


## CASE REPORT

## A case of effective usage of a weighted blanket for a person with severe dementia

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### INTRODUCTION

Sleep disorders are common among persons with dementia: 50.8% of them have insomnia.<sup>1</sup> The behavioural and psychological symptoms of dementia (BPSD), including day-night reversal and wandering during the night, increase the care burden of patients' family members and care staff. In general, pharmacological therapy is prescribed to treat sleep disorders; however, as its effectiveness is limited, non-pharmacological therapy (NPT) has also been proposed.<sup>2</sup> Weighted blankets (WBs) have been used as an NPT in the USA and the Nordic countries, and their effectiveness has started to attract the attention of Japanese medical professionals. Phototherapy is the most common and effective form of NPT, and other forms of this intervention such as lifestyle therapy, electrical stimulation, and cognitive behavioural therapy are also widely employed.<sup>3</sup>

To facilitate better sleep quality in persons with dementia afflicted with symptoms of day-night reversal, the Alzheimer's Association of America recommends various types of lifestyle changes: reducing naps, increasing daytime activity, and regulating sleep rhythms with adequate exposure to sunlight.<sup>4</sup> WBs have demonstrated positive psychological effects in adults with depression and in children with developmental disabilities. They have also been used for persons with dementia in Nordic countries. Field *et al.* reported that pressure stimulation of the body releases oxytocin, a happy hormone, which has a calming effect and activates the secretion of serotonin.<sup>5</sup> This study was the first clinical trial of WBs for persons with dementia in Japan.

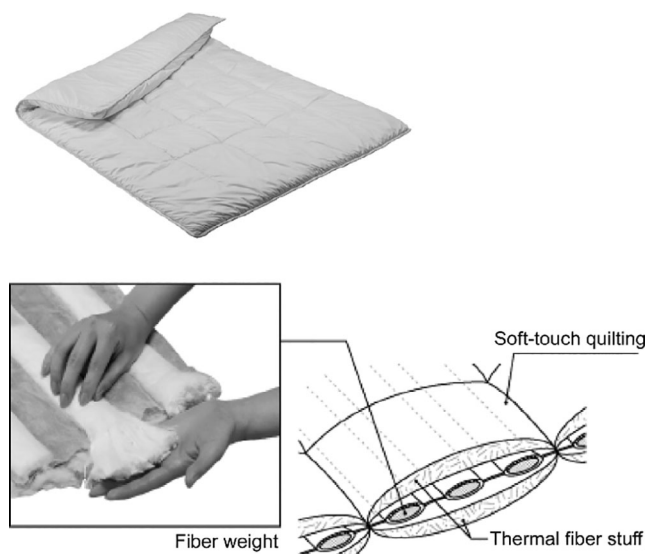
### CASE PRESENTATION

Our case study demonstrates the effectiveness of a WB for a person with severe dementia. The participant was a woman in her 80s living in a nursing home who agreed to participate in the study. At the time of the case study, she was 138 cm tall and weighed 42 kg. She was diagnosed with Alzheimer's disease in 1991. Her symptoms progressed over time, and she began to exhibit symptoms such as wandering, collecting things, and odd eating behaviours. There were complaints from the neighbours about these symptoms, and she was moved to a nursing home in June 2016. At that time, her Clinical Dementia Rating was 3 (severe dementia) and ranked at care level 5 (extreme need of care) on the Long-term Care Insurance system. She had a sleep disorder, with BPSD including day-night reversal, wandering during the night, and hallucinations. Because she had difficulty answering questions, using the Mini-Mental State Examination was not feasible. She had never received pharmacological therapy for her sleep disorder, and her only daily medication was a laxative. She needed mild care support with daily activities. For example, when she fell asleep while sitting up and eating, the care staff would help her eat. She frequently left her room and wandered around the floor throughout the night. The care staff would catch her wandering and lead her back to bed to lie down. The care staff attempted lifestyle therapies from the time of her admission, such as promoting participation in activities during the day and sleep induction at night. The results of the lifestyle therapies showed a slight increase in sleep time, but her nocturnal

auditory hallucinations, hallucinations, and wandering did not decrease; thus, the burden on the care staff increased.

**METHODS**

Our WB clinical trial was performed to compare the patient’s sleep conditions before and after the trial. This study used the Weighted Hug Futon (France Bed Co. Ltd., Tokyo, Japan) from November 2018 to April 2019 in the nursing home (Fig. 1). This WB was developed for the Japanese climate and sleeping style. It weighs 6 kg and is 150 × 200 cm. The trial period was five months. To investigate the effectiveness of the WB, we analyzed the patient’s daily care records, including average sleeping hours per month and the frequency of nocturnal awakening and wandering during the night. One of the caregivers in charge of the patient was interviewed about her behaviour and psychosomatic state. The caregiver’s remarks related to the patient’s BPSD were recorded both before and after the trial and were analyzed by KH Coder (<https://khcoder.net/en/>) for changes. In addition, the caregiver took the Neuropsychiatric Inventory Questionnaire, which enabled us to ascertain the severity of dementia symptoms and the care burden level.

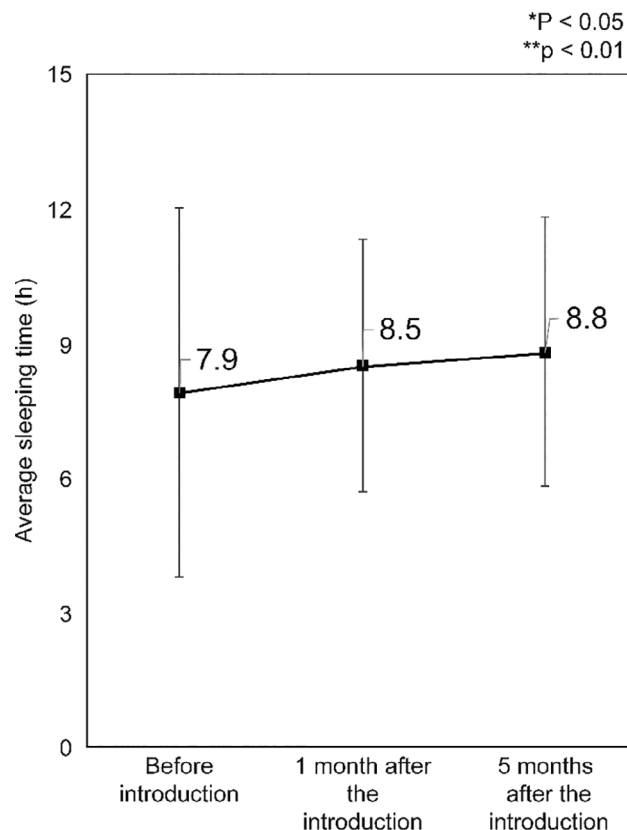


**Figure 1** Weighted Hug Futon. This weighted blanket has a longitudinal arrangement of barbed fibre bundles between thermal fibre stuff. The exterior is made of a soft-touch material with a quilted finish. The total weight is 6 kg.

The Ethics Committee of the University of Tokyo granted approval (no. 18-308). The study was performed in accordance with the ethical standards laid down in the Declaration of Helsinki. Informed consent was obtained from the patient’s adult guardian before the patient’s inclusion in this study.

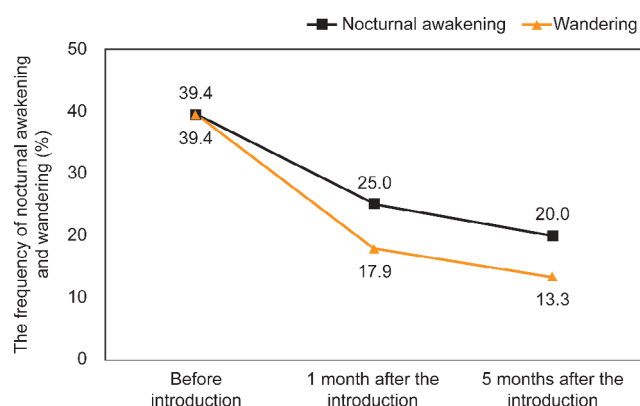
**RESULTS**

Over the course of the trial, the sleeping status of the participant and her BPSD improved. According to the daily care records, her sleeping hours increased and the frequency of nocturnal awakening decreased after the WB intervention. Her average sleeping hours gradually increased from 7.9 h before the trial to 8.5 h after 1 month of use and to 8.8 h after 5 months of use (Fig. 2). Figure 3 shows the frequency of nocturnal awakenings and wanderings during the night. The frequency of nocturnal awakenings decreased



**Figure 2** Line graph showing the average sleeping time of the patient before and after weighted blanket use. Error bars indicate standard deviation, and squares indicate the average sleeping time.

from 13 times per 30 days (39.4%) to 7 times per 28 days (25.0%) after 1 month of use and 6 times per 30 days (20.0%) after 5 months of use. The frequency of wanderings during the night also decreased from 13 times per 30 days (39.4%) to 5 times per 28 days (17.9%) after 1 month of use and 4 times per 30 days (13.3%) after 5 months of use. According to the interview with the caregiver, significant changes in patient behaviour and psychosomatic state were observed. At night, she went to her own bed to sleep independently when she felt sleepy. Her night wandering stopped at the beginning of the trial, and she was able to lie in her bed or sit on her favourite chair in the



**Figure 3** Line graph showing the frequency of nocturnal awakenings and wandering during the night before and after weighted blanket usage. Squares indicate the frequency of nocturnal awakenings, and triangles indicate the frequency of wanderings during the night.

living room. The results of the analyses also suggest a noticeable change in the health of the patient.

The caregiver's comments, analyzed by KH Coder, indicated that before the trial, the frequencies of negative, positive, and "other" comments were 52.9%, 5.9%, and 41.2%, respectively. However, after 1 month of WB use, the frequencies of negative and "other" comments decreased to 28.8% and 25.6%, respectively, whereas positive comments increased to 45.6%. After 5 months of WB use, the frequency of positive comments gradually increased to 66.7%, and the frequencies of negative comments and "other" decreased to 6.7% and 26.7%, respectively. In addition, the frequency of somnolence decreased, and she actively participated in recreational activities during the day. Five months after the introduction of the WB, the care level of the patient, based on the Long-term Care Insurance system, improved from 5 (extreme need of care) to 3 (considerable need of care).

Additionally, the results of the Neuropsychiatric Inventory Questionnaire showed that the burden of the care staff was reduced. The results indicated that the severity of the patient's symptoms decreased from 9 to 4, and the care burden level decreased from 8 to 3. Table 1 shows that the severity and distress of euphoria and night-time behaviours were reduced and that hallucinations disappeared. During the interviews, the care staff expressed a desire for the patient to continue using the WB after the demonstration was complete. The patient improved

**Table 1** Neuropsychiatric Inventory Questionnaire results before and after weighted blanket (WB) use

Symptoms	Before use of WB		After 5 months of WB use	
	Severity <sup>†</sup>	Distress <sup>‡</sup>	Severity <sup>†</sup>	Distress <sup>‡</sup>
1 Delusions	—	—	—	—
2 Hallucination	2	3	—	—
3 Agitation/aggression	1	1	1	1
4 Depression/dysphoria	—	—	—	—
5 Anxiety	—	—	—	—
6 Elation/euphoria	3	1	2	1
7 Apathy/indifference	—	—	—	—
8 Disinhibition	—	—	—	—
9 Irritability/lability	—	—	—	—
10 Motor disturbance	—	—	—	—
11 Night-time behaviours	3	3	1	1
12 Appetite/eating	—	—	—	—
Total	9	8	4	3

<sup>†</sup> Subject's symptom severity scale: 1, mild; 2, moderate; 3, severe. <sup>‡</sup> Caregiver's distress (due to symptom) scale: 0, none; 1, minimal; 2, mild; 3, moderate; 4, severe; 5, extremely or very severe.

enough to be able to sleep calmly at night and became more active during the day.

## DISCUSSION

This case study shows the effectiveness of WBs for persons with dementia for the first time in Japan. As a result of this trial, a decrease in the frequency of nocturnal awakenings and night wanderings led to a decrease in day-night reversal symptoms. The participant was able to sleep calmly at night and was more active during the day. Five months after the introduction of a WB, her care level, based on the Long-term Care Insurance system, improved from 5 (extreme need of care) to 3 (considerable need of care). Therefore, it can be concluded that the introduction of a WB effectively reduces BPSD. However, the patient's day-night reversals did not completely disappear as BPSD affect patients' emotional ups and downs, which are dependent on the environment and relationships. Therefore, this study suggests that the effectiveness of WBs can be further enhanced by combining use with lifestyle therapy, including environmental adjustments and psychological support from the care staff, tailored to the individual needs of each person with dementia.

Patients should have enough physical capability to move under the WB and to move it away from the head when needed to avoid risks of suffocation.

If patients have cardiovascular or pulmonary diseases as well as dementia, WBs should be used only after consulting medical doctors.

Although further studies are necessary to verify the effectiveness of WBs, the results of this case study suggest that they can be an effective means of NPT to reduce sleep disorders in persons with dementia and the burden of care staff.

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