

Implementing physical exercise and music interventions for patients suffering from dementia on an acute psychogeriatric inpatient ward

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Abstract

Background: Increasing attention is focusing on psychosocial interventions for treating patients with dementia.

Aims: This observational intervention study investigated the impact of physical exercise and music interventions among patients with dementia on an acute psychogeriatric ward.

Materials and method: The data were collected during February 2009 – December 2010 (n=89; treatment as usual) and during April 2011 – March 2013 (n=86; treatment as usual with physical exercise, e.g. balance, flexibility, strength training and music interventions, e.g. singing, listening to music and playing instruments). The primary outcome measure was the Neuropsychiatric Inventory and the secondary outcome measures were the Alzheimer's Disease Cooperative Study–Activities of Daily Living, the Barthel Index and the Mini Mental State Examination.

Results: In both groups, neuropsychiatric symptoms decreased ($p<0.001$) but daily functioning deteriorated ($p<0.001$). No significant between-group differences for either outcome variable were found. Based on linear mixed models fewer exercise sessions associated with more severe symptoms ($p=0.030$), and the time variable (admission/discharge) with a decline in the level of neuropsychiatric symptoms ($p<0.001$). Moreover, female gender ($p=0.026$) and more exercise sessions ($p=0.039$) associated with an increased level of functioning ($p=0.031$) and the time variable (admission/discharge) with a drop in the level of functioning during hospitalization ($p<0.001$).

Conclusion: Although no differences were found between the study groups, analysis within the intervention group suggest that physical exercise may have some positive effects for both neuropsychiatric symptoms and the level of functioning in some patients with dementia while no positive effects regarding music interventions were found.

Keywords: activities of daily living, behavioural symptoms, dementia, exercise, music

Introduction

Dementia has become a worldwide concern. In 2015 the number of people living with dementia was estimated to be approximately 46,8 million and the number is predicted to nearly double in the next 20 years. Alzheimer's disease is the most common form of dementia accounting 60 to 80 percent of all dementia cases. [1.] Health care costs for individuals with Alzheimer's disease and other dementia are substantial. Between 2005 and 2009 the total worldwide cost of dementia increased by 34% [2] and again between 2010 and 2015 by about 35% [1]. There is an urgent need for new treatment methods for patients with dementia [3].

Dementia refers to multiple cognitive deficits and impairment in activities of daily living (ADL) [4,5]. Neuropsychiatric symptoms (NPS; also known as behavioural and psychological symptoms) such as apathy, depression, agitation, anxiety and psychosis, are common in dementia [6,7]. NPS associated with the degree of cognitive and functional impairment [8] have been found to contribute to the institutionalization [9] and caregiver burden of people with dementia [10,11]. Agitation and psychosis are commonly treated with psychiatric medications [12] although the efficacy of, for example, atypical antipsychotics for these symptoms is, at most, only modest and they may cause serious adverse effects [13,14]. Based on these findings, recent guidelines recommend that psychopharmacological interventions should not be the first-line treatments for NPS [15,16].

Systematic reviews [17-23] focused on the effects on music interventions on patients with dementia suggest that these interventions seem to have a positive effect on some symptoms, such as depression [17,19, 21], anxiety [17, 21, 22] and behavioural problems [17-19, 21] while the findings concerning agitation/aggression are inconsistent [19, 20].

Moreover, there is not enough evidence to support the efficacy of these interventions on ADL [17].

Also physical exercise interventions among dementia patients have been investigated in several trials and systematic reviews and meta-analyses have been published [24–29]. Some reviews report effect of physical exercise on NPS [25,28,29]. Physical exercise may also improve ADL [24,26] and mobility and functional limitations, which are important to impairing ADL [27]. Fleiner et al. [28] reviewed the effects of short term exercise applicable to carry out in acute care settings and reported that exercise may have positive effect on NPS. They argued that randomized controlled trials in acute dementia care settings are rare. Recently Bürge et al. [30] found no benefit of four weeks exercise programme over a social activity programme in ADL. Moreover Fleiner et al. [31] examined two weeks exercise programme. As compared to social stimulation program exercise programme showed significantly more positive effects on neuropsychiatric signs and symptoms.

In our previous research [32] on an acute psychogeriatric ward we found that patients' NPS improved significantly during their hospital stay while their level of functioning deteriorated. We also found a substantial increase in psychotropic medication [32]. Earlier studies have shown that NPS and functional impairment have been found to contribute to institutionalization [9]. Moreover, hospital stay may impair ADL among patients with dementia [33,34]. In light of these findings as well as our earlier findings [32], we decided to explore if adding nonpharmacological interventions to routine treatment on an acute psychogeriatric ward would have any impact on NPS, ADL and psychotropic medication. Music and physical exercise interventions were chosen since there is some evidence that music interventions alleviate NPS [17-19,21,22] and physical exercise has been suggested to

improve ADL [24,26] and perhaps some NPS [25,28,29,31]. Moreover, both interventions are practicable while needing only moderate time and personnel resources and are feasible to implement in inpatient settings.

The main aim of the present study was to explore the impact of physical exercise and music interventions on NPS, level of functioning and use of psychotropic medication in a replicated sample of patients with dementia on one acute psychogeriatric ward. We hypothesized that systematically including physical exercise and music interventions in the routine treatment of these patients would improve NPS and ADL and reduce the use of psychotropic medications.

Methods

Study design

The study is an observational intervention study, a benchmark controlled trial (BCT) which is a novel concept. BCTs assess comparative effectiveness between single or sets of interventions, between clinical pathways or between factors related to the health care system. BCTs can be used to assess the impact of clinical intervention in routine settings. Thus these trials support both clinical and policy decisions. [35]. The study was conducted in accordance with the Declaration of Helsinki [36] and the study protocol was evaluated and registered by the regional ethics committee of the university hospital. Informed consent was obtained from the participants or their relatives if the participant's Mini Mental State Examination [MMSE; 37] score was lower than 18 prior to inclusion [37,38].

Setting and participants

Participants were recruited from one acute psychogeriatric ward with 17 beds at one University Hospital in Finland. All consecutively admitted patients were screened by the nurse responsible for the study or her deputy and included in the study if they had a diagnosis of dementia according to the ICD-10 (F00, F01, F02, F03) confirmed by a physician. There were no specific exclusion criteria. The participants for the two study groups (a control group and an intervention group) were recruited in two phases. The data on the patients in the control group were collected from February 2009 to December 2010 and the data on the patients in the intervention group from April 2011 to March 2013. A new treatment procedure was implemented between the two data collection periods. During the first round of data collection, 175 patients met the inclusion criteria and 89 patients (48%) participated in the study (“control group”, treatment as usual). During the second round of data collection after the introduction of the new treatment procedure, 173 patients met the inclusion criteria and 86 patients (50%) participated (“intervention group”) (Figure 1). There were no significant differences in baseline demographic or clinical characteristics between the two study groups (Table 1).

[Figure 1 near here]

[Table 1 near here]

Study intervention

All participants in both study groups received treatment as usual including medication and multidisciplinary treatment negotiations in which patients’ relatives were also asked to participate. The primary nursing model, where every nurse was responsible for a small group

of patients from the time of admission to the time of discharge, was used on the ward [39]. Multidisciplinary team meetings took place daily. Moreover, treatment as usual included some recreational activities in the ward's living room such as reading newspaper, painting, playing games, singing songs, listening music and exercise training. These activities were carried out infrequently based on nurses' individual interests and if they were not busy with routine work. On some days during a week there was also a possibility to walk outdoor in a group with a nurse. Patients' willingness to take part in different activities were asked separately each time.

The new treatment procedure implemented in the intervention group was planned together with the ward staff, based on a literature review. The basic structure of the old treatment model was maintained but two psychosocial interventions, physical exercise and music were included in the treatment. When planning music and exercise interventions a music therapist and a physiotherapist were consulted. The chief physician and the nursing director were also involved in planning the new treatment procedure. The physical exercise interventions included balance, flexibility and strength training either when seated or standing, relaxation and exercise with a restorator. Music could be a part of the exercise sessions. Moreover, physical exercise included walking on the ward or outside the ward. The music interventions included singing or listening to familiar songs, listening to music played by the staff, playing hand-held percussion instruments, moving or dancing to music as well as discussing feelings and memories related to music. Both the physical exercise and music sessions were carried out either individually or in groups.

Interventions were carried out according to a weekly schedule including two music groups, two physical exercise groups, and the opportunity to walk outdoors six times a week. The

groups were scheduled to last 45 minutes. These groups were open to all patients on the ward, not only for patients in the study sample. Moreover, the weekly schedule included 30 minutes in every day to carry out individual music or physical exercise sessions. Patients' individual treatment plans for participating in activating interventions were negotiated in the treatment plan meeting based on his or her needs and ability to participate. The nurses encouraged the patients to participate in the activities. The staff (physiotherapist, physical education instructor, registered nurses, practical mental health nurses) working on the study ward carried out the interventions.

To support systematic implementation of the new treatment procedure the nurses' ability to work according to the new treatment procedure was ensured by training them in eight training sessions over 5.5 days. The training sessions included assessment and care of patients' NPS, collaboration with family members, the basics of group therapy as well as physical exercise and music interventions in the treatment of patients with dementia. To guide the staff to implement the new treatment procedure a written treatment manual with detailed information about interventions were introduced to them. Moreover, the staff had a possibility to discuss and ask questions about the study in the ward meetings. The ward manager, who took part in the research group's meetings, was responsible for the implementation process.

Measures

The primary outcome measure was the Neuropsychiatric Inventory (NPI) [40] and the secondary outcome measures were the Mini-Mental State Examination (MMSE) [37], the Barthel Index (BI) [41] and the Alzheimer's Disease Cooperative Study–Activities of Daily Living (ADCS-ADL) [42]. Patients' background characteristics (gender, age, marital status,

setting before admission, type of dementia, length of stay) were collected using questionnaires, and psychotropic medication use at admission and at discharge was obtained from patient files. Altogether seven nurses who were trained specifically in the use of the scales and members of the ward staff collected the data. The assessors were not blind to study period. Data collection was carried out following admission after patients' participation in the study was ascertained, and before discharge after the day of exit was decided.

Statistical analysis

Paired and independent samples t-test were used with different clinical and medication related scale variables in analysing the changes between admission and discharge, and in comparisons between the control and intervention groups. Pearson or Spearman correlations were used in the comparisons between clinical and treatment related variables. Linear mixed models (LMM) for repeated measures were used for analyzing the changes in either NPI or ADCS-ADL scores. Within these models, age and total numbers of different interventions (music and physical exercise) as covariates, and time (admission/discharge), gender, antipsychotic dosage (less than 50 mg chlorpromazine equivalents [cpz_{ekv}] /day vs. at least 50 mg cpz_{ekv}/day) and benzodiazepine dosage (less than 5 mg diazepam equivalents/day [dz_{ekv}] vs. at least 5 mg dz_{ekv}/day) as factors. The selection of psychosocial treatment related variables for the LMM models was based on exploratory correlation analysis, in which different modalities had very high inter-correlations ($r > 0.9$, data not shown). Therefore only the total numbers of music and physical exercise sessions were included in the analysis models. The level of statistical significance was set at $p < 0.05$. Dose equivalences of antipsychotic and anxiolytic drugs were calculated according to Andreasen et al. [43]. All

calculations were performed using SPSS statistical software package (version 22.0, IBM Inc.).

Results

During the study period, a total of 194 nurse-directed music groups were carried out, each of them lasting an average of 44 minutes (min 10, max 120, SD 15.9). These groups included listening to music or singing, which were often combined with remembering or talking about some themes related to music, body motioning, relaxing or playing with rhythm instruments. The number of participants in these groups varied between 2 and 14 (mean 7, SD 2.4). The individual music sessions included the same elements as the group based sessions and lasted on average 34 minutes (min 10, max 90, SD 13.8). In total, the patients participated, on average, in nine (SD 8.2) individual or group based music sessions. Physiotherapist-directed groups (n=43) mainly included strength, mobility and stability training. The nurse-directed physical exercise groups (n=120) included stretching, doing gymnastics, throwing of balls or beanbags or walking outdoors. The mean number of participants in the physical exercise groups was five (min 2, max 14, SD 2.4) and the groups lasted approximately 37 minutes (min 15, max 75, SD 11.4). During the individual physical exercise sessions, patients primarily walked outdoors or on the ward with a nurse. The mean duration was 27 minutes (min 5, max 60, SD 11.0). In total, the patients participated, on average, in seven (SD 8.4) individual or group based physical exercise sessions. The median (IQR) distributions of attendance in music and exercise groups per week were 1.0 (1.2) and 0.9 (1.3), respectively.

In the intervention group (n=86) with activating physical exercise and music interventions added to treatment as usual, the total NPI score decreased from 33.2 to 16.9 ($p<0.001$) but daily functioning (ADCS-ADL) deteriorated from 31.3 to 20.0 ($p<0.001$) during the hospital stay. In the control group (treatment as usual), the corresponding changes were: total NPI score decreased from 34.6 to 19.5 ($p<0.001$) and daily functioning deteriorated from 32.2 to 21.7 ($p<0.001$) during the hospital stay. No significant changes were found in functional state according to the Barthel Index in either study group. There were no significant changes in any measured outcome variables between the study groups (Table 2).

[Table 2 near here]

When exploring total NPI or single items in the baseline assessments, no significant differences were found between the intervention or the control group. On the contrary, significant differences were found at discharge in the “anxiety” item between the intervention and the control group (mean vs. 1.71, SD 2.74 vs. mean 2.93, SD 3.69; $p=0.01$) with less anxiety in the intervention group as well as in “sleep and night time behaviour” (mean 2.63, SD 3.26 vs. mean 1.57, SD 2.36; $p=0.02$) referring to more night-time problems in the intervention group.

Seventy five (87.2%) patients in the intervention group received psychotropic medication at admission and at discharge the number of patients was 81 (94.2%). In the control group 72 (80.9%) patients had psychotropic medication at admission and 85 (95.5%) at discharge. There were not significant differences between the intervention and the control group in antipsychotic medication dosage [milligrams per day in chlorpromazine equivalents] on admission (mean 33.1 mg [SD 57.7, range 0–300] vs. mean 46.8 mg [SD 68.2, range 0–300])

or in discharge (62.4 mg [SD 61.8, range 0–313] vs. mean 80.8 mg [SD 81.3, range 0–320]). There were no differences in dosages of anxiolytic medications [milligrams per day in diazepam equivalents] between the intervention group (mean 3.4 mg, SD 7.9) and the control group (mean 3.4 mg, SD 6.0) on admission or at discharge (intervention group mean 8.9 mg, SD 10.6 vs. control group mean 6.2 mg, SD 7.0, $p=0.06$). The length of stay was equal between the intervention and the control group (mean days 46.5, SD 27.8 vs. 44.4, SD 32.9, $p=0.65$).

In explorative correlation analyses, both the number of individual based music intervention ($r=0.237$, $p=0.033$) and the group music intervention sessions ($r=0.273$, $p=0.014$) correlated positively with dosage of antipsychotic medications and with dosage of anxiolytic medications ($r=0.299$, $p=0.007$). However, the number of individual or group based physical exercise sessions had no significant correlations with antipsychotic or anxiolytic medication dosages ($r=0.045-0.166$).

Linear mixed models (LMM) for repeated measures were used for analyzing the changes in either NPI (model 1) or ADCS-ADL (model 2) scores. Within these models, age and total numbers of different interventions (music and physical exercise) and change in antipsychotic or anxiolytic dosage from admission to discharge were used as covariates, and time (admission/discharge) and gender as factors. In the model 1, the significant explanatory variables for NPI score included the number of physical exercise sessions ($B=-0.68$, $p=0.030$), with fewer exercise sessions associated with more severe symptoms, and the time variable (admission vs. discharge, $B=14.6$, $p<0.001$; Table 3a) indicating a decline in the level of neuropsychiatric symptoms during hospitalization. In the model 2, the significant explanatory variables included gender ($B=-6.67$, $p=0.026$), with female gender associated with better level

of functioning, and the time variable (admission/discharge, $B=9.11$, $p<0.001$, Table 3b) indicating a drop in the level of functioning during hospitalization.

Table 3a/3b near here

Discussion

Given the findings from earlier studies [9,33,34] as well as our own findings [32] the main aim of this study was to explore if adding nonpharmacological interventions to routine treatment on an acute psychogeriatric ward would benefit patients with dementia. We hypothesized that systematically including physical exercise and music interventions in routine treatment would relieve NPS, improve ADL and reduce use of psychotropic medication. The two cohort samples from the same ward at different time points had equal levels of baseline neuropsychiatric symptoms and functioning. Within both study groups, NPS decreased while ADL functioning deteriorated during the hospital stay, with no differences between the study groups. However, among the single items “anxiety” seemed to diminish more in the intervention group than among the controls whereas the item “sleep and night time behaviour” improved less.

In this patient population we were not able to replicate the findings of recent reviews where music interventions influenced NPS, especially anxiety [17,21,22] and behavioural problems [17-19,21] and also agitation or aggression [19]. We found no differences between the groups in these symptoms, except anxiety, which at discharge was lower in the intervention than in the control group. However, due on our study design the reason for this difference is not clear. Based on the earlier systematic reviews [17,44] it seems that the length of the intervention

period is associated with the effects of music interventions. In our study the patients participated, on average, in nine (SD 8.2) music sessions. Thus it might be that to achieve better effects more sessions are needed.

Two recent reviews [24,25] reported no benefit for overall NPS of physical exercise over usual care, as was also the case in this study. However, Fleiner et al. [28,31] reported that short term exercise may have positive effect on NPS as was the case in our study based on the analysis within the intervention group. In the LMM models, NPI total score and level of daily functioning in intervention group at discharge were used as dependent variables, on the one hand to reflect the outcome of the inpatient treatment, but also to reduce error variance due to the marked heterogeneity in the different clinical variables of the sample. As the sample was collected on a clinical basis, the inter-individual variability in different clinical features is likely to confound the results. In the LMM models, the number of physical exercise sessions had a favourable effect both on NPI total score and daily functioning. Forbes et al. [24] and Blankevoort et al. [26] have reported that physical exercise may improve ADL in patients with dementia. Bürge et al. [30], who examined exercise sessions on acute psychogeriatric wards, could not find any benefit of exercise over a social activity programme. However, they found that physical exercise may delay the loss of mobility [30], which is crucial to the ability to manage ADL [27]. Thus, based on the limited evidence from earlier studies [28-31] in acute psychogeriatric settings and the findings of the present study, it seems that implementing physical exercise in the treatment procedures of acute psychogeriatric wards may be worthwhile.

Regarding the use of antipsychotics or anxiolytic medications no differences were found in the doses between the groups either on admission or at discharge. In this naturalistic setting

the doses of psychotropics were adjusted only on the basis of clinical decision and were not subject to influence from the study protocol or the personnel. Unexpectedly, a weak but significant correlation was found between music interventions and dosage of both antipsychotics and anxiolytics. Patients who participated more in music interventions, either group or individual based, had larger dosages of these medications at discharge. Although the correlations were weak, it may be that active music interventions such as singing and actively playing rhythm instruments could overstimulate some of these patients. A recent meta-analysis [23] also showed that receptive music interventions, just music-listening, have a better effect in agitation, anxiety and behavioural problems than interactive music therapy.

The absence of more positive findings may be due to some patients being in the most acute and severe state of illness at the beginning of the hospital stay, which may have made it difficult for them to concentrate on physical exercise and music interventions. Moreover, it is possible that the implementation of the new treatment procedure was still incomplete when data collection started. To implement new procedures successfully in clinical practice is a complex process [45].

Nevertheless, it seems that research regarding interventions like physical exercise and music interventions on acute psychogeriatric wards is rare. When we started this study we found no corresponding research. During the last years two randomized controlled trials [30,31] which also examined physical exercise on acute psychogeriatric settings have been published. More controlled trials with more homogenous sample are needed to establish whether implementing music and exercise interventions systematically on an acute psychogeriatric ward may play a role in the treatment of patients with dementia. Moreover, it might be better to explore music

and exercise interventions in separate study settings to ease the realization of the interventions in a routine clinical setting.

The study had some limitations. The main weakness of our study is that an observational pretest–posttest study is not as powerful design to test hypothesis than is an randomized controlled trial. The study design included two different groups in different time frames. Only around 50% of the data on eligible patients could be included in both study groups (see Figure 1). The study was carried out on one acute psychogeriatric ward which limits the generalizability of the findings. Moreover, the study was conducted in a routine clinical setting where the pressure of routine work may have affected the delivery of the interventions. Thus, we cannot be certain that all the interventions for all the patients would have been applied consistently. The old treatment model’s recreational activities included also some singing, music listening and exercise training in the ward’s living room as well as walking outdoor. However, these activities were carried out infrequently and not based on individual patient’s treatment plan. Although there were no significant difference in length of stay between groups between patients it varied a lot. In the intervention group the shortest length of stay was nine days. Thus some patients have had possibility to take part only few study interventions. Finally, the nurses who assessed the outcomes were not blinded to the group allocation. However, the NPI has been showed to have good test-retest and excellent interrater reliability [46]. Despite these limitations, so far as we know the current study established first time evidence for the utility of implementing music and exercise interventions for routine treatment on an acute psychogeriatric ward.

Disclosure of interest

The authors report no conflicts of interest.

Funding

This study was financially supported by the Competitive State Research Financing of the Expert Responsibility area of Tampere University Hospital

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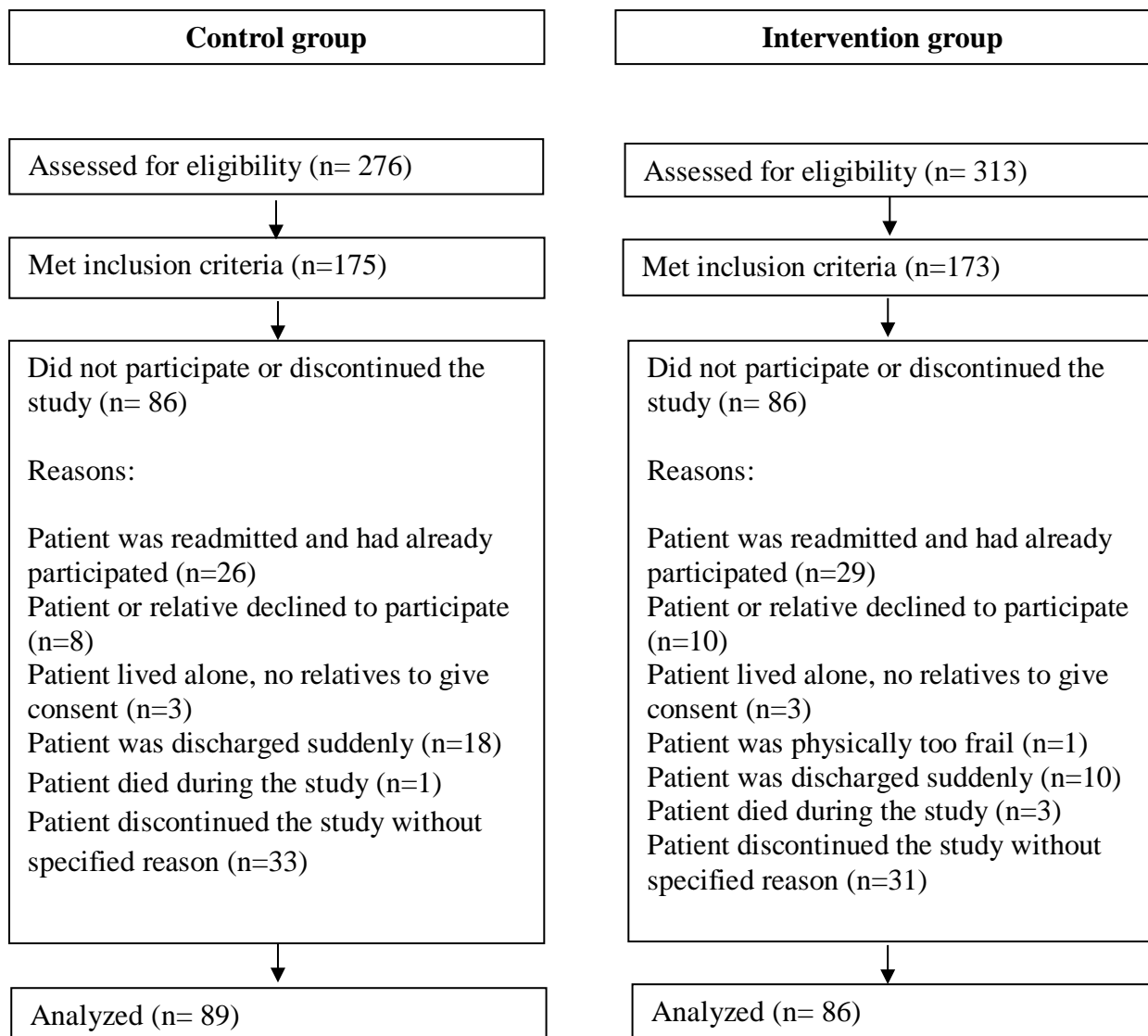


TABLE 1. Baseline demographic and clinical characteristics of the patients in the study groups.

Characteristics	Control group (n=89)	Intervention group (n=86)	p-value
Female gender; n (%)	55 (61.8)	41 (47.7)	0.06
Age (years) mean (SD, range)	77.7 (8.2, 53–94)	78.0(8.5, 57–95)	0.84
Marital status n (%)			0.16
Single	6 (6.8)	4 (4.8)	
Married	36 (40.9)	47 (56.0)	
Divorced	12 (13.6)	5 (6.0)	
Widowed	34 (38.6)	28 (33.3)	
Admitted; n (%)			0.77
Home	52 (59.1)	54 (63.5)	
Sheltered accommodation	11 (12.5)	6 (7.1)	
Residential care home	7 (8.0)	8 (9.4)	
Primary care ward	9 (10.2)	7 (8.2)	
Other	9 (10.2)	10 (11.8)	
Type of dementia; n (%)			0.32
Alzheimer (F00)	62 (69.7)	63 (73.2)	
Vascular (F01)	9 (10.1)	10 (11.6)	
Other (F02)	4 (4.5)	3 (3.5)	
Not specified (F03)	13 (14.6)	5 (5.8)	
MMSE score	13.4 (7.9)	13.2 (7.2)	0.61
Length of stay (days) mean (SD, range)	44 (32.8, 5–165)	46 (27.8, 9–126)	0.64

TABLE 2. Changes in scores of NPI, ADCS-ADL and BI.

Variable	Control group (n=89) Mean (SD)				Intervention group (n=86) Mean (SD)				Difference in change between groups
	Admission	Discharge	Change	<i>p</i>	Admission	Discharge	Change	<i>p</i>	<i>p</i>
NPI	34.6 (25.4)	19,5 (19.7)	-15.1 (22.6)	<0.001	33.2 (20.2)	16.9 (14.4)	-16.3 (21.9)	<0.001	0.73
ADCS-ADL	32.2 (18.4)	21,7 (13.6)	-10.5 (14.0)	<0.001	31.3 (18.1)	20.0 (13.6)	-11.2 (15.6)	<0.001	0.75
Barthel Index	73.2 (22.8)	73,3 (24.0)	0.1 (14.6)	0.97	73.4 (22.1)	70.4 (25.6)	-3.0 (17.4)	0.11	0.21

NPI indicates Neuropsychiatric Inventory; ADCS-ADL, Alzheimer's Disease Cooperative Study–Activities of Daily Living; BI, Barthel Index.

* $p < 0.05$

TABLE 3a/3b. Linear mixed models for repeated measures of 1) Neuropsychiatric inventory (NPI) score (upper table), 2) ADCS-ADL interview score (lower table) and possible confounding factors. The explaining variables were gender and age as confounding factors, number of exercise sessions, change in antipsychotic and anxiolytic doses from admission to discharge, time (admission/discharge), and the interaction of time and number of exercise sessions. Interpretation of factor estimates accordingly: a positive estimate indicates more NPI symptoms or better ADCS-ADL functioning in men or at admission, and vice versa.

Dependent variable: Neuropsychiatric inventory score

	Estimate (B)	95% CI		t	p
		Lower	Upper		
Gender (male)	-0.34	-5.87	5.20	-0.12	0.90
Age	-0.24	-0.57	0.084	-1.48	0.14
Number of exercise sessions	-0.50	-0.91	-0.084	-2.40	0.019
Change in antipsychotic dose ¹	0.045	0.003	0.087	2.15	0.035
Change in anxiolytic dose ¹	0.24	0.006	0.49	1.95	0.056
Time: admission vs. discharge	14.7	8.05	21.3	4.40	<0.001
Time*Number of exercise sessions	0.27	-0.33	0.87	0.90	0.38

Dependent variable: ADCS-ADL² interview score

	Estimate (B)	95% CI		t	p
		Lower	Upper		
Gender (male)	-6.47	-12.3	-0.61	-2.20	0.031
Age	0.29	-0.05	0.63	1.68	0.097
Number of exercise sessions	0.31	-0.03	0.66	1.80	0.077
Change in antipsychotic dose ¹	-0.012	-0.05	0.03	0.57	0.57
Change in anxiolytic dose ¹	-0.11	-0.37	0.15	0.82	0.41
Time: admission vs. discharge	9.08	4.33	13.8	3.81	<0.001
Time*Number of exercise sessions	0.38	-0.03	0.79	1.81	0.074

¹Dose change from admission to discharge

²The Alzheimer's Disease Cooperative Study, Activities of Daily Living