Physical Activity in Nursing Homes—
Barriers and Facilitators: 
A Cross-Sectional Study

Sonja Kalinowski, Ines Wulff, Marita Kölzsch, Kirsten Kopke, Reinhold Kreutz, and Dagmar Dräger

Purpose: To explore different institutional barriers to and facilitators of physical activity (PA) in nursing homes. Methods: Cross-sectional survey of 40 German nursing homes and 217 nursing-home residents (NHRs; $M \pm SD$ age $80 \pm 10.2$ yr, 55% women, MMSE $\geq 20$). Quantitative data were collected on the structural characteristics of nursing homes and the PA services available. Results: Forms of exercise available were not adequately communicated to residents. Overall participation was below 50%. Awareness was significantly higher in residents with informed relatives ($p = .003$). A broad range of forms of exercise was generally available ($M \pm SD$ 5 $\pm 2.22$, range 0–10), but they were rarely tailored to NHRs’ needs and their effectiveness remains questionable. Conclusion: Multidimensional opportunities to promote PA in NHRs are identified.

Keywords: exercise, institution, body movement

Physical activity is one of the most important strategies for promoting health and treating diverse health problems in older adults (Sagiv, 2007). There have been rapid advances in knowledge on physical activity in older adults (Nelson et al., 2007), and evidence of the benefits of regular physical activity and exercise in older adults with chronic diseases and disabilities is accumulating (Chodzko-Zajko et al., 2009). In this study, we follow the definition of Chodzko-Zajko et al., who referred to physical activity as “body movement that is produced by the contraction of skeletal muscles and that increases energy expenditure. Exercise refers to planned, structured, and repetitive movement to improve or maintain one or more components of physical fitness” (p. 1511). In addition, there has been increasing investigation of how physical activity and exercise affect institutionalized older adults (Bastone & Filho, 2004; Fiatarone Singh, 2002; Rydwik, Frändin, & Akner, 2004; Weening-Dijksterhuis, de Greef, Scherder, Slaets, & van der Schans, 2011).
The potential health benefits of physical activity and exercise for nursing-home residents (NHRs) are recognized. Physical activity has, for example, been shown to be associated with improved functional performance (Bastone & Filho, 2004; Kolanowski, Buettner, Litaker, & Yu, 2006; Nikolaus, 2001) and mobility (Rydwik et al., 2004), as well as reduced incidence of falls (Clemson et al. 2004; Tinetti et al., 1994) and incontinence (Ouslander et al., 2005, Schnelle et al., 2010) and reduced risk of depression (Nelson et al., 2007). Nevertheless, specific guidelines and recommendations concerning regular physical activity in this vulnerable target group are lacking. There are few opportunities for preventive exercise in residential geriatric care (Brach, Nieder, Nieder, & Mechling, 2009), and there is a growing need for evidence-based physical activity programs and exercises designed especially for NHRs (Kalinowski, Wulff, & Dräger, 2010; Rydwik et al., 2004). Standards guiding the implementation of evidence-informed programs are thus urgently required in Germany and elsewhere (Benjamin, Edwards, & Caswell, 2009).

At present, 717,000 older people live in nursing homes in Germany (Federal Statistical Office, 2011), and the number is growing. Moreover, increasing numbers of NHRs have impaired or reduced functional abilities (Schneekloth & von Törne, 2007). Data from a number of studies document low levels of physical activity and engagement in NHRs (Kolanowski et al., 2006; MacRae, Schnelle, Simmons & Ouslander, 1996). Inactivity and increasing numbers of chronic diseases and impairments are major risk factors that contribute to loss of physical function and may create a vicious cycle.

The nursing-home setting has been largely neglected by research, its population being difficult to reach. Existing physical activity programs have not yet been implemented nationwide in German nursing homes. Although pilot projects and studies have been done, there is a scarcity of structured, planned, and regular physical activity programs (Tittlbach, Henken, Lautersack, & Bös, 2007). There is thus an urgent need for programs capable of facilitating physical activity in institutionalized older adults.

Moreover, there has been little investigation of the opportunities for physical activity beyond exercise for institutionalized older adults in Germany (but see de Bruin, Spence, Hartmann, & Murer, 2008, for a description of the situation in Swiss residential settings). Given the funding constraints that hamper the implementation of physical activity programs in Germany and, for example, Canada (see Benjamin et al., 2009), the importance of investigating opportunities for increasing levels of physical activity beyond such programs is clear. Identifying points of intervention to raise levels of physical activity in nursing homes may help break the vicious cycle of inactivity and reduced capacity (World Health Organization, 1998). In particular, the structural characteristics of institutions and services supporting regular physical activity are key elements in preventing or delaying diseases and in offsetting the adverse effects often associated with increasing age (Meyer, 2006). Unless both of these key aspects are addressed, the risk of further functional impairment increases, leading to heavier dependence on care and decreased autonomy (Tittlbach et al., 2007).

The purpose of this study was therefore to explore institutional barriers and facilitators of physical activity in nursing homes. To this end, we investigated the structural characteristics of institutions and the physical activity services available to residents to identify potential points of intervention to promote physical activity.
Methods

Design

The study design was cross-sectional. All data presented in this article were collected over a 1-year period between March 2009 and April 2010 as part of a larger study, which also obtained data on pain intensity and frequency, pharmacological pain treatment, and perceived autonomy of NHRs. The whole study complied with the Declaration of Helsinki, and ethical approval was received from the local ethics committee.

Survey creation was informed by a theory of the factors influencing physical activity that was developed by the project’s multidisciplinary research team. On this basis, we drew up a theoretically and conceptually based model identifying barriers to and facilitators of physical activity in nursing homes (Kalinowski et al., 2010). The model covers various personal and environmental factors, as well as their interdependencies influencing the physical activity. The conceptual basis of the model was the World Health Organization’s (2001) International Classification of Functioning, Disability and Health (ICF).

Sampling and Recruitment

A random sample of nursing homes and residents in the German federal city-state Berlin and the rural German federal state Brandenburg was drawn. We contacted 147 administrators of nursing homes by letter of information and telephone to determine their interest in participating. Of the administrators contacted, 107 administrators refused to participate, primarily due to lack of personnel and time—some local support was needed to access the nursing documentation and to find rooms or participants, for example. The final sample thus comprised 40 nursing homes. A random sample of residents was drawn from these 40 facilities. Inclusion criteria for residents were having lived in the nursing home for at least 4 weeks and receiving health care services according to the guidelines of long-term-care insurance. All mechanically ventilated, comatose, and dying residents and persons undergoing rehabilitation were excluded. In view of the demographic characteristics of German nursing homes (Federal Statistical Office, 2011), men were oversampled to ensure their adequate representation in the analyses at a ratio of 2:3. We invited the residents and their legal representatives to participate by an information letter; informed nursing-home staff provided further information orally. Participation of nursing homes and residents was voluntary. Written informed consent was obtained from either residents themselves or their legal representatives, and from administrators. The final study population comprised 560 residents. Characteristics of the total NHR population, details of recruitment strategies, and the interview manual will be described elsewhere (Dräger et al., 2012).

For the current investigation of physical activity data, a specific target population—a subsample of 217 residents—who were able to answer interview questions was identified from overall participants: Residents with a Mini Mental Status Examination (MMSE) score ≥20 (Folstein, Folstein, & McHugh, 1975). As 343 NHRs did not meet this inclusion criterion, the following analyses are based on data from 217 residents and 40 nursing homes.
Measures

We applied a multiperspective approach, with a combination of measures to obtain comprehensive and quantitative data on the structural characteristics of the institutions and the physical activity services offered and used. Whereas the administrators were asked to complete a single questionnaire covering several domains and various contents, the residents’ situation was surveyed by several different measures. An overview of the measures implemented is provided in Figure 1.

Subjective data were collected by interviewing the residents and having the nursing-home administrators complete a questionnaire.

Residents’ Interview. The residents’ face-to-face interview included questions about sociodemographic characteristics, corresponding questions assessing the physical activity services received and used, and further questions about received and personally taken measures to maintain physical activity, involvement in everyday life, and wishes for further individual promotion of their functional abilities.

Administrator Questionnaire. The administrator questionnaire covered the following five domains: facility characteristics (operator, size, conceptual focus), physical activity services offered (type, instructors, frequencies, duration), methods of communicating the physical activity services available (addressing the residents and relatives personally, handouts, notice boards, brochures, flyers), physical activity instruction courses (type, intended for employees, residents, and relatives), and structural characteristics of the institutions (equipment, therapists employed, and physical environment: accessibility of rooms, rooms designed for physical activity, availability of outdoor areas, distance to public transport and pedestrian zones or city centers, and appropriate signposting tailored to the special requirements of the residents).

The resident interview and administrator questionnaire were developed specifically for the purposes of this study by the project research team because no available and previously evaluated questionnaires or interviews were found to be suitable or modifiable for our specific requirements. Having consulted the relevant literature, our interdisciplinary research team of experts first drafted the questions in a pilot phase. We chose to develop standardized face-to-face resident interviews and administrator questionnaires to be able to cope with a large number of participants and to allow quantitative analysis of the data using statistical methods. Both measures were structured around different thematic topics. The administrator questionnaire covered 11 topics, and the resident interview, five topics. Most questions in both measures were closed-ended with a dichotomous choice format. Our intention here was to keep complexity as low as possible, particularly with regard to the resident interviews. Some open-ended questions (e.g., “Who?” “How much?” “Which?” “Other?”) were included in both measures to provide further information. The answers were structured by category and worked up quantitatively in this manner. Further information on the methodology used to develop the questionnaires, which have not yet been published, is available on request.

Objective data were obtained by reference to the nursing documentation, through a standardized assessment of cognitive status, and by inspecting physical features of the indoor environment based on standardized dichotomous criteria.
Figure 1 — Overview of measurements implemented and domains covered. PA = physical activity. *Measures developed specially for the current study have not yet been published.
(presence of seating arrangements in the corridors for resting, lighting comparable to natural daylight). The following assessment is commonly applied in clinical and research routines and is established as an assessment in geriatrics.

**Cognitive Status.** The MMSE (Folstein et al., 1975) was administered to assess the cognitive status of all residents. The MMSE is useful in assessing the severity of cognitive impairment (Folstein et al., 1975) and is a preferred screening instrument due to its brevity (Burkart, Heun, Maier, & Benkert, 1998). It focuses on cognitive aspects of mental functions and requires vocal responses and ability to name, follow commands, write a sentence, and copy a polygon. The total score ranges from 0 to 30, with lower scores indicating greater cognitive impairment. Folstein et al. documented its validity and reliability.

The full set of instruments was pretested and modified after a pilot study with 51 residents of four nursing homes, after which the instruments were revised as necessary. In both the pilot and the main study, the complete measures were administered by well-trained researchers, all of whom held a professional and an additional academic qualification in therapy, sports science, nursing, or pharmacy. Close attention was paid to feasibility in this target group (e.g., need to avoid exhaustion, confusion, or overtiredness).

To avoid or minimize missing data in the main study, we chose to obtain resident data through face-to-face interviews. The residents were interviewed in their private living area, where disturbances could be avoided. As far as possible, reasons for nonresponse were documented directly. In addition, in collaboration with the administrators, we controlled open questions and items immediately after they had completed their questionnaire. Researchers were available to answer queries on both measures. Data transfer to statistical software was supported by a syntax check for transmission errors.

**Statistical Analysis**

PASW version 18.0 software (SPSS, Inc., Chicago, IL) was used for statistical analysis. Given the research questions addressed and the explorative approach taken, we relied primarily on descriptive statistics. The institutional and selected residents’ characteristics were summarized using means (± SD) or frequencies and percentages as appropriate. The significance level was set at alpha = .05. Comparisons between groups were performed using the chi-square test.

Data obtained from residents were matched with information provided by the administrator about the forms of exercise available in the facility. The response alternatives available to residents were “no service,” “I participate,” or “no interest.” In cases where residents responded “no service” when a service did in fact exist, residents were coded as being unaware of this particular service.

**Results**

In a first step, the data were checked for completeness and compliance with the inclusion criteria. Concerning the residents’ face-to-face interview and the administrator questionnaire, some items were identified as having missing data. Data were missing for 5% of these items in the resident interview and for 10% of these
items in the administrator questionnaire. As the documented reasons for these data being missing differed, we assumed that the missing values occurred at random.

Nursing-Home Characteristics

A total of 40 nursing homes \((n = 20 \text{ in each state})\) participated. The distribution of operators was basically consistent with the distribution documented in the German national nursing statistics (Federal Statistical Office, 2011): 17 facilities were privately owned, 22 were operated by social services or charities, and one was operated by public services. The size of the institutions ranged from 20 to 230 places in Berlin and from 20 to 205 places in Brandenburg. Of the participating residents, 102 were located in Berlin and 115 in Brandenburg.

Resident Characteristics

Due to the oversampling, almost half of the 217 participants \((M \pm SD \text{ age } 80 \pm 10.2 \text{ years, range } 45–100)\) were men (45%). More than half of the residents (62%) were able to walk, 35% were able to sit, and 3% were confined to bed. Most were assigned to Care Category I (54%), meaning that they needed at least 90 min of care per day, or to Care Category II (39%), meaning that they needed at least 3 hr of care per day. The most frequent diagnosis was arterial hypertension, followed by osteoporosis and depressive episodes for women and coronary heart disease and diabetes for men. More than half the residents (60%) had a low level of education. The mean MMSE score was 26 (SD 3).

Structural Characteristics of the Nursing Home

Physical Environment. With the exception of one nursing home, all rooms required in the daily routine were accessible to residents. All facilities had a garden or an outdoor area with places to sit. More than three quarters provided opportunities for residents to participate in social life, with public transport within a short distance (<200 m) and pedestrian zones or city centers within walking distance. One in four had no designated exercise room. None of the administrators saw any need for improvement in this respect. Four of the facilities lacked appropriate signposting.

Changing to the resident perspective, due to diverse seating arrangements and lighting in the facilities, it was observed at the time of assessment that 17% of the NHRs had inadequate lighting (i.e., not similar to natural daylight) in their living area and 34% of walking residents had no seating arrangements to rest for a time in the corridor areas.

Equipment. Some two thirds of facilities had stability balls; barely half had gym parachutes or resistance bands or tubing. One in four had ninepins, gymnastic batons, or small dumbbells. Five nursing homes had an exercise machine or an ergometer. One of them also had a treadmill and a therapeutic swimming pool. One administrator identified a need for the provision of exercise machines or ergometers.

Therapists Employed. The employment situation with respect to therapists was quite heterogeneous. Half of the nursing homes employed occupational or physical therapists. Of these 20 facilities, 17 offered occupational therapy and 7 offered physical therapy (four provided both services).
Table 1 presents the mean amount of occupational and physical therapy provided (in minutes per week per resident) by facility size and operator. Larger facilities and private operators tended to provide higher amounts of occupational and physical therapy. Given the low number of facilities employing therapists, however, statistical differences were not calculated.

Across facilities, the total hours per week of therapy provided ranged from 25 to 146 hr of occupational therapy and from 7.5 to 110 hr of physical therapy.

**Physical Activity Instruction Courses.** Nursing employees in 34 of the facilities had received special training in the promotion of physical activity—primarily in fall-prevention training (19 nursing homes), transfer optimization (15), and positioning of residents (11). Five facilities offered instruction courses according to the Bobath concept or neurodevelopmental treatment activities (Bobath, 1990). One in four provided their staff with instruction in mobilizing residents in bed and in wheelchairs, as well as in using personal aids and other medical appliances. One facility provided employee instruction in gait training. Most facilities (32) provided instruction for all nursing staff; two facilities instructed only selected nursing employees.

In contrast, more than half of the facilities (25 nursing homes) had not implemented personal instruction courses for residents or their relatives. Specifically, 65% of residents stated that they had not been instructed on how to enhance their personal physical activity or improve their motor skills. Likewise, 65% stated that the institution staff did not encourage them to be active or to exercise.

**Methods of Communicating the Physical Activity Services Available.** We begin our description of the physical activity services available by considering the methods by which the availability of these services was communicated to residents. Clearly, an awareness of the services provided is a crucial prerequisite for their uptake.

All administrators stated that they informed residents about the services available by addressing them personally. Almost all facilities (37) posted information about the services offered on notice boards. About three in four facilities (28) informed relatives about the physical activity services available. A quarter (13) produced brochures, flyers, and/or handouts; these materials were put in the residents’ rooms in eight facilities. In five facilities, all five of these methods of

Table 1  Mean Amounts of Occupational and Physical Therapy Provided by Facilities

<table>
<thead>
<tr>
<th>Facility characteristic</th>
<th>Amount of Therapy (min per week per resident)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Occupational therapy</td>
</tr>
<tr>
<td>Size (no. of residents)</td>
<td></td>
</tr>
<tr>
<td>≤125</td>
<td>20</td>
</tr>
<tr>
<td>&gt;125</td>
<td>35</td>
</tr>
<tr>
<td>Operator</td>
<td></td>
</tr>
<tr>
<td>charity</td>
<td>22</td>
</tr>
<tr>
<td>private</td>
<td>36</td>
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</tbody>
</table>
communication were used. In eight facilities, four methods were used in parallel, and in 14 homes, three methods.

Physical Activity Services

**Individual Intervention Plans.** In an additional question, administrators were asked for individualized intervention plans or targeted procedures used to enhance residents’ personal physical activity (not prescribed by physicians). They were asked for specified types, frequencies, length, and scheduling of these plans. Almost three in four (28 homes) provided such intervention plans.

**Forms of Exercise.** The data revealed that a broad range of forms of exercise were used to promote residents’ physical activity in all but two of the nursing homes. A total of 24 forms of exercise were offered. No major differences in the range and variety of exercise offered were found across operators (profit or nonprofit) or regions (urban or rural).

The variety of forms of exercise available is notable ($M \pm SD = 5 \pm 2.22$, range 0–10). More than half of the facilities (23) offered four to seven different forms of exercise; six facilities offered 8–10 forms. For the most part, these were not evidence-based physical activity programs or forms of exercise specifically targeting NHRs. Rather than forms of exercise tailored to specific target groups (e.g., transfer training for wheelchair users or exercises in an upright position for stroke patients), administrators tended to report “one-size-fits-all” approaches. Figure 2 provides an overview of the 10 most commonly provided forms of exercise.

Recreational or leisure-time physical activities were implemented as frequently as forms of exercise promoting basic functional motor skills. The most frequent form of exercise was gymnastics, which was offered by just over half the facilities. Fifteen facilities provided specific functional training of the motor skills required to perform activities of daily living (ADL) such as dressing, feeding, and personal hygiene. In contrast, specific functional training to enhance residents’ mobility skills (e.g., fall prevention, gait training, or training in the use of personal aids and other medical appliances) does not appear in Figure 2 because it was offered only by a few facilities—fall-prevention training was offered by six facilities. Eight nursing homes offered seated gymnastics, four of them in addition to “standard” gymnastics.

Each of the 10 most commonly provided forms of exercise differed in terms of frequency, duration, and instructor qualifications. These differences are documented in Table 2 for the function-oriented forms of exercise offered: strength and balance, ADL training, and explicitly labeled fall prevention. As shown in the table, not all instructors were state-certified therapists or registered nurses—some courses were facilitated by social or resident caregivers or by nursing assistants.

Analysis of the exercise setting (individual vs. group) revealed that the 10 most commonly provided forms of exercise were predominantly delivered in group settings. With respect to the function-oriented forms of exercise, half of the strength and balance exercises were performed in individual settings, whereas ADL training and fall-prevention exercises were primarily offered as group interventions.

**Participation.** Figure 3 presents the most commonly provided forms of exercise (administrator perspective) in terms of their uptake by residents (resident perspective), in descending order of participation. Fall prevention was added as
**Figure 2** — Ten most commonly provided forms of exercise.
Table 2  Differences in the Function-Oriented Courses Offered

<table>
<thead>
<tr>
<th>Type of exercise</th>
<th>Instructors</th>
<th>Frequency</th>
<th>Duration (min)</th>
</tr>
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<tbody>
<tr>
<td>Strength and balance</td>
<td>3 nurses</td>
<td>1 ×/week</td>
<td>10, 45, 60</td>
</tr>
<tr>
<td></td>
<td>3 resident caregivers*</td>
<td>2 ×/week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 physical therapist</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 occupational therapist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADL training (n = 15)</td>
<td>7 nurses</td>
<td>1 ×/day</td>
<td>10, 15, 20, 30, 60, (120)*</td>
</tr>
<tr>
<td></td>
<td>5 occupational therapists</td>
<td>1 ×/week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 physical therapist</td>
<td>2 ×/week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 nursing assistant*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 all employees*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall prevention (n = 6)</td>
<td>2 physical therapists</td>
<td>1 ×/week</td>
<td>20, 30, 45, 60, 90</td>
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<tr>
<td></td>
<td>1 physical therapist or social caregiver*</td>
<td>2 ×/week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 occupational therapists</td>
<td>1 ×/month</td>
<td></td>
</tr>
</tbody>
</table>

Note. ADL = activities of daily living. Instructors marked with an asterisk* were neither state-certified therapists nor registered nurses.

*This response was scored as a mistake because daily ADL training of 120 min is implausible.

an alternative for strength and balance training and seated gymnastics, which had no equivalent in the resident interview.

Participation did not reach 50% in any of the programs. The form of exercise with the highest participation was gymnastics (46%). Less than a quarter of residents participated in fall-prevention training, and 6% participated in ADL training. Approximately one third of the residents stated that they had no interest in each form of exercise provided. At the same time, high proportions of residents were unaware of services provided. This lack of awareness also applied to the function-oriented forms of exercise, ADL training, and fall prevention.

When discrepancies were found between the forms of exercise provided and those of which residents were aware (administrator vs. resident perspective), we investigated all described methods of communication in detail. It emerged that residents’ awareness was significantly higher when their relatives were informed about the forms of exercise available in the facility ($p = .003$).

**NHRs’ Own Activities and Wishes.** To identify further opportunities for physical activity beyond the services provided, we asked residents about their involvement in the everyday life and running of the facility. Most (80%) stated that facility employees performed (domestic) tasks such as setting the table, washing the dishes, folding and returning clean clothes, delivering newspapers, and feeding pets. About 10% of residents reported participating in such everyday tasks, and 10% had no interest in doing so.
Figure 3 — Residents’ participation in the most commonly provided forms of exercise. ADL = activities of daily living.
Most (76%) residents stated that they took measures of their own to maintain their functional abilities. Responses to an additional open question ("If yes, what do you do?") revealed that most of these activities were nonspecific. The largest category was "take a stroll/walk around the facility," followed by "physical exercises/gymnastics" and "move my arms, legs, and hands while sitting in the wheelchair." Overall, the residents’ answers revealed a great variety of personal activity plans that were difficult to categorize due to their heterogeneity.

Furthermore, 22% of residents voiced wishes for further individual promotion of their functional abilities. The three most frequent responses to an extra open-ended question ("If yes, which ones?") were more physical therapy, more exercise and training, and individual plans and instructions for movement. Finally, 86% of residents stated that they had no opportunity to influence the physical activity program implemented.

**Discussion**

Our findings on the structural characteristics of nursing homes and the physical activity services provided make it possible to identify several points of intervention for promoting physical activity in nursing homes.

Beyond organized interventions, the structural characteristics of nursing homes, starting with the physical environment, offer a potential point of intervention to promote physical activity. Spatial conditions and the built environment can encourage autonomy or dependency (Bohn, 2006). In their study of Swiss residential settings, de Bruin et al. (2008) found that facility structure could reduce rather than enhance residents’ interest in physical activity. Likewise, Benjamin et al. (2009) reported constraints in the built environment of Canadian long-term-care facilities that functioned as barriers to physical activity (e.g., steep ramps). For the most part, our findings revealed that the spatial conditions of the nursing homes were conducive to autonomous physical activity within the facility, at least: All rooms required in the daily routine, including outdoor areas, were accessible to residents. Moreover, all facilities had a garden or an outdoor area—in contrast to the limited availability of outdoor areas reported in Taiwanese long-term-care institutions, for example (Chen, 2010). However, there is room for improvement in the provision of designated rooms for exercise and interventions—one in four facilities had no such rooms. Designated exercise rooms are the precondition for providing undisturbed interventions without needing to move furniture or being disturbed by passing employees or visitors. Our data are thus consistent with previous findings identifying a need for designated safe spaces for physical activity (Benjamin et al., 2009).

Appropriate signposting adapted to residents’ specific needs (e.g., impaired vision) is important for safe and self-directed locomotion in the facility. Some nursing homes showed deficits in this area that could be easily addressed. Other typical shortcomings such as dimmed and monotonous lighting in corridors (Buschmann & Winter, 2001) and in bedrooms (Sacco-Peterson & Borell, 2004) complicate vision and make it more difficult for residents to recognize rooms and objects, to orient themselves, and to move about safely. Corridor design should provide functional pedestrian spaces and seating areas for tired residents. The deficits detected in both of these areas could be eliminated with minimal financial expense.
In terms of equipment, our findings show that exercise equipment—rather than ergometers, exercise machines, and movement systems—is generally used to support physical activity. This equipment is mainly used during organized interventions. In contrast, exercise machines and ergometers, in particular, can be used individually and beyond fixed times. Exercise machines may be used for passive exercise (without requiring active muscle contractions), assistive exercise (i.e., power-assisted exercise), active exercise (requiring personal muscle activity), or resistive exercise (with personal muscle activity against resistance). Although the availability of such equipment was insufficient in the nursing homes examined, most administrators did not see any room for improvement. The purchase of exercise machines would open up potential for physical activity without the need for great investment in personnel time and effort. In Germany, for example, these systems are a recognized tool in the list of technical aids and can be requested at neutral cost for residents and facilities by public health insurers (GKV-Spitzenverband, 2011).

Half the facilities employed occupational and physical therapists to foster residents’ physical activity, reflecting their willingness to maintain and enhance residents’ functional abilities. Half the facilities, however, did not employ qualified therapists. Statistically, only the mean amount of therapy provided by larger and private facilities appeared to be sufficient, as measured against recommended treatment durations (GKV-Spitzenverband, 2008). There is clearly room for improvement here. One promising possibility would be for nursing homes to establish cooperation agreements with schools or universities of cooperative education, thus providing residents with therapy sessions at neutral cost. These interventions would be closely supervised and based on current scientific knowledge. This possibility may be of particular relevance for nursing homes with more limited financial resources.

Physical activity instruction courses for nursing-home employees were widely implemented. The most commonly received instruction was in fall prevention, reflecting the prevalent fear of falling among residents and the known dangers of falls. Courses in fall prevention can equip nursing staff with the knowledge and skills to promote autonomous physical activity in a safe environment. Other courses targeted aspects of physical activity that are relevant during nursing routines (transfer optimization and positioning). Components of these courses focus on the self-empowerment of residents as another prerequisite for physical activity. For example, transfer-optimization training helps or enables residents to get out of bed. NHRs have stressed their perceived importance of this ability (Bourret, Bernick, Cott, & Kontos, 2002). Positioning is important for the physical activity of bedridden residents. A targeted and planned positioning can stimulate and facilitate perception and the ability to exercise movable parts of the body (Lückhoff, 2010). However, topics such as gait training, gait guidance, and training with walking aids were covered far too seldom, although assisted walking is a routine element of geriatric nursing (e.g., from the bedroom to the dining room and back). There is clear potential for skilled employees to teach residents key competences (e.g., individual use of and walking with aids). In this way, nurses and residents could learn to recognize and capitalize on functional daily activities as useful training interventions. Moreover, there is room for improvement in the physical activity instruction courses and advice provided for residents and relatives; more than half the facilities offered no such services. Consequently, residents’ personal activity
plans were predominantly nonspecific and probably self-drafted, and their effectiveness remains questionable.

Providers have to ensure that all residents are adequately informed about the programs of exercise available. Awareness of the services offered is clearly a precondition for their uptake. The discrepancies found between the services provided (administrator perspective) and residents’ awareness of those services (resident perspective) indicated substantial communication deficits. There is an urgent need for action here, as communication problems are evidently preventing the active participation of many residents—particularly in the function-oriented forms of exercise, ADL training and fall prevention. Here, in particular, enhanced services and effective, targeted methods of communication are needed. Our findings demonstrate the value of both informing relatives and evaluating the methods of communication used in individual nursing homes. A differentiated program cannot help enhance physical activity if the addressees are unaware of it.

Personal physical activity services, such as recommended individual activity plans (Nelson et al., 2007), are of particular relevance for residents with multiple diseases, who are characterized by heterogeneous physical conditions and needs. In our study, three in four nursing homes provided such individual plans based on residents’ personal capabilities, thus offering an essential basis for promoting physical activity. What is worrisome, however, is that one in four nursing homes did not provide individual activity plans. Yet some essential training interventions—for example, dressing, stand and gait training, and using aids and appliances—are difficult to implement in group settings. There is thus considerable potential for the implementation of individual activity plans with personalized aspects. In this way, residents could gain knowledge and skills and be encouraged and enabled to train on their own—beyond planned interventions and adapted to their own daily routine.

Although the nursing homes offered a broad range of forms of exercise, these often failed to reach the residents. These findings from Germany are consistent with previous data from Austria (Jenull-Schiefer & Janig, 2004). Apart from communication deficits, some further causes of this mismatch were identified. Due to the lack of specific guidelines on regular physical activity and evidence-based physical activity programs for NHRs, the exercises provided were rarely tailored to specific target groups, and group interventions dominated. Previous research has criticized group interventions for taking a “shotgun approach” (Jenull-Schiefer & Janig 2004) rather than targeting individual needs (de Bruin et al., 2008).

Current guidelines for the treatment of older adults with chronic diseases and disabilities (Fiatarone Singh, 2002) recommend training in cardiovascular endurance, resistance, flexibility, and balance. Results from a comprehensive review on physical activity for frail institutionalized older adults (Weening-Dijksterhuis et al., 2011) suggest a combination of strength, balance, endurance, and ADL training. Only some of the nursing homes examined fulfilled these recommendations, and two did not provide any form of exercise, which is clearly not acceptable. Less than one quarter (eight facilities) covered some of the recommended parameters (Chodzko-Zajko et al., 2009; World Health Organization, 2010) by implementing strength and balance exercises. However, most facilities did not offer the balance exercises that are recommended for older adults at risk for falling (Nelson et al., 2007) or for frequent fallers (Chodzko-Zajko et al., 2009). None of the homes
offered aerobic exercise or endurance training, although guidelines recommend 150 min of moderate-intensity aerobic physical activity per week for older adults (Chodzko-Zajko et al., 2009; World Health Organization, 2010) and about 180 min/week for frail institutionalized older adults (Weening-Dijkstra et al., 2011).

In terms of frequency, it has been recommended that muscle-strengthening activities be performed 2 or 3 days/week (Fiatarone Singh, 2002; Nelson et al., 2007; World Health Organization, 2010) and balance exercises 1–7 days/week (Fiatarone Singh, 2002). The strength and balance exercises offered were approximately in line with these recommendations. It is recommended that ADL training be performed three times per week (Weening-Dijkstra et al., 2011), but the ADL interventions offered in the nursing homes examined did not meet these recommendations. As the available research does not allow specific recommendations to be made on the frequency and intensity of fall-prevention interventions for individuals with mobility problems, we cannot compare the empirical data in this domain with recommended parameters (Chodzko-Zajko et al., 2009).

The qualifications of the instructors who provided physical activity services differed. Many were not adequately qualified to facilitate strength and balance courses—for the most part, these interventions were run by registered nurses or resident caregivers. Comparable barriers in professional skills were indicated by residents in the study of Stathi and Simey (2007), who reported negative experiences with exercise instructors who were “unprofessional” and “did not identify participants’ needs and abilities, and exposed them to unnecessary risks” (p. 279).

Overall, compared with findings from Switzerland (de Bruin et al., 2008), the frequencies, session duration, and content of the physical activity services offered by the German nursing homes examined seem insufficient. Their effectiveness remains questionable. There is thus much scope to motivate nursing homes to offer programs fostering physical activity. The potential health benefits of physical activity and exercises for impaired and institutionalized older adults are well known—physical activity has been shown to have various beneficial effects on the most frequent diagnoses in this sample: hypertension, coronary heart disease, diabetes, osteoporosis, and depressive episodes (Mensink, 2003; Nelson et al., 2007; Pescatello et al., 2004). Benjamin et al. (2009) confirm this positive known value of physical activity for older adults in long-term care. However, barriers persist in their implementation. In addition, targeted and function-oriented exercise programs (e.g., fall prevention, ADL training, transfer training, stand and gait training, and training with walking aids) were rarely provided. These could and should be implemented by giving targeted and function-oriented exercises greater priority in physical activity programs. Moreover, our data identify specific groups that may also require targeted interventions (e.g., exercises for walkers and for residents able to sit, special strengthening exercises for women with osteoporosis).

Besides a lack of awareness, residents’ poor participation was attributable to their low interest. These findings raise several questions. On the one hand, to what extent does participation depend on the professional quality of the instructors (de Bruin et al., 2008) and the courses conceptualized and implemented? On the other hand, to what extent do these services meet residents’ needs? Most forms of exercise were offered in group settings and thus failed to cater to the heterogeneous needs of residents with multiple illnesses. Identifying individual preferences, needs,
and wishes is a key condition for tailoring the services offered. This is of special importance for NHRs who suffer from pain (AGS Panel on Persistent Pain in Older Persons, 2002). Nursing-home staff should ask residents about their wishes, their experience of exercise (Stathi & Simey, 2007), and their needs and should give them the opportunity to influence or to take part in creating a physical activity program. The vast majority of residents had not been given the opportunity to be involved in this way—Chen (2010) identified this lack of involvement and the associated restrictions in physical activity choices as a barrier to physical activity. Possibly because of this situation, three in four NHRs exercised on their own and unassisted. Residents are thus clearly motivated, and there is much individual potential to promote physical activity. This potential must be tapped. To this end, it is indispensable to encourage all residents, providing them with continuous support and reinforcement. There is a need for proactive nursing (Stathi & Simey, 2007) that includes individual instruction and is integrated into everyday life tasks, sensitizing residents to everyday movements as useful training stimuli.

Our findings identify several barriers to and facilitators of physical activity in nursing homes and may thus usefully inform the development of interventions designed to increase physical activity in this setting. First, operators and health care providers need to check that the necessary institutional framework is in place: appropriate signposting and seating areas, availability of equipment for individual use beyond fixed times (e.g., ergometers), adequate lines of communication, and willingness to cooperate with researchers in implementing an intervention designed to increase physical activity. Second, researchers and operators should ensure that the following aspects are covered in the development of intervention measures: assessment of residents’ requirements, resident participation in program development, provision of physical activity plans for residents and of advice for residents and relatives, coverage of other routine elements of geriatric nursing in physical activity instruction courses for employees (e.g., gait guidance), and greater prioritization of targeted and function-oriented exercises in existing physical activity programs.

**Limitations**

There are some notable limitations to the current study. First, it was limited to residents with an MMSE score ≥20. Thus, although some NHRs with cognitive impairments were included, those with MMSE scores <20 were excluded from the study. Our results thus cover a substantial group of NHRs, but residents with severe cognitive impairments and dementia have specific needs. In preparation for future demographic developments, the challenge will be to include NHRs with severe cognitive impairments in research and to address their special needs. Regarding the choice of an MMSE cutoff score of 20 for cognitive screening (MacKenzie, Copp, Shaw, & Goodwin, 1996), it should be mentioned that various cutoff values have been examined and that scores may be biased, for example, by educational level or age (Woodford & George, 2007).

The second limitation is the cross-sectional design itself. Because data collection was limited to a single time point, it was not possible to test the efficacy of existing physical activity interventions or to analyze cause-and-effect relationships.
The third limitation is that data were predominantly obtained from self-report measures (administrator questionnaire and resident interview), the inherent limitations of which include social-desirability bias and cognitive challenge. Future research could include objective measures of physical activity, such as ActiGraphy using accelerometers, to compare self-reported and actual physical activity (see, e.g., Troiano et al., 2008).

Additional research with larger samples of residents and nursing homes that are representative at a national level (e.g., spread across Germany or other nations) is needed to confirm the generalizability of the barriers and facilitators identified.

**Conclusion**

The current findings provide insight into how physical activity can be promoted in German nursing homes despite residents’ multiple chronic diseases and impairments. Our findings identify important barriers and facilitators to physical activity in terms of the structural characteristics of the institutions and the physical activity services currently provided. Interventions at the points identified can foster the multidimensional promotion of physical activity in NHRs. As we have noted, several existing barriers could be changed into facilitators relatively easily and at low cost. Our results further underline the importance of tailoring physical activity services to individual residents’ needs. NHRs are in particular need of physical activity and are a target group with specific and heterogeneous characteristics. Therefore, various aspects must be taken into consideration when planning and implementing these services.

This study extends, to our knowledge, previous findings by providing the first German empirical data in this domain. This initial survey of the status of physical activity services in German nursing homes thus provides a vital basis for further investigation of exercise and activity programs. Future research should further investigate residents’ individual needs and requirements for physical activity services—especially among residents who are unable to express their needs.

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