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THE EFFECTS OF A PSYCHOMOTOR ACTIVATION PROGRAMME FOR USE IN GROUPS OF COGNITIVELY IMPAIRED PEOPLE IN HOMES FOR THE ELDERLY

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SUMMARY

Objectives. To test the effects of the Psychomotor Activation Programme (PAP) on the behaviour and cognition of demented elderly people.

Design. Randomized controlled trial with an experimental group and a control group. Post-test after 6 months.

Setting. Group care projects for demented elderly people living in 11 different homes for the elderly in The Netherlands.

Participants. One hundred and thirty-four subjects entered the study (72 in the experimental group and 62 in the control group), 42 of whom dropped out (27 in the experimental group and 15 in the control group).

Measurements. Individual behaviour and group behaviour were scored using two Dutch scales (BIP and SIPO respectively) developed and validated for use in psychogeriatric populations. Cognition was measured with the short and the long versions of the Cognitive Screening Test (CST-14 and CST-20). Disability was measured with the Barthel Index. Medicine use, falls, other accidents and life events were registered.

Results. The PAP had a beneficial effect on cognition (CST-14, $F = 2.63$, $p \leqslant 0.05$, effect size 0.4) (CST-20, $F = 3.77$, $p \leqslant 0.05$, effect size 0.5) and increased positive group behaviour in participants with relatively mild cognitive problems (SIPO, $F = 4.46$, $p \leqslant 0.05$).

Conclusions. The PAP stabilizes cognitive performance and has some beneficial effects on behaviour. Positive findings were supported by a simultaneously conducted process evaluation.

KEY WORDS—aged; cognition; physical activity; dementia; trial

The prevalence of cognitive impairment is growing as the number of elderly people, especially the oldest old, increases. In The Netherlands, although most cognitively impaired elderly people are cared for at home by family caregivers (Ott *et al*., 1995), people with cognitive impairment spend about 25% of their life, after the illness has developed, in homes for the elderly and in nursing homes (Perenboom *et al*., 1996). This article concerns cognitively impaired elderly people who have an indication for admission to nursing home care but who for reasons of cost and well-being are taken care of in homes for the elderly, in so-called group care projects, instead of in nursing homes. These groups are usually made up of 6–12 psychogeriatric

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patients with different types of dementia, behavioural problems and disabilities in daily living. The quality of life of demented elderly people living in such groups is higher than that of people receiving traditional nursing home care, and most groups have special group activities (Annerstedt, 1994).

The Psychomotor Activation Programme (PAP) was developed by the Free University of Amsterdam (Dröes, 1991) for use with nursing home patients with senile dementia of the Alzheimer type and the protocol has recently been published (Dröes, 1997a). The PAP is characterized by a systematic approach and is based on the adaptation–coping model (Dröes, 1991). It is centred around four themes: communication, reactivation, resocialization and effective functioning. Its aim is to help patients with dementia to cope with the changes they encounter as a consequence of the disease. In the PAP, sporting activities and games are used to stimulate cognitive and psychosocial functions. It is recommended that the PAP sessions be performed in a separate room. The PAP is partly comparable with activation programmes such as Doing Things (Zgola, 1985), Reality Orientation Training (Green *et al*., 1983) and Validation (Feil, 1989), and includes movement activities such as playing with big and small balls and playing hockey sitting down, daily activities such as cooking, and hobby activities such as arranging flowers. A review of different forms of psychomotor therapy in dementia is given by Dröes (1997b).

The PAP has been found to have a beneficial effect on life satisfaction, restless behaviour at night and aggression in nursing home patients (Dröes, 1991).

Although there have been very few studies of physical activity for older people with dementia, these studies show a beneficial effect. Diesfeldt and Diesfeldt-Groenedijk (1977) found that physical exercise had a beneficial effect on the cognitive performance of psychogeriatric patients. A more recent uncontrolled study provided evidence that walking programmes for physically active persons with severe dementia living in nursing homes were helpful in decreasing aggressive behaviour (Holmberg, 1997). Friedman and Tappen (1991) showed in a randomized controlled trial that planned walking (30 minutes three times a week) had a beneficial effect on the communication skills of Alzheimer's patients living in nursing homes. Validation therapy has also been found to relieve behavioural problems in people with severe cognitive impairment (Morton and Bleathman, 1991).

One difficulty of research in this field is the size of the groups, and the only way to conduct a randomized controlled study of the effects of programmes such as the PAP is to perform multicentre studies. This article reports a randomized controlled trial of the PAP implemented in the setting of group care projects in 11 different homes for the elderly in The Netherlands. We tested the hypothesis that the PAP would reduce behavioural problems and cognitive decline when compared with the usual care methods.

METHODS

Selection of research sample

A short questionnaire including questions about the presence of group care projects, number of participants, total number of residents, the presence of activity leaders and their interest in the PAP was sent to all known homes for the elderly in The Netherlands ($N = 1340$). It was explained that the PAP would be implemented in 100 homes for the elderly (all over the country) after a pilot study was carried out in 12 homes and after development of a protocol. The majority of homes ($n = 807$, 60%) responded to this questionnaire. The following inclusion criteria were used to select the 12 homes for the pilot study: a minimum of 30 residents; at least one group care project for psychogeriatric elderly people with a minimum of six participants; group care project run at least 5 days a week; presence of a specially trained activity leader in addition to nursing staff; enough space to introduce the PAP; group care project in effect for more than 1 year. For practical reasons and because we were working in cooperation with another institute (Office for Applied Social Gerontology in Nijmegen), a region criterion was added to facilitate research: six homes for the elderly had to be in the region around Leiden (in the western area of The Netherlands) and six in the region around Nijmegen (in the eastern area). After the region criterion was applied using postal codes (western area codes 22, 23, 24, including 28 homes, eastern area codes 53, 54, 65, 66, 68, including 50 homes), a total of 13 homes in the western region and 16 homes in the eastern region were identified that met all the criteria. One home in the western region (which met the criteria) was added at the request of the study sponsor. An additional criterion was

introduced, namely, that the home for the elderly should not have an existing protocolled exercise programme because of the possibility of ceiling effects. Three per cent ($n = 25$) of the 807 Dutch homes for the elderly worked with a protocolled exercise programme; these homes were excluded.

Six homes around Leiden and six homes around Nijmegen, at a convenient travelling distance from both, were asked to cooperate in the pilot study. All 12 homes agreed to cooperate, but one home worked with *ad hoc* group care facilities (groups were different each day) which were unsuitable for this study. The home in question tried to adapt its facilities but did not succeed so was excluded from the study. There was not enough time to select a replacement home. Thus 11 homes (five in the Leiden region, six in the Nijmegen region) participated in the study; their characteristics (age and sex of residents) are given in Table 1.

Design

We used a pre-test–post-test design with an experimental group and a control group. The minimum desired group size (60 subjects in both groups) was determined by power calculations (power >80) applied to the results of an earlier study with the PAP in homes for the elderly (Hopman-Rock *et al.*, 1993) and an expected dropout rate through illness or death of 10–20%. The PAP was administered at least twice a week by specially trained staff, according to the PAP protocol (Dröes, 1997a), in addition to the usual activities. For a subject to remain in the experimental group, he or she had to attend a minimum of 15 PAP sessions (this criterion was chosen after evaluation of all the participation rates of the PAP sessions of the 11 homes, see Results section). The subjects in the control group took part in the usual activities, such as light household activities, bible reading and—sometimes—singing. To avoid contamination (sometimes the same staff delivered the PAP as well as the usual programme), the staff were instructed that no PAP sessions or similar activities were allowed in the control groups. All caregivers, activity leaders and families of the participants were informed through a letter and information booklet about the start of the study. Participants (if they were able to) as well as relevant relatives were asked to give their informed consent. The study was approved by the TNO Medical Ethics Committee. Where possible, the participants in a given home for the elderly were randomly divided into groups, with one group receiving the PAP and the other group receiving normal care and other recreational group activities (homes, A, B, F, H, I, J, see Table 1). Some homes had clustered subjects into small (<8 subjects) groups according to cognitive functioning (relatively higher and relatively lower). If these groups could not be further subdivided into experimental and control groups because of organizational problems, the group as a whole was allocated at random to the experimental or the control group (home D versus home E). Home B had two heterogeneous groups, one smaller and one bigger. Here, the biggest group was assigned to the experimental condition to increase the number of subjects in the experimental group. Some homes had only one small group. These groups were randomly assigned to the

Table 1. Characteristics of the 11 participating homes for the elderly

Home	No. of existing groups	No. of subjects	Age mean (SD); range (yr)	% female	Groups exp.–con.
A	2*	12	84.2 (6.7); 73–95	100	6–6
B	2	19	84.8 (3.9); 80–93	84	14–5
C	1	9	88.7 (3.1); 84–93	100	0–9
D	2*	19	83.6 (7.2); 67–95	89	6†–13
E	2*	12	84.8 (5.9); 74–93	92	9–3†
F	1	12	83.6 (7.3); 64–92	100	6–7
H	1	13	87.8 (3.9); 78–93	100	6–6
I	1	13	85.3 (5.0); 78–93	100	6–7
J	1	11	86.3 (4.7); 83–96	90	5–6
K	1	7	87.0 (3.9); 80–91	71	7–0
L	1	7	86.0 (4.1); 77–89	86	7–0
Total		134	84.7 (5.4); 64–96	91	72–62

*One low cognition and one high cognition group.
†Low cognition group.

experimental group or the control group (home C vs home K, home L). The pilot study lasted 6 months.

Procedures and instruments

Before the start of the PAP, two activity leaders from each home were trained for 2 days in the theory and practice of the PAP by specialist psychomotor therapists. Researchers visited the homes to instruct activity leaders and caregivers how to score the behaviour and activities of daily living (nursing dependency) of the participants. The following observational instruments were used.

Behavioural Observation Scale for Intramural Psychogeriatry (BIP) (Verstraten and van Eekelen, 1987). This instrument consists of 13 subscales, of which 5 were used in the present study (to avoid too much pressure on the caregivers who had to complete this questionnaire). The applied subscales were: non-social behaviour (eight items), apathetic behaviour (six items), rebellious behaviour (five items), restlessness (five items) and depression (six items). Each item concerns a specific behaviour that can be present to a certain degree: never, hardly ever, sometimes, or most of the time. Each scale has a total scale score reflecting the level of a certain individual behaviour, as observed during a 2-week period. The reliability of the different scales for use in The Netherlands varies from reasonable to good (Cronbach's alpha non-social behaviour 0.83, apathetic behaviour 0.79, rebellious behaviour 0.61, restlessness 0.68, depression 0.84).

Social Interaction Scale for Psychogeriatric Older People (SIPO) (Staats and Hopman-Rock, 1997). This instrument evaluates the behaviour (over a 2-week period) of psychogeriatric people during group activities excluding physical activities. The SIPO consists of 19 items with the same categories as the BIP. Two subscales are distinguished: negative group behaviour (example of an item: 'gets annoyed, without reason, with others in the group') and positive group behaviour (example: 'is helpful to other members of the group'). The validity and reliability of the SIPO is good (Cronbach's alpha 0.85; Hopman-Rock *et al.*, 1993).

Barthel Index (Mahoney and Barthel, 1965; Wade and Collin, 1988). The Barthel Index is a standard measure of physical disability that is widely used in neurological research. It consists of 10 items concerning activities of daily living (ADL) such as personal care, transfer and dressing. Response categories are expressed in terms of independence: scores range from 0 to 3 per question (total 20 points maximum) according to the Dutch Barthel Index used by the Work Group for Stroke Patients in The Netherlands. The higher the score, the more independent the person. The validity and reliability are good (McDowell and Newell, 1987). The Barthel Index is also an age-dependent indicator of nursing dependency (Al-Khawaja *et al.*, 1997). The Barthel Index was used as a control variable.

Cognitive Screening Test (CST) (Graaf and Deelman, 1991). The cognitive impairments of the participants were assessed using the CST. The CST is similar to the well-known MMSE (Folstein *et al.*, 1975), but is much easier to use in a field setting. The manual of the CST describes short and long versions of the test and provides norms for both tests. We used both versions to gain as much information as possible. The six additional questions of the CST-20 are slightly more difficult to answer than those of the CST-14.

The long version (20 points maximum) of the CST was administered in a face-to-face interview with the participants by a trained neuropsychologist (Nijmegen region) and a trained social gerontologist (Leiden region). These interviews were blind to the experimental or control status of the subjects. It was not possible to administer the CST to every subject. Some people were temporarily hospitalized when the interviewer came and some refused to participate (no differences were found between the experimental group and the group with regard to participation rate). The validity and reliability of the CST for use in groups of demented elderly subjects are good (Cronbach's alpha CST-14, 0.80; CST-20, 0.82). CST scores are also correlated with clinical judgement about dementia, scored on a scale of 1–5, ranging from no dementia to very severe dementia (CST-14, −0.74; CST-20, −0.78) (Graaf and Deelman, 1991).

We also asked the nursing staff to register the use of medication and changes in medication use, falls, hospital admissions and other significant life events in all group care participants during the study.

Statistical analyses

SPSS for Windows was used for statistical procedures. *t*-tests (two-sided) were employed for comparison of dropout rates and baseline data. A multivariate analysis of variance (MANOVA) for repeated measurements was used to test the hypothesis that cognition would be the same or higher and behaviour problems would occur less frequently in the experimental group than in the control group at the end of the study. The one-sided *p*-values of the interaction effect of time and group are reported. A *p*-value between 0.05 and 0.10 was regarded as a pronounced trend. The *p*-value of <0.05 was used to indicate a statistically significant difference. The *p*-values reported in Tables 3 and 4 are one-sided. If the one-sided alternative hypothesis is confirmed, the *p*-values will be relatively low (2-sided *p*-value divided by 2); however, if the one-sided alternative hypothesis is not confirmed, the *p*-value will be $1.00 -$ (two-sided *p*-value divided by 2). This means that a *p*-value of >0.95 indicates a noteworthy effect opposite to the expected effect. To facilitate the interpretation of the results, effect sizes, calculated according to the method of Cohen (1988), are also reported, using the differences between scores. The effect size is computed by dividing the difference between the scores of the experimental group and the control group by the standard deviation of the difference scores of both groups together. An effect size of 0.2 is regarded as a small effect, 0.5 as a medium-sized effect and 0.8 as a large effect (Cohen, 1988).

RESULTS

Before the start of the study, people had already dropped out because of admission to a nursing home, illness, death or no informed consent (a minimum estimation of the pre-study dropout was four in the experimental group and seven in the control group). One hundred and thirty-four subjects remained (72 in the experimental group and 62 in the control group) with complete baseline measurements. Because of personnel changes in one home for the elderly (K, see Table 1), the PAP was discontinued shortly after the start of the study. This home for the elderly ($n = 6$) was excluded from the study because fewer than 15 PAP sessions were given. In the course of the study, 16 people died (12 in the experimental group and four in the control group), eight people were transferred to other facilities, four became ill, four refused further cooperation and two dropped out for other reasons. Eight people in the experimental group attended fewer than 15 PAP sessions (including six people in home K). Ninety-two people thus completed the study (45 in the experimental group and 47 in the control group). The subjects who dropped out differed significantly from those who did not in terms of age (higher, $p < 0.05$), cognition (lower, $p < 0.01$) and activities of daily living as measured with Barthel Index (lower, $p < 0.05$). No differences were found in behaviour (on BIP and SIPO). The dropout rate was significantly higher in the experimental group ($\chi^2 = 5.9$, $p = 0.01$), but the mortality rate was not significantly different between the two groups ($\chi^2 = 10.1$, $p = 0.07$). Age and physical disability (Barthel Index) did not differ in the experimental group and the control group at post-test assessment (age $t = 0.35$, $p = 0.73$; Barthel Index $t = 0.30$, $p = 0.77$). The characteristics of the subjects at baseline by treatment group are given in Table 2.

At baseline, the subjects in the control group were more depressed ($t = -2.29$, $df = 90$, $p = 0.02$) and they tended to be more rebellious ($t = 1.89$, $df = 90$, $p = 0.06$) than the subjects in the experimental group. No differences between groups were found in level of dependence and cognitive impairments. The Barthel Index was used to assess dependence on nursing care. All participants were very dependent on nursing care, especially for dressing, climbing stairs and bathing. Almost 40% of participants had problems with eating and were incontinent of faeces (see Fig. 1).

Subjects in the experimental group were offered the PAP twice a week for 6 months. The mean attendance, as registered by the activity leaders, was 28 sessions (SD 11.4); data for people who attended fewer than 15 PAP sessions were excluded from the analyses. The reason for non-attendance was usually illness. Eighteen people fell (six in the experimental group and seven in the control group fell once, two people in both groups fell twice, and one person in the experimental group fell seven times during the study period). These falls did not occur during the PAP sessions. No differences during the 6 months were found between the control group and the experimental group in medicine use or in life events. Table 3 shows the results of the MANOVA analyses on the BIP, SIPO and CST.

Table 2. Characteristics of subjects at baseline

	Experimental ($N = 45$) mean (SD)	Control ($N = 47$) mean (SD)	*t*-value	d*f*	*p*-value
% female	91	98	2.0*	1	0.15
Age (yr)	83.8 (5.8)	84.2 (5.6)	−0.35	90	0.73
BIP non-social behaviour (max. = 24)	9.2 (5.2)	8.0 (3.8)	1.30	90	0.20
BIP apathetic behaviour (max. = 18)	7.3 (3.9)	6.9 (2.8)	0.65	90	0.51
BIP rebellious behaviour (max. = 15)	4.1 (2.5)	5.2 (2.8)	−1.89	90	0.06
BIP restlessness (max. = 15)	4.1 (2.8)	5.0 (3.1)	−1.57	90	0.12
BIP depression (max. = 18)	5.0 (3.40)	6.7 (3.7)	−2.29	90	0.02
CST-14 (max. = 14)	5.1 (3.3)†	6.1 (3.2)†	−1.27	72	0.21
CST-20 (max. = 20)	5.9 (4.1)†	6.9 (4.0)†	−1.14	72	0.26
SIPO-positive subscale (max. = 36)	26.7 (5.9)	27.4 (5.1)	−0.59	90	0.56
SIPO-negative subscale (max. = 40)	29.5 (4.0)	28.5 (4.4)	1.09	90	0.28
Barthel Index (max. = 20)	11.5 (5.7)	11.5 (5.0)	0.00	86	1.0
No. of medications	4.3 (2.3)	5.1 (2.8)	−1.42	86	0.16

*χ^2-test.
†N experimental = 36, N control = 35, see Methods section.

The PAP had a statistically significant effect on cognition and a very modest effect (trend) on non-social behaviour. Because at baseline some differences were found in rebellious and depressive behaviour, we controlled for these variables in the MANOVA. The same results were found. The effect size on the CST-14 was 0.4, on the CST-20 0.5 and on non-social behaviour 0.3 (Table 3), that

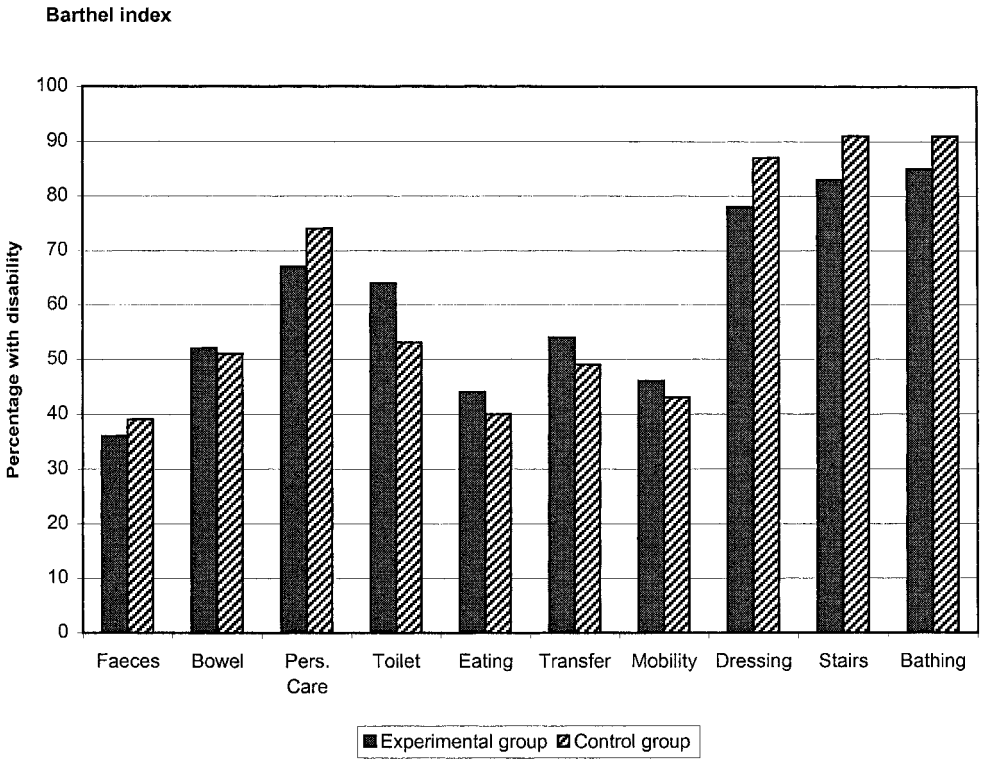

Fig. 1. Barthel Index scores of the experimental group and the control at baseline (total $N = 92$)

Table 3. Results of the MANOVA analysis of the BIP, SIPO and CST scores

	Condition	Baseline mean (SD)	After 6 months Mean (SD)	*F*-value	*p*-value 1-sided	Effect size
BIP non-social behaviour	Exp. ($N = 45$)	9.2 (5.2)	8.0 (3.8)	1.80	0.09	0.3
	Con. ($N = 47$)	8.9 (4.1)	9.0 (4.7)			
BIP apathetic behaviour	Exp. ($N = 45$)	7.3 (3.9)	7.1 (2.9)	1.32	0.18	0.2
	Con. ($N = 47$)	6.9 (2.8)	7.6 (3.7)			
BIP rebellious behaviour	Exp. ($N = 45$)	4.1 (2.6)	4.5 (2.7)	1.52	0.89	0.3
	Con. ($N = 47$)	5.2 (2.8)	4.8 (3.1)			
BIP restlessness	Exp. ($N = 45$)	4.1 (2.8)	4.2 (2.7)	1.38	0.88	0.2
	Con. ($N = 47$)	5.0 (3.1)	4.6 (3.3)			
BIP depression	Exp. ($N = 45$)	5.0 (3.4)	4.9 (3.8)	0.20	0.33	0.1
	Con. ($N = 47$)	6.7 (3.7)	6.3 (4.2)			
CST-14†	Exp. ($N = 36$)	5.1 (3.3)	4.8 (3.4)	2.63	**0.05***	0.4
	Con. ($N = 35$)	6.3 (3.1)	4.9 (3.3)			
CST-20†	Exp. ($N = 36$)	5.9 (4.1)	5.6 (4.2)	3.77	**0.03***	0.5
	Con. ($N = 35$)	7.2 (3.9)	5.9 (3.9)			
SIPO-positive	Exp. ($N = 45$)	26.7 (5.9)	27.4 (6.5)	1.44	0.12	0.3
	Con. ($N = 47$)	27.4 (5.1)	26.6 (6.4)			
SIPO-negative	Exp. ($N = 45$)	29.5 (4.0)	29.8 (4.5)	0.01	0.53	0.0
	Con. ($N = 47$)	28.5 (4.4)	28.7 (4.9)			

*$p \leqslant 0.05$.
†N Experimental = 36, N Control = 35, see Methods section.

is, the positive effects on cognition can be termed moderate and the effects on behaviour as small to moderate.

Because some homes for the elderly distinguished between subjects with relatively high and relatively low levels of cognition, and because the results showed a 'regression to the mean' effect, we were interested in the effects of the PAP on each of these groups separately. We therefore divided the total group into those with a CST score above or below the median. The same results as in Table 3, but for each cognition group separately, are shown in Table 4(a) and 4(b).

In the groups with a relatively low level of cognitive functioning, the mean BIP scores stabilized or decreased in both the experimental and the control groups, whereas the CST scores stabilized in the experimental group and decreased in the control group. In the groups with a relatively high level of cognitive functioning, the BIP scores tended to improve in the experimental group, the CST scores in the experimental group decreased less than in the control group and the SIPO-positive scores increased significantly in the experimental group. The SIPO-negative scores also increased in the experimental group, albeit not significantly.

DISCUSSION

This randomized controlled study was designed to investigate the effects of a psychomotor activation programme on the behaviour and cognitive functioning of participants in 'group care projects' for psychogeriatric people in homes for the elderly.

Cognitive functioning was significantly improved after the intervention despite a small sample size and the relatively modest intervention of a minimum of 15 PAP sessions in 6 months. The effects on behaviour were not significant, but trends were present. Positive group behaviour tended to increase and non-social behaviour tended to decrease (especially in the group with relatively high cognition), but rebellious and negative group behaviour also tended to increase. In general, the subjects tended to be more alert. Although the study population was very care-dependent, the prevalence of urinary and faecal problems in our population was similar to that seen in other studies with cognitively impaired subjects (Hellström *et al.*, 1994).

The quantitative findings were supported by the simultaneously conducted process evaluation (Wijhe *et al.*, 1997; Staats *et al.*, 1998), which showed that caregivers and activity leaders were

Table 4(a). Results of the MANOVA analysis of the BIP, SIPO and CST scores of groups with a relatively low level of cognition (< median, CST-20 score ⩽ 6)

	Condition	Baseline Mean (SD)	After 6 months Mean (SD)	*F*-value	*p*-value 1-sided
BIP non-social behaviour	Exp. ($N = 21$)	9.2 (5.6)	9.9 (3.2)	1.14	0.15
	Con. ($N = 16$)	8.3 (2.5)	10.6 (4.2)		
BIP apathetic behaviour	Exp. ($N = 21$)	7.8 (3.9)	8.2 (3.3)	0.74	0.19
	Con. ($N = 16$)	7.8 (2.6)	9.4 (3.0)		
BIP rebellious behaviour	Exp. ($N = 21$)	4.3 (3.0)	5.1 (2.7)	0.74	0.89
	Con. ($N = 16$)	6.3 (2.3)	6.2 (2.1)		
BIP restlessness	Exp. ($N = 21$)	3.9 (2.7)	4.9 (2.9)	2.0	0.92
	Con. ($N = 16$)	5.3 (2.9)	4.9 (3.5)		
BIP depression	Exp. ($N = 21$)	5.1 (3.8)	5.2 (3.8)	0.04	0.57
	Con. ($N = 16$)	6.3 (4.2)	6.2 (4.1)		
CST-20	Exp. ($N = 20$)	2.9 (1.9)	3.1 (2.7)	1.31	0.13
	Con. ($N = 15$)	3.7 (2.0)	3.1 (2.1)		
SIPO-positive	Exp. ($N = 21$)	26.6 (5.2)	25.0 (4.7)	0.00	0.50
	Con. ($N = 16$)	25.1 (4.3)	23.6 (6.6)		
SIPO-negative	Exp. ($N = 21$)	29.4 (4.0)	28.7 (4.9)	0.28	0.30
	Con. ($N = 16$)	27.6 (5.0)	27.8 (5.6)		

Table 4(b). Results of the MANOVA analysis of the BIP, SIPO and CST scores of groups with a relatively high level of cognition (>median, CST-20 score >6)

	Condition	Baseline Mean (SD)	After 6 months Mean (SD)	*F*-value	*p*-value 1-sided
BIP non-social behaviour	Exp. ($N = 17$)	8.1 (4.6)	7.7 (5.2)	0.53	0.24
	Con. ($N = 20$)	6.0 (3.1)	6.8 (3.5)		
BIP apathetic behaviour	Exp. ($N = 17$)	6.5 (3.6)	6.4 (2.0)	0.12	0.36
	Con. ($N = 20$)	5.4 (2.1)	5.7 (3.5)		
BIP rebellious behaviour	Exp. ($N = 17$)	3.5 (1.8)	3.4 (2.7)	2.65	0.94
	Con. ($N = 20$)	4.2 (2.9)	2.9 (2.4)		
BIP restlessness	Exp. ($N = 17$)	4.8 (3.0)	3.7 (2.6)	0.76	0.17
	Con. ($N = 20$)	4.4 (2.6)	4.0 (2.6)		
BIP depression	Exp. ($N = 17$)	5.4 (3.4)	4.7 (3.9	0.17	0.34
	Con. ($N = 20$)	6.3 (3.4)	6.1 (3.4)		
CST-20	Exp. ($N = 16$)	9.8 (2.7)	8.7 (3.6)	1.54	0.11
	Con. ($N = 20$)	9.8 (2.8)	7.4 (4.0)		
SIPO-positive	Exp. ($N = 17$)	28.4 (5.8)	30.8 (5.2)	4.46	**0.02***
	Con. ($N = 20$)	31.2 (3.7)	30.1 (4.6)		
SIPO-negative	Exp. ($N = 17$)	29.6 (4.5)	31.2 (4.2)	2.27	0.93
	Con. ($N = 20$)	29.9 (3.7)	29.7 (4.1)		

*$p \leqslant 0.05$.

very enthusiastic about the PAP and that participants sometimes demonstrated unexpected improvements in physical functioning (such as catching balls). Anecdotal evidence indicated that the PAP was successful in reintegrating people into the group and that some people with aphasia even started to talk again. Other investigators have shown that physical and group activities can have a beneficial effect on cognition (Gerber *et al.*, 1991; Abraham *et al.*, 1992; Payten and Porter, 1994; Smits *et al.*, 1995; Rovner *et al.*, 1996; Diesfeldt and Diesfeldt-Groenendijk, 1977). Vanfraechem-Raway and Lefevre (1998) recently reported similar results in a small study in Belgium.

The actual intervention was in fact a minimal one, because of limitations due to practical boundaries. Although the protocol states the PAP should be given twice a week (based on earlier

results, Dröes, 1991), this was not possible in all the participating homes for the elderly. In fact, it is very difficult to change the existing routine in homes for the elderly because of the already heavy workload of staff in these settings. The observation that the intervention had a significant effect despite its inadequate implementation further emphasizes the validity of this approach. In the future, more emphasis will be put on the importance of the PAP as part of the treatment for patients with dementia during the training sessions for caregivers and activity leaders.

The high rate of dropout in this type of research makes it difficult to achieve sufficient statistical power and to generalize results to other cognitively impaired groups. Indeed, our study did not have enough power to detect (at the 0.05 level) small to moderate effects on behaviour. The low dropout rate due to death in the control group (a dropout rate of 7% was found where 10–20% was expected) can be partly explained by the high death rate in this group just before the start of the study, as indicated by the lower number of control subjects at baseline. The rate of falls was about the same in both groups, indicating that no adverse mobility effects were present. A potential weakness of the study is that observers in the homes could not be blinded to the group condition; however, behaviour was usually scored by the nursing staff and not by the activity leaders. We assumed that the nursing staff were less aware of which subjects participated in the PAP. It should be emphasized that those who administered the CST were blind to the group condition. Another disadvantage of this study was that, because of their low interviewability, participants were observed by the staff, and because the nursing staff and activity leaders were always very busy the number of observation variables had to be reduced to a minimum. Earlier research showed that restlessness at night decreased with the PAP (Dröes, 1991). This phenomenon seemed to be confirmed in research with the PAP in homes for the elderly (Hopman-Rock *et al*., 1993). The latter study also provided evidence that the use of the PAP in group care projects could lead to stabilization of cognitive functioning. In the current study we did not find that the PAP diminished restlessness. On the contrary, in the low cognition group restlessness, measured with the BIP, even increased.

The results should be interpreted with care, as there are indications of a so-called 'regression to the mean': the scores of the experimental and the control groups were more similar at the end of the study than they were at the start. However, there was a sound effect of the PAP on the mean scores of the CTS-20 in the high cognition group: the experimental group showed a much smaller decrease than the control group, although this effect was not statistically significant, possibly because of the small group size. In the low cognition group, cognition even improved slightly in the experimental group compared to the control group. The PAP stimulates memory functions because each session has aspects such as recalling the activities of the last session and remembering the names of participants.

In conclusion, the PAP appeared to have a beneficial effect on the behaviour and cognition of elderly demented people, which may improve the quality of life not only of the people themselves but also of their family and carers. Since this study was performed, the PAP has been introduced to another 100 homes for the elderly in The Netherlands and plans are being developed to disseminate it to other European countries.

KEY POINTS

- Evaluation of a psychomotor activation programme (PAP) for demented elderly people.
- Randomized controlled trial with 134 subjects.
- Evaluation of behaviour and cognition.
- Stabilization of cognitive performance and beneficial effects on behaviour were found.

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