

## RESEARCH ARTICLE

# Psychosocial behaviour management programme for home-dwelling people with dementia: A cluster-randomized controlled trial

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## Objective

Little is known about the effectiveness of a psychosocial behaviour management programme on home-dwelling people with dementia. We developed a Behaviour Analytics & Support Enhancement (BASE) programme for care managers and professional caregivers of home care services in Japan. We investigated the effects of BASE on challenging behaviour of home-dwelling people with dementia.

**Methods:** A cluster-randomized controlled trial was conducted with home care providers from 3 different districts in Tokyo. Each provider recruited persons with dementia aged 65 years or older to receive home care in the BASE programme in August 2016. An online monitoring and assessment system was introduced to the intervention group for repeated measures of challenging behaviour with a total score of the Neuropsychiatric Inventory. Care professionals in both the intervention and control groups evaluated challenging behaviour of persons with dementia at baseline (September 2016) and follow-up (February 2017).

**Results:** A majority of persons with dementia had Alzheimer disease (59.3%). One-hundred and forty-one persons with dementia were included in the intervention group and 142 in the control group. Multilevel modelling revealed a significant reduction in challenging behaviour in the intervention group after 6 months (mean score, 18.3 to 11.2) compared with that of the control group (11.6 to 10.8;  $P < .05$ ).

**Conclusion:** The implementation of the BASE programme resulted in a reduction of challenging behaviour of home-dwelling people with dementia. Future research should examine the long-term effects of behaviour management programmes on behaviour, nursing home placement, and hospital admission of home-dwelling people with dementia.

## KEYWORDS

challenging behaviour, dementia, home care workers, palliative care

## 1 | INTRODUCTION

Dementia is one of the biggest global public health and social care challenges facing people today and in the future. Alzheimer Disease International estimated in 2015 that 46.8 million people worldwide are living with dementia. This number is estimated to increase to 10,131.5 million<sup>1</sup> by 2050. People with dementia may exhibit behaviour such as shouting, wandering, agitation, and resistance to care that

challenges caregivers,<sup>2,3</sup> leading to caregiver burden and subsequent nursing home placement.<sup>4,5</sup>

Several countries have developed national dementia plans and implemented palliative care approaches to address these challenging behaviours.<sup>6</sup> Palliative care approaches prioritize psychosocial interventions aimed at addressing challenging behaviour, as international dementia care guidelines recommend the use of non-pharmacological methods prior to pharmacotherapy when the focus is on treatment of

challenging behaviour.<sup>7</sup> The effects of psychosocial interventions on challenging behaviour have been examined in various forms of therapies such as dance,<sup>8,9</sup> music,<sup>10</sup> and removal of environmental triggers.<sup>11</sup> However, the evidence concerning individual treatment strategies is limited.<sup>12-14</sup> Challenging behaviour is deemed as a form of communication that implies unmet needs of persons with dementia.<sup>15-17</sup> Hence, treatment should be tailored to individual needs.<sup>13,18-20</sup>

Palliative behaviour management programmes have been developed mainly for nursing home residents with dementia.<sup>14,21-26</sup> Since most people with dementia live at their own home<sup>1</sup> and are vulnerable to changes in place of care or residence,<sup>27,28</sup> behaviour management in home care settings is a critical issue among dementia care strategies. Some psychosocial intervention programmes for home-dwelling people with dementia have been developed<sup>29,30</sup>; however, little is known about their effectiveness on the behaviour of people with dementia.

Japan is also facing a striking increase in people with dementia. It is estimated that the number of persons with dementia will reach 7.3 million<sup>31</sup> by 2025. To address the social challenges, the national government established the Japanese dementia plan.<sup>32</sup> The national dementia plan calls for non-pharmacological and psychosocial approaches for management of challenging behaviours. Under the public long-term care insurance programme, care managers handle monthly care plans for home care recipients. The recipients usually purchase home care services from providers other than the care managers. However, care managers and professional caregivers of home care services are sometimes unaware of the palliative care approaches.<sup>33</sup> Home care providers usually only have a few hours of contact per week with a care recipient, which implies difficulties in sharing their understanding of the persons and integration of home care services based on a palliative care approach.

Therefore, we developed a Behaviour Analytics & Support Enhancement (BASE) programme to enable care managers and professional caregivers of home care services to identify unmet needs, to explore and implement an action plan, and to evaluate the efficacy of the intervention. Our previous report indicated enhanced attitudes towards dementia care among participating care managers and professional caregivers.<sup>34</sup> In the present study, we investigated the effect of the BASE programme on challenging behaviour in home-dwelling people with dementia.

## 2 | METHODS

### 2.1 | Design

A cluster-randomized controlled trial was conducted with home care service providers from 3 different districts under the Tokyo Metropolitan Government. The Tokyo prefecture has the largest population throughout Japan and faces an unprecedented increase in the number of people with dementia that is expected to reach<sup>35</sup> 600 000 in 2025.

### 2.2 | Procedure

A total of 45 local home care service providers were initially enrolled in the study and randomized to the BASE programme, focusing on psychosocial interventions for challenging behaviour. We applied a cluster

### Key points

- Little is known about the effectiveness of a psychosocial behaviour management programme for home-dwelling people with dementia.
- We developed a psychosocial behaviour management programme for care managers and professional caregivers of home care services focusing on psychosocial interventions aimed at reducing challenging behaviours of home-dwelling people with dementia.
- A cluster-randomized controlled trial resulted in a significant reduction of challenging behaviour in people with dementia at 6 months after implementation.
- Future research should examine the long-term effects of behaviour management programmes on behaviour, nursing home placement, and hospital admission of home-dwelling people with dementia.

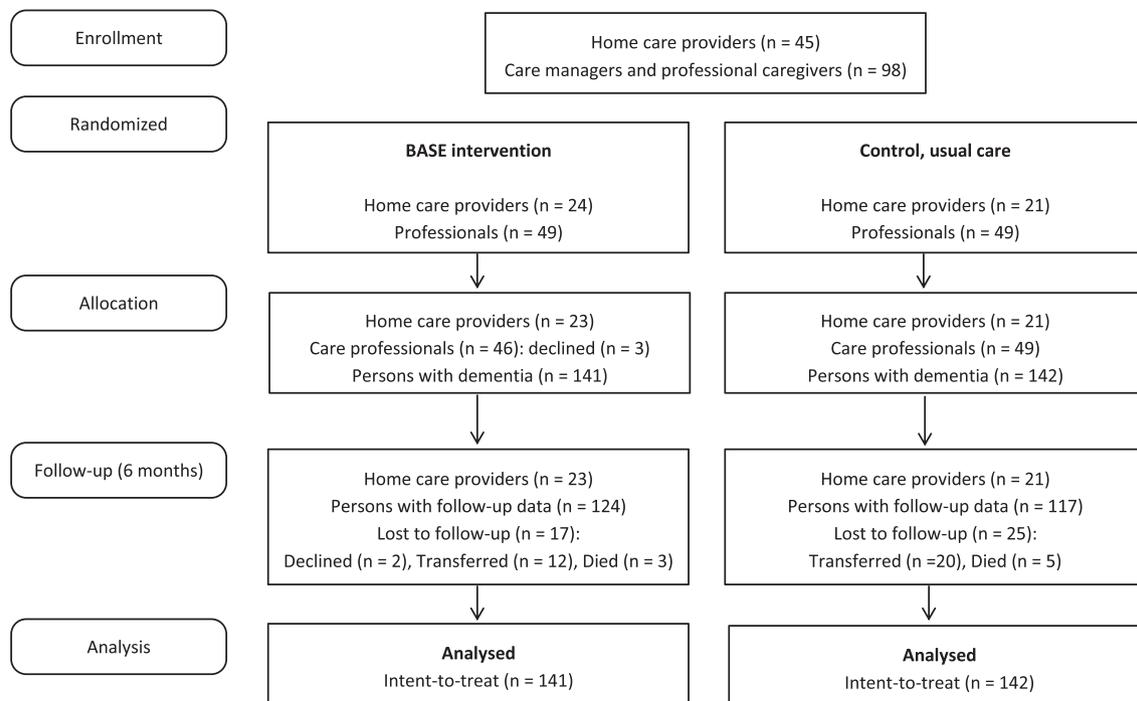
randomization based on provider to avoid contamination of the BASE programme between persons with dementia in the intervention and control groups. After the completion of recruitment, a statistician not associated with the project allocated providers to either the intervention (the BASE programme) or control conditions (the usual home care service) using block randomization performed in a 1:1 ratio in randomly sequenced blocks by a computerized random number function in Microsoft Excel. Randomization of providers was stratified by type of services, type of organizations (social welfare corporation, medical corporation, and for-profit organization), and area. If one organization included multiple providers from 2 or 3 types of services, they were treated as one set of providers.

Care professionals were recruited within each home care service provider. A total of 98 care professionals (81 care managers and 17 professional caregivers) of the 45 providers were initially enrolled in the study. Of the 49 care professionals of the 24 providers in the intervention group, 3 professionals declined to participate in the training course. The remaining 46 care professionals of the 23 providers underwent the training course. Data collection was performed between September 2016 and February 2017 (Figure 1).

### 2.3 | Participants

Within each provider, persons who had a diagnosis of dementia and were aged 65 years or older were eligible for participation, providing that written consent was received. If the person with dementia had difficulty in decision making, written proxy consent was obtained. Each provider recruited up to 10 persons with dementia who had started using the service by the provider most recently.

The sample size was calculated for the primary analysis via the software G\*Power 3.1.9.2. Assuming an alpha level of 0.05 and 95% power, the required number of participants to observe an effect size of 0.25 in challenging behaviour is 251. To allow for a 15% dropout



**FIGURE 1** The figure shows enrollment and randomization of people with dementia who received long-term care insurance services to an intervention group and control group. Randomization of long-term care providers was stratified by type of services, type of organizations (social welfare corporation, medical corporation, and for-profit organization), and area. BASE, Behaviour Analytics & Support Enhancement

rate, the sample size for the study was set at 295 persons with dementia.

## 2.4 | Intervention

The BASE programme consisted of (1) a training course, (2) a web-based tool for ongoing monitoring and assessment for challenging behaviour, and (3) a multiagency discussion meeting.

All care professionals in the intervention group underwent a 2-day training course on August 22 to 23, 2016. The training course addresses (1) dementia as an illness, (2) challenging behaviour as a communication of unmet needs, (3) assessment of challenging behaviour, and (4) exploring unmet needs and action plans. The training course has been developed via a workshop between a Japanese working group and a Swedish team of the BPSD (Behavioural and Psychological Symptoms of Dementia) Programme of Care.<sup>36</sup> The BPSD Programme of Care is a working tool for professional caregivers focusing on psychosocial interventions for challenging behaviours and is based on the well-developed national guidelines for dementia care.<sup>6</sup> The core principle of the training course was based on a palliative care approach<sup>7</sup> and deemed challenging behaviour as a communication that implies unmet needs of the person with dementia.<sup>15-17</sup>

The care professionals launched input of measures of their persons with dementia using the web-based tool at baseline in September 2016. The care professionals were required to evaluate challenging behaviours of a person with dementia in face-to-face interviews with other professional caregivers who provided care to the person with dementia.

There was a multiagency discussion meeting with the care professionals in the intervention group to evaluate challenging behaviours of

each person, specify unmet needs, and establish an action plan based on their needs in September 2016. Unmet needs, contents of the action plan, and type of caregivers involved in the meeting were categorized and recorded in the web-based tool (Table 1). The categories of unmet needs were developed in reference to the findings on associations between basic needs and challenging behaviour.<sup>37</sup> The care professionals could choose one or more categories of actions; however, they were encouraged to tailor the treatment to the individual needs of people with challenging behaviour.

The care professionals implemented ongoing monitoring for challenging behaviour of the person with dementia. Then, they conducted a monthly multiagency discussion to reassess behaviour and unmet needs and revise the action plan for the person. Care managers schedule a mandatory monthly meeting with providers of home care services regarding the management of the monthly amount of care for the person as per the public benefit schedule. The final assessment was conducted in February 2017, 6 months after the baseline.

## 2.5 | Control

Same as the intervention group, the care professionals input of measures of their persons with dementia using the web-based tool at baseline in September 2016. The care professionals were also required to evaluate challenging behaviours of a person with dementia in face-to-face interviews with other professional caregivers who provided care to the person. The web-based tool for the control group had no assessment of unmet needs nor an action plan. The care professionals implemented usual home care services and mandatory monthly meetings regarding the management of the monthly amount of care for the person.

**TABLE 1** Unmet needs, action plan, and type of caregiver involved in a multiagency discussion meeting

	N	%
Unmet needs		
Pain	56	39.7
Social relation	43	30.5
Hearing	35	24.8
Drink	31	22.0
Evacuation	26	18.4
Meal	25	17.7
Urine	23	16.3
Sleep	21	14.9
Blood pressure	19	13.5
Eyesight	18	12.8
Medication	14	9.9
Blood sugar	12	8.5
Breathing	10	7.1
Pulse	9	6.4
Temperature	4	2.8
Action plan		
Pleasant activity/recreation	77	54.6
Outdoor activity	66	46.8
Physical activity/exercise	52	36.9
Music/song	45	31.9
Massage/touching	38	27.0
Calm environment/removal of environmental triggers	24	17.0
Type of caregiver involved in the multiagency discussion meeting		
Family member	124	87.9
Physical therapist	106	75.2
Occupational therapist	9	6.4
Doctor	8	5.7
Nursing assistant	6	4.3
Other care worker	5	3.4
Nurse	5	3.4

A reassessment was also performed in February 2017, 6 months after the baseline.

## 2.6 | Measurements

The care professionals in both the intervention and control groups input information on challenging behaviour, pain, and personal characteristics of each person with dementia using the web-based tool at baseline and follow-up. When a person with dementia was transferred to a hospital or a care facility, or died before the completion of the study period, the care professional conducted measurements based on the most recent information regarding the person in home care settings.

The Neuropsychiatric Inventory—Nursing Home version (NPI-NH) was used for repeated measures of the incidence and severity of challenging behaviour. The original NPI includes 12 items to rate the frequency and severity of neuropsychiatric symptoms in people with dementia.<sup>38-41</sup> The score for each item ranges from 0 to 12, with higher scores indicating worse behaviour. The multiplication of frequency times and severity scores results in a total score ranging from

0 to 144. The Japanese version of the NPI-NH also has a total score of the multiplication of frequency times (0-3) and severity scores (1-4) ranging from 0 to 144 and is reported to have good validity and reliability.<sup>42</sup>

Pain was assessed using the Japanese version of the Abbey pain scale. The Abbey pain scale is an observational 4-item pain assessment scale for people with cognitive impairment.<sup>43</sup> Each item is rated on a 4-point scale (*absent* = 0, *mild* = 1, *moderate* = 2, *severe* = 3). An overall assessment of pain intensity ranges from 0 to 18. The Japanese version of the Abbey pain scale has been confirmed for reliability and validity.<sup>44</sup>

Personal characteristics included age, gender, type of dementia, cognitive impairment, and activity of daily living (ADL). Cognitive impairment was evaluated using the Japanese version of the Short-Memory Questionnaire (SMQ). The SMQ is an informant-based, 14-item scale to assess the severity of memory problems.<sup>45</sup> The total score ranges from 0 to 46. The Japanese version of the SMQ has shown a fair reliability and validity.<sup>46</sup> Activity of daily living were measured using the Japanese version of the Barthel Index. The Barthel Index is a 10-item scale that measures basic aspects of activity related to self-care and mobility.<sup>47</sup> The total score ranges between 0 and 100. Lower scores indicate greater physical dependency. The Japanese version of the Barthel Index has been validated.<sup>48</sup>

Prescribed medication was recorded regarding name of drug and dosage per day. For the present study, medication for the nervous system was used for analysis based on Anatomical Therapeutic Chemical classification. Percentage of prescriptions in each group was calculated for analgesics (N02), antipsychotics (N05A), anxiolytics (N05B), hypnotics and sedatives (N05C), antidepressants (N06A), and antimentia drugs (N06D).

## 2.7 | Ethical considerations

The care professionals of each provider explained the aim of the study, the voluntary nature of participation, and provided an assurance of anonymity for persons with dementia to the persons. If the person had difficulty in decision making, the care professional provided an explanation and assurance to the proxies.

Approval was obtained from the Ethics Review Board of the Tokyo Metropolitan Institute of Medical Science (number 16-2). Procedures involving experiments on human subjects are done in accord with the Helsinki Declaration of 1975. This trial is registered at the UMIN Clinical Trials Registry (UMIN000021966).

## 2.8 | Data analysis

Baseline differences in personal characteristics, pain, and challenging behaviour were examined between the intervention and control groups. Pain and challenging behaviour were also compared at a follow-up assessment for each group. Chi-square tests were used for categorical variables, and *t* tests for numeric variables. Changes in cognitive impairment, ADL, and prescribed medication were tested for the total sample from baseline to follow-up assessment.

Random effects linear regression models for pain and challenging behaviour at follow-up, considering clustering by care professional,

were performed including potential confounding variables at baseline: age, sex, type of dementia, cognitive impairment, ADL, use of antipsychotics, pain, and challenging behaviour. Type of provider and use of antidementia drugs at baseline were also entered as covariates because of a significant difference between the groups.

All of the analyses were based on the intention-to-treat principle. All statistical analyses were conducted using Stata SE for Windows, version 14.0 (StataCorp, College Station, Texas). The two-tailed significance level was set at 0.05.

## 2.9 | Role of funding source

The funding source had no involvement in the design and conduct of the study; the collection, management, analysis, and interpretation of the data; or the preparation, review, or approval of the manuscript.

## 3 | RESULTS

### 3.1 | Baseline characteristics

A majority of the 283 persons with dementia had Alzheimer disease (59.3%). The 283 persons had a mean score of 13.5 (standard deviation [s.d.] = 5.9) in cognitive impairment and 66.7 (s.d. = 27.2) in ADL at baseline.

At baseline, there were 141 persons with dementia enrolled in the intervention group, and 142 in the control group (Figure 1). There were no significant differences between the 2 groups in age, sex, type of dementia, cognitive impairment, ADL, or prescribed medication except for antidementia drugs. At baseline, the intervention group had higher scores on the Abbey pain scale and the NPI-NH compared with the control group (Table 2).

### 3.2 | Unmet needs, action plan, and type of caregivers in the intervention

At baseline, the most frequent unmet needs identified in the intervention group were pain ( $n = 56$ , 39.7%) and social relations ( $n = 43$ , 30.5%). The action plan was mostly linked to pleasant activity/recreation ( $n = 77$ , 54.6%) and outdoor activity ( $n = 66$ , 46.8%). The most frequent caregivers involved in the multiagency meeting were family members ( $n = 124$ , 87.9%) and physical therapists ( $n = 106$ , 75.2%) (Table 1).

During the 6-month period, 2 in the intervention group were declined due to family caregiver's preference, 10 were transferred to hospital, 2 to a care facility, and 3 died. In the control group, there were 6 cases lost for hospital admission, 14 for nursing home placement, and 5 by death. The percentage of cessation was not significantly different between the intervention group (12.1%, 17 of 141) and the control

**TABLE 2** Characteristics of participants at baseline

	Intervention	Control	Test Statistic	P Value
Type of provider, n (%)			$\chi^2(2) = 7.41$	.025
In-home long-term care support <sup>a</sup>	118 (83.7)	124 (87.3)		
Home-visit nursing care	17 (12.1)	6 (4.2)		
Group home	6 (4.3)	12 (8.5)		
Age, mean (s.d.)	83.7 (7.1)	84.9 (6.7)	$t(279.85) = 1.41$	.159
Sex, male, n (%)	48 (34.0)	36 (25.4)	$\chi^2(1) = 2.56$	.110
Type of dementia, Alzheimer, n (%)	77 (54.6)	92 (64.8)	$\chi^2(1) = 3.05$	.081
Cognitive impairment, mean (s.d.) <sup>b</sup>	13.6 (5.4)	13.4 (6.4)	$t(274.45) = 0.18$	.860
ADL, mean (s.d.) <sup>c</sup>	64.9 (28.8)	68.5 (25.5)	$t(276.70) = 1.10$	.272
Prescribed medication, n (%)				
N06D: Antidementia drugs	65 (46.1)	92 (64.8)	$\chi^2(1) = 10.01$	.002
N02: Analgesics	33 (23.4)	25 (17.6)	$\chi^2(1) = 1.46$	.227
N05A: Antipsychotics	23 (16.3)	17 (12.0)	$\chi^2(1) = 1.10$	.295
N05C: Hypnotics and sedatives	20 (14.2)	10 (7.0)	$\chi^2(1) = 3.81$	.051
N05B: Anxiolytics	14 (9.9)	14 (9.9)	$\chi^2(1) = 0.0004$	.984
N06A: Antidepressants	8 (5.7)	6 (4.2)	$\chi^2(1) = 0.316$	.574
Pain, mean (s.d.) <sup>d</sup>	2.4 (2.8)	1.0 (1.6)	$t(222.43) = 5.21$	<.001
Challenging behaviour, mean (s.d.) <sup>e</sup>	18.3 (13.1)	11.6 (11.2)	$t(274.17) = 4.67$	<.001

A chi-square test was used for categorical variables, and  $t$  test for continuous variables.

<sup>a</sup>In-home long-term care support providers employ home care managers to handle monthly care plans for home care recipients. Recipients usually purchase home-based care services from providers other than the in-home long-term care support providers.

<sup>b</sup>Cognitive impairment was measured by the Japanese version of the Short-Memory Questionnaire. The total score ranged from 0 to 46, with higher scores indicating more memory problems.

<sup>c</sup>ADL, activity of daily living was measured by the Japanese version of the Barthel Index. The total score ranged from 0 to 100, with higher scores indicating less physical dependency.

<sup>d</sup>Pain was measured by the Japanese version of the Abbey Pain scale. The total score ranged from 0 to 18, with higher scores indicating more pain intensity.

<sup>e</sup>Challenging behaviour was measured by the Japanese version of the NPI-NH, Neuropsychiatric Inventory—Nursing Home version. The total score ranged from 0 to 144, with higher scores indicating worse behaviour.

group (17.6%, 25 of 142;  $\chi^2(1) = 1.72, P = .189$ ). The 42 cessation cases did not differ from the 241 remaining cases in baseline characteristics except for lower ADL ( $t(52.18) = 2.58, P = .013$ ). Thus, the last assessment of each of the 283 cases was included in the following analysis.

### 3.3 | Outcomes at follow-up

At follow-up, the intervention group had a mean score of 11.2 (s.d. = 11.9) on NPI-NH and 1.8 (s.d. = 2.6) on the Abbey Pain scale whereas the control group had 10.8 (s.d. = 12.5) and 0.9 (s.d. = 1.6), respectively. There was a significant decline from baseline in the NPI-NH ( $t(140) = 6.88, P < .001$ ) and the Abbey Pain scale ( $t(140) = 2.63, P = 0.01$ ) in the intervention group. There were no significant changes from baseline either in the NPI-NH ( $t(141) = 0.95, P = 0.346$ ) or in the Abbey Pain scale ( $t(141) = 0.43, P = 0.671$ ) in the controls.

A total of 283 persons with dementia showed a significant decline from the baseline in cognitive impairment ( $t(282) = 3.52, P < .001$ ) and

ADL ( $t(282) = 4.74, P < .001$ ). The percentage of medication was not changed for analgesics (McNemar  $\chi^2(1) = 0.06, P = 1.000$ ), antipsychotics (McNemar  $\chi^2(1) = 0.29, P = .791$ ), anxiolytics (McNemar  $\chi^2(1) = 0.40, P = .754$ ), hypnotics and sedatives (McNemar  $\chi^2(1) = 0.67, P = .688$ ), antidepressants (McNemar  $\chi^2(1) = 1.00, P = 1.000$ ), or antimentia drugs (McNemar  $\chi^2(1) = 0.25, P = .804$ ).

A multilevel linear regression model revealed significantly less challenging behaviour in the intervention group compared to the control group at follow-up. There was no significant difference in pain between the two groups (Table 3).

## 4 | DISCUSSION

In a cluster randomized controlled trial, implementation of the BASE programme resulted in a significant reduction of challenging behaviours of people with dementia after 6 months. A combination of training course, ongoing monitoring, and an assessment system focusing on

**TABLE 3** Outcomes at 6-month follow-up assessment

Coefficient (95% Confidence Interval)	Pain	Challenging Behaviour
Fixed effect		
Intercept	1.17 (−2.06, 4.40)	−3.52 (−21.36, 14.32)
Intervention	0.01 (−0.55, 0.57)	−3.99 (−6.70, −1.29)
Baseline characteristic		
Type of provider, in-home long-term care support <sup>a</sup>	−0.30 (−1.06, 0.46)	1.54 (−2.14, 5.21)
Age, year	−0.004 (−0.04, 0.03)	0.06 (−0.12, 0.25)
Sex, male	−0.20 (−0.68, 0.28)	1.10 (−1.58, 3.78)
Type of dementia, Alzheimer's	−0.18 (−0.67, 0.30)	−1.45 (−4.10, 1.19)
Cognitive impairment (0–46) <sup>b</sup>	0.03 (−0.01, 0.07)	0.16 (−0.06, 0.39)
ADL (0–100) <sup>c</sup>	−0.005 (−0.01, 0.005)	−0.02 (−0.07, 0.04)
Use of antipsychotics	0.19 (−0.45, 0.82)	−0.10 (−3.59, 3.39)
Use of antimentia drugs	−0.40 (−0.86, 0.05)	0.29 (−2.22, 2.79)
Pain (0–18) <sup>d</sup>	<b>0.36</b> (0.26, 0.47)	0.38 (−0.19, 0.95)
Challenging behaviour (0–114) <sup>e</sup>	<b>0.03</b> (0.01, 0.05)	<b>0.56</b> (0.45, 0.66)
Random effect		
Residual	2.62 (2.14, 3.22)	90.49 (73.73, 111.06)
Intercept: care professional	0.80 (0.40, 1.60)	7.66 (1.36, 43.13)
Intraclass correlation coefficient (ICC)	0.234	0.078
Fitness of model		
Log likelihood	−567.95	−1049.60
$\chi^2(11)$	102.44	142.71
P value	<.001	<.001
Akaike's information criterion (AIC)	1163.90	2127.20

**Bold**, significant at  $P < .05$ .

Multilevel linear regression analysis including care professional as a random effect.

<sup>a</sup>In-home long-term care support providers employ home care managers to handle monthly care plans for home care recipients. Recipients usually purchase home-based care services from providers other than the in-home long-term care support providers.

<sup>b</sup>Cognitive impairment was measured by the Japanese version of the Short-Memory Questionnaire. The total score ranged from 0 to 46, with higher scores indicating more memory problems.

<sup>c</sup>ADL, activity of daily living was measured by the Japanese version of the Barthel Index. The total score ranged from 0 to 100, with higher scores indicating less physical dependency.

<sup>d</sup>Pain was measured by the Japanese version of the Abbey Pain scale. The total score ranged from 0 to 18, with higher scores indicating more pain intensity.

<sup>e</sup>Challenging behaviour was measured by the Japanese version of the NPI-NH, Neuropsychiatric Inventory—Nursing Home version. The total score ranged from 0 to 144, with higher scores indicating worse behaviour.

unmet needs was effective for behaviour management for home-dwelling persons with dementia.

The BASE programme may have succeeded based on applying a palliative care approach by care managers and professional caregivers, resulting in improvement in challenging behaviours. Professionals' high knowledge and positive attitudes regarding palliative care for dementia have been associated with high quality of life among home-dwelling people with dementia.<sup>33</sup> The successful interventions for challenging behaviour rested on the active engagement of caregivers and the continuing provision of tailored interventions and support.<sup>19,21,49</sup> Our introduction of an online system following the training course could help care managers and professional caregivers translate their knowledge into practices for people with dementia.<sup>34</sup> The strength of this study further lies in the development of a behaviour management programme for home-dwelling people with dementia. Unlike previous psychosocial intervention programmes that have included education and counselling to dyads of home-dwelling person with dementia and family caregivers,<sup>29,30</sup> the BASE programme could be characterized by its focus on evaluation of challenging behaviour and unmet needs in the multiagency discussion. Persons with dementia under a home care programme usually receive home care services from multiple providers and have a lower quality of life compared to those in residential care settings in Japan.<sup>33</sup> The BASE programme could potentially contribute to the integration and individualization of home care services, resulting in appropriate environmental modification for a home-dwelling person with dementia.

The intervention group also showed a significant decline in pain from baseline to follow-up assessment. However, controlling for baseline characteristics, pain at follow-up did not show a significant difference between the two groups. The higher score on pain could imply an enhanced assessment of pain in people with dementia among professional caregivers who received the training course. One palliative care programme for residents with dementia in nursing homes was found to decrease observed pain, but not estimated pain.<sup>50</sup> Since people with dementia were less likely to undergo pain management both in home care and residential care settings in Japan,<sup>51</sup> care professionals in the control group remained unaware of and underestimated the presence of pain among people with dementia.

Our sample had a relatively low percentage of antipsychotic medication use in both groups compared to a previous report (20%) in Tokyo.<sup>33</sup> The rate of antipsychotic medication use remained unchanged from baseline to follow-up assessment. Since our recruitment process had a voluntary basis, participating providers would have already been more committed to psychosocial approaches to challenging behaviour rather than the use of antipsychotics. Our sample had a high percentage of antidementia drug use, which can explain the low use of antipsychotic medication. In addition, a care team under the public long-term care insurance programme does not necessarily include medical doctors in Japan. Medication can be prescribed by medical doctors under the public health care insurance programme so that participating care professionals could not have made decisions about medication for the person with dementia.

There were several limitations to this study. First, the findings are limited to a small number of areas and types of home care service

providers, which could reduce the generalizability of study results. Second, assessment of challenging behaviour was used by care managers and professional caregivers who provided home care services to the person with dementia. The manner of data collection could lead to a bias in the assessments. The baseline assessment in the intervention group followed completion of the training course for care professionals. Hence, the measurement of challenging behaviours might have been more active in the intervention group. Third, the follow-up assessment was performed only 6 months after the baseline. Due to the short period of monitoring, we could not examine long-term effects of the BASE programme such as prevention of nursing home placement or hospital admission of people with dementia.

Despite these limitations, the present study indicates positive effects of a behaviour management programme on home-dwelling people with dementia. Future research should examine the long-term effects of behaviour management programmes on behaviour, nursing home placement, and hospital admission of home-dwelling people with dementia.

## 5 | CONCLUSION

We developed the BASE programme as a psychosocial behaviour management programme for care managers and professional caregivers of home care services. The results of a cluster randomized controlled trial indicated a significant reduction in challenging behaviours of home-dwelling people with dementia via the BASE programme.

## CONFLICT OF INTEREST

The other authors declare no competing interests.

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