted that reflects the distribution of DSCUs/ no-DSCUs in the whole sample. The number of 160 nursing homes is not calculated with respect to statistical power but determined with respect to feasibility and an equal distribution of the German federal states.

The statistical methods that will be applied in this study are robust and adequate also for small sample sizes (Blasius, 2014; Le Roux & Rouanet, 2010). More important than a certain number of participants is to guarantee the heterogeneity of the sample, to gain representativeness of German nursing homes in general.

3.9 | Statistical methods

To answer the research questions according to the previous research aim, the following statistical methods will be applied:

To investigate associations of variables (contextual characteristics) and enhance the previous typology, factor analysis of mixed data (FAMD) with hierarchical clustering (HC) will be applied. FAMD is a principal component method dedicated to analyze a data set of contextual characteristics containing both quantitative and qualitative variables. This statistical method is used to describe the association between all variables. Additionally, this approach is also recommended to explore the similarity between the care units by taking into account the mixed types of variables (Kassambra, 2017; Pagès, 2014).

Consequently, FAMD can be used as a pre-processing technique to perform a clustering method on the principal components (Husson et al., 2017; Blasius & Greenacre, 2014). This is done in a second step by applying the HC method using Ward's criterion to aggregate clusters is performed on the factorial axes of the MCA (Blasius, 2014; Le Roux & Rouanet, 2010). This analysis step is used to identify the appropriate cluster structure of care units and define the contextual characteristics which contribute to the cluster model. To prove the quality of the result, we will use internal cluster validation measurements such as the silhouette width and the Dunn Index to design the procedure of evaluating the goodness of clustering algorithm results (Kassambra, 2017).

TABLE 2 Overview of German care unit context questionnaire variables, their measurement and assumed assignments for typology

Variable	Categories	Assumed type assignment	Empirical evidence
Architecture			
Building specific for residents with Dementia	No	UC	Bergmann et al. (2020); Palm, Bartholomeyczik, et al. (2014)
	Yes	DSCU	Bergmann et al. (2020)
Architectural segregation from other units	No	UC	Bergmann et al. (2020)
	Yes	DSCU, HC	Palm, Bartholomeyczik, et al. (2014); Palm, Köhler, et al. (2014)
Care unit is protected by an exit control	No	UC, HC	
	Yes	DSCU	Bergmann et al. (2020)
Care unit is on several floors	No	DSCU	
	Yes	UC	
Care unit with group living concept	No	UC	
	Yes	HC	
Accessible outdoor area	No	HC	Bergmann et al. (2020)
	Yes	DSCU, UC	Palm, Bartholomeyczik, et al. (2014); Palm, Köhler, et al. (2014)
Number of rooms for residents	Open response option[a]		
Availability of single rooms	No (<100%)	UC	Bergmann et al. (2020)
	Yes (=100%)	HC	Bergmann et al. (2020)
Financing			
Specialization of care unit	No	UC	
	Yes	DSCU	Palm, Bartholomeyczik, et al. (2014); Palm, Köhler, et al. (2014)
Type of specialization	Gerontopsychiatric/ closed LU/DSCU	DSCU	
	Other	UC	
Inclusion criteria for admission to care unit	No		
	Yes	DSCU	Palm, Bartholomeyczik, et al. (2014); Palm, Köhler, et al. (2014); Weyerer et al. (2010)
Additional financing regulated by a special agreement	No	HC	Bergmann et al. (2020)
	Yes	DSCU	Bergmann et al. (2020)
Higher costs for residents	No	UC	
	Yes	DSCU	Weyerer et al. (2010)
Higher Registered-nurse ratio	No	UC, HC	
	Yes	DSCU	
Professionals			
Constant assignment of nurses (per care unit)	No	HC	Bergmann et al. (2020)
	Yes	UC	Bergmann et al. (2020)
Continuous presence of a registered nurse on night shift	No	UC	
	Yes	DSCU	
Continuous presence of a registered nurse on daily shift	No	HC	Bergmann et al. (2020)
	Yes	UC	Bergmann et al. (2020)
Special qualification of head nurse in psychogeriatric care	No	UC	Bergmann et al. (2020)
	Yes	DSCU	Bergmann et al. (2020)
Full-time employment of the head nurse	No	HC	
	Yes	UC	

(Continues)

TABLE 2 (Continued)

Variable	Categories	Assumed type assignment	Empirical evidence
Head nurse is only responsible for one care unit	No	HC	
	Yes	UC	
Residents			
Number of beds in care unit	Open response option[a]	UC (Number of beds in care unit >15)	Bergmann et al. (2020)
	Open response option[a]	HC (Number of beds in care unit <15)	Bergmann et al. (2020)
Number of short-term care places in care unit	Open response option[a]	UC (≥ 1)	
	Open response option[a]	DSCU (0)	
Numbers of residents in different care degrees (Pflegegrad, PG)	PG 0–6 (%) as open response option[a]	Normal distribution for several types of care units	Statista (2021)
Number of residents with a medical diagnosis of dementia	Low (%)	UC (51.8%)	Hoffmann et al. (2014); Weyerer et al., (2010)
	High (%)	DSCU (100%)	Stadt Hamburg (2016); Weyerer et al., (2010)
Number of residents who cannot be mobilized out of bed	Low (%)	DSCU	Palm, Bartholomeyczik, et al., (2014); Palm, Köhler, et al. (2014); Weyerer et al. (2010)
	High (%)	UC, HC	Stadt Hamburg (2016); Weyerer et al. (2010)
Number of residents with a court order for accommodation	Low (0%)	UC	
	High (>0%)	DSCU (closed)	German law §1906 BGB
Number of residents with a court order for measures restricting their freedom/ physical restraint	Low (0%)	DSCU	Joyce et al. (2018); Weyerer et al. (2010)
	High (>0%)	UC	Weyerer et al. (2010)
Residents-per-registered nurse ratio (defined as nurses with a minimum education of 3 years)	High	UC (RNRatio greater than the median; cut-off: median = 18)	Bergmann et al. (2020)
	Low	DSCU RNRatio less than or equal to the median; cut-off: median = 18)	Bergmann et al. (2020)
Meals			
Dining in the care unit	No	UC	
	Yes	DSCU	
Opportunities to cook lunch in the care unit	No	UC	Bergmann et al. (2020)
	Yes	HC	Bergmann et al. (2020)
Meal service	Lunch on a tray	UC	
	Lunch is prepared on plates by staff	UC	Bergmann et al. (2020)
	Self-service	HC	Bergmann et al. (2020)

Abbreviations: DSCU, dementia special care unit; HC, house community; UC, usual care.
[a]Not defined yet, category building when data available.

The result of a cluster analysis requires theoretical-interpretative classification before declaring it as a typology. In order to evaluate the cluster-analyzed typology, both the logical consistency and the subjective traceability have to be described in the context of our previous research knowledge. In the final step of enhancing the typology, we will interpret the identified clusters as subjectively meaningful schemas. Therefore, we will compare these clusters with our a priori assumptions from the literature and our own research (Schmidt-Hertha & Toippelt, 2011).

Based on this typology, the differences between care unit types in terms of implementation of dementia-specific interventions are described and tested.

TABLE 3 Overview of Dementia Policy Questionnaire variables

Dementia policy Questionnaire
Written procedural instructions and conceptual elaborations
Fixed visitor regulations, which regulate visiting hours and the number of visitors
Systematic and structured recording of preferences
Information on residents' preferences on transition sheet
Policies that specify that residents are involved in staff selection
Policies specify that residents or relatives participate in case conferences
Policies specify how nursing assistants are involved in case conferences
Guidelines specifying that residents can use common areas all day
Systematic and structured recording of preferences during prophylaxis
Policy specifying how external staff can obtain information on residents' preferences when moving in
Policy specifying about conversations on care planning with resident and relatives
Policy specifying how residents and relatives to be involved in alternative procedures to measures restricting freedom
Policy specifying how to deal with refusal of nursing measures and prophylaxis
Dementia-specific interventions
Evaluation of taken psychotropic drugs
Use of dementia-specific instruments to assess pain
Use of dementia-specific instruments to record behavior
Staff training on person-centred care
Presence on an expert on person-centred care
Implementation of Dementia Care Mapping (DCM)
Music therapy once a week

3.10 | Missing values

The telephone interview is a reliable method to avoid missing values, because the questions are answered by participants and interviewer in common due to effective communication and standardized questions (Musselwhite et al., 2007; Schnell et al., 2013). Additionally, the items are designed in a way that they are easy to understand and clearly to answer. If, nevertheless, up to a maximum of 30% missing data should occur, this is handled by the R package missMDA (Josse & Husson, 2016; Phan et al., 2019).

3.11 | Data handling

During the recruitment process, the quality of the contact information will be ensured by checking on missing or incorrect information in the data of the selected institutions. If necessary, missing or incorrect information will be updated.

The responses from the telephone interviews using pseudonyms will be collected via a Computer-Assisted Interview (CAI). Data will be stored in secure local databases. The data quality will be ensured in terms of logical consistency based on various plausibility criteria (checking for redundancy, completeness and accuracy) during the process of data preparation by the data management. A data management plan has been created to document research data processing.

As requested by the rules on good scientific practice of the German Research Foundation, the research data will be archived for 10 years after finalizing the study.

The datasets that will be used and analyzed during the current study are available from the corresponding author on reasonable request.

3.12 | Expected results

We expect that we will be able to validate the findings from our previous study (Bergmann et al., 2020) with respect to some of the measured variables. To improve comprehensibility of our assumptions, we specified for every variable our expectation to which of the existing types they may contribute. This expectation is based on our previous research, knowledge in the field and literature. Table 2 shows our a priori assumptions as assumed type assignment:

because the findings from our previous research are not based on a representative sample, we cannot obviate that our assumptions do not apply. Therefore, we will run additional explorative analysis to find out, if another cluster solution is fitting better to the data.

Regarding the implemented dementia-specific interventions and policies for person-centred care, we assume that they are significantly related to the contextual characteristics of DSCUs or related types. Evidence has shown that DSCUs with a smaller size and higher staff/resident ratio by day have an effect on person-centred care (Røen et al., 2018). Therefore, we expect an association between contextual characteristics of DSCUs and the existence of policies for person-centred care.

3.13 | Ethical considerations

The study follows the ethical principles of the Helsinki Declaration (World Medical Association, 2013). It has been reviewed and approved by the ethical committee of the German society of Nursing Science (Deutsche Gesellschaft für Pflegewissenschaft e.V.) in October 2018 (Application number: 18-016). It is not expected that participants of this study will experience any ethical critical situations. The personal data about the participants (age, vocational training qualification and function in the nursing home) will be protected by the European General Data Protection Regulation. All data handling processes in this study respect this (Aktuelle Gesetze, 2021).

A participant information sheet as well as the researchers themselves will inform about the purpose of the study, their rights regarding data protection and also about the possibility to step back from the study at any time without any disadvantages.

No data of vulnerable persons will be collected. All participants will give their written informed consent before participating in the study. To prevent identification, data will be collected using a code number as pseudonym for both the nursing home and the participants.

3.14 | Validity and reliability

The study design addresses threats to the validity with regard to selection bias, interviewer and non-response bias. The telephone survey mode minimizes selection bias because it can be assumed that every nursing home can be reached by telephone (Sedgwick, 2015). The availability of the participants by telephone when contacted is nevertheless a factor influencing inclusion in the study (Schulz, 2006). Interviewer bias will be avoided because the interviews are conducted exclusively by one researcher who was trained for the interviews. To enhance standardization, an interview manual was developed and will be applied. Several methods will be applied to avoid non-response bias and increase willingness to participate. But as participation in the study will be voluntary, participating nursing homes may differ from those who decline to participate: nursing homes with DSCUs might be more interested in participating than those without DSCUs since this study focuses on dementia specific care structures in nursing homes. Therefore, non-response bias will be hard to avoid completely (Sedgwick, 2015).

Four pre-test interviews with nursing home administrators were conducted by one researcher who is responsible for interviewing staff in the main study. In this pre-test, the interview length was estimated at 35 minutes, and 56 items were evaluated using cognitive debriefing techniques (Willis, 2005) for linguistic validation. Three items were rephrased and adapted, because pre-test participants misunderstood words or context of items. Three items were excluded that ask about the definition of a care unit in general, since we only focus on the randomly selected care unit.

4 | DISCUSSION

The study aims to enhance a former typology (Bergmann et al., 2020) that will visualize and describe the complexity of contextual characteristics of care units in Germany. This is relevant in order to understand whether a complex intervention really makes a difference (Palm, Köhler, et al., 2014). Contextual characteristics impact on initiated mechanisms of complex interventions that cause a change in outcomes (Pawson & Tilley, 2004). The results of this study will provide critical information needed for future studies that investigate complex interventions in settings that are assigned to one of the identified care unit types (Bergmann et al., 2020). If contextual characteristics lead to variability in outcomes (Hansen & Jones, 2017), the results of this study help to investigate whether a complex intervention shows better effects in a certain care unit type than in others.

4.1 | Limitations

A telephone-based survey study based on a random sample has many challenges. We applied several methods to minimize limitations, but we may not be able to eliminate these.

We may not be able to confirm our typology because the previous collected data were drawn from a convenience sample.

5 | CONCLUSION

The final enhanced typology will provide evidence for future studies to define the context of nursing homes and care units and to investigate transferability of complex interventions.

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CONFLICT OF INTEREST

No conflict of interest has been declared by the authors.

AUTHOR CONTRIBUTIONS

All authors have agreed on the final version. Study design: Rebecca Palm, Johannes Michael Bergmann; Data management: René Mueller-Widmer; Development of study protocol: Anna Louisa Hoffmann, Johannes Michael Bergmann, René Mueller-Widmer, Rebecca Palm; Manuscript draft and revision: Anna Louisa Hoffmann, Johannes Michael Bergmann; Manuscript revision: Rebecca Palm, René Mueller-Widmer.

PEER REVIEW

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DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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