Baby dolls as therapeutic tools for severe dementia patients

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T. Tamura, K. Nakajima, M. Nambu, K. Nakamura, S. Yonemitsu, A. Itoh, Y. Higashi, T. Fujimoto, H. Uno, Baby dolls as therapeutic tools for severe dementia patients, Gerontechnology 1(2): 111 - 118. A baby doll was used as a virtual baby for severe dementia patients who also suffered from twilight syndrome. During a therapeutic program, the occupational therapist presented two soft plastic dolls and one silicon doll for 90 seconds. The patients were observed by an occupational therapist for 60-minutes, and their reaction classified into four categories (no reaction, close observation, taking care of the baby doll, communication with other patients). The baby dolls were also delivered to the main hall after dinner, but only those patients whose attention was caught and held by a doll were interested in caring for it. The patients appeared much happier and less agitated after the dolls were presented. Although doll therapy would not suit all patients, it is a useful tool that may facilitate rehabilitation.

Key words: virtual environment, virtual baby, doll therapy, dementia patient, care

Virtual environment (VE) technology, the direct use of virtual reality (VR), is a tool in the treatment or assessment of psychological and physical disorders. The considerable potential of VEs has recently been subjected to scientific assessment of diagnosis, treatment, or rehabilitation for a wide range of mental disorders and functional impairments. At the IEEE VR 2001 meeting held in Yokohama, Japan, a lecture was given on the application of VE to rehabilitation[1]. VR can be used to achieve a cure, to increase motivation, and to improve quality of life. Although both physicians and engineers are interested in the application of VE, few comprehensive studies of this form of treatment have been performed. In cancer treatment, VEs help patients to reduce pain, and motivate training through the use of a ligament-type ergometer[2]. As the patient walks, the landscape in the VE changes in response to changes in the speed of the ergometer. These environmental changes improve the patient's motivation and the effectiveness of the training. Virtual environments that employ assistive walkers[3] and horse-riding simulators[4] proved highly effective. Toy robots have also been introduced as virtual pets in clinical rehabilitation. In long-term care institutions, playing with pet robots helps children to make a successful return to kindergarten or school.

Pet-assistive and diversional therapies are commonly used as occupational therapies for patients with severe and moderate dementia[5,6]. Pet-assistive therapy involves play interactions between live animals and dementia patients. In previous studies, blood-pressure and heart-rate readings decreased in patients who were introduced to animals. Social and psychological functions also improved. These studies involved children and healthy elderly people who lived alone[6]. Diversional therapy involves play activities with an occupational therapist (OTR). Doll therapy, in which baby dolls are introduced to the dementia patients, serves to remind patients of their younger days when they cared for real babies[7]. There have been several attempts in Japan to use doll therapy, but no research report has been

Figure 1. Baby dolls used in this study.

published yet. Most attempts were rather subjective. To ensure that patients care for the doll, as they would do in case of a real baby, the baby doll must resemble a real baby in weight and form. However, no quantitative studies have been performed on the relationship between characteristics of dolls and patients' preference. Thus we performed a qualitative study on how the doll therapy affects elderly patients especially dementia patients.

The aim of this study is to evaluate the response of dementia patients to three different dolls. We discuss the efficiency of doll therapy and the activities of patients in the presence and absence of intervention.

METHODS

Three types of doll were used (Figure 1). Doll A on the left is called the Koken Baby (Koken, Tokyo, Japan), doll B in the middle is 'Say Cheese' (Lee Middleton Original Dolls Inc., Ohio, USA), and doll C on the right has been developed by Takara (Tokyo, Japan). Height and weight of the dolls are shown in Table 1. Doll A was made of silicon and had a texture that was similar to human skin. Dolls B and C had stuffed bodies, and heads and limbs made of polyvinylchloride. The brown hair of Doll A was painted on, while the hair on Dolls B and C consisted of implanted polyethylene. The neck of Doll B was flexible and required support when the doll was being held. The necks of Dolls A and C were stiff. The face of Doll A was anatomically accurate, the face of Doll B simulated exaggerated laughing, and Doll C had the face of a one-year-old Japanese baby. To accentuate the differences in shape and form, the dolls were dressed with the same clothes and cap.

Experimental Procedures in the Therapeutic Study

Thirteen patients (3 males and 10 females) with severe dementia were given occupational therapy during daytime. Their average age was 90.2±5.2 years (ages ranging from 82 to 102 years). All patients were verified by MRI analysis as having Alzheimer's dementia. The periods of disease symptoms ranged from 3 to 18 years. Five of the 13 patients had visual and hearing impairments, and 10 had cognitive impairments. The Gottfries-Bråne-Steen (GBS) scale for rating dementia was 68.9±19.6 points on average (ranging from 31 to 95 points). The GBS scale is divided into four subscales measuring motor, intellectual and emotional functions, and characteristic symptoms of dementia[8]. Occupational therapists observe the activity of dementia patients and were recommended to confer with the staff about the status of the patient.

The patients were residents in a long-term care institution that was staffed by three OTRs and ten helpers for 40 inmates, who were mostly Alzheimer's patients. For this study, we selected subjects who suffered from twilight syndrome, i.e., patients who were agitated and wandered around the nursing home either after dinner or at dusk. The

Table 1. Doll characteristics.

	Doll A	Doll B	Doll C
Manufacturer	Koken	Lee Middleton	Takara
Height in cm	48	50	46
Weight in g	1766	1452	1226
Material	Silicon	Polyvinylchloride with stuffed body	Polyvinylchloride with stuffed body
Neck	Stiff	Flexible	Stiff

first study was carried out as a group study for one hour during the normal occupational therapy program. The study was scheduled at 10–11 am or 3–4 pm. Three or four patients were gathered in the therapy room, the therapist displayed the dolls for 90 seconds, and the patients' activities were monitored. Each doll was shown for a period of 90 seconds and then taken away. The three dolls were repeatedly shown during the therapeutic program. In preliminary tests, we showed the dolls to patients for different periods and determined patient responses; the slowest reaction took less than 90 seconds. Thus, we choose a 90-second period for showing the dolls to the patients. The activities were recorded on videotape. After the therapy, the recordings were viewed by a skilled OTR and classified as: no reaction, close observation, care giving, and communication with other patients. The total amount of activities indicated the efficiency of doll therapy, and were counted and summarized after classification. The summation of activities was carried out by a simple barcode method[9]. For the time study, we also applied the barcode method. Initially, we pre-determined the possible activities. We then classified the activities into four categories, allocated each an individual barcode, and printed the four different barcodes on one sheet. While viewing the recording, the OTR simply scanned the appropriate barcode with a barcode reader. The data were transferred to a personal computer and loaded into a spreadsheet for further analysis. The events were assembled chronologically into a spreadsheet.

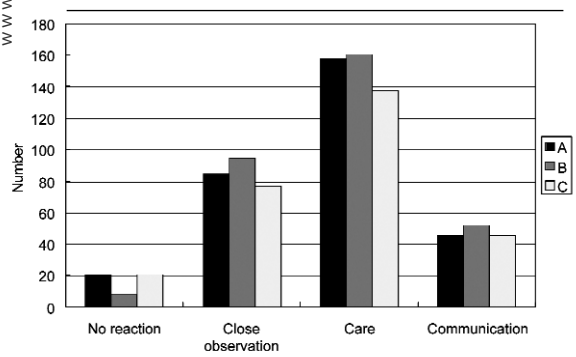


Figure 2. Activities of patients during occupational therapy intervention using baby dolls.

Experimental Procedures in the General Environment

The second experiment was carried out in a more general environment. In the nursing home, the patients tended to wander or become agitated after dinner because of their desire to go home. Therefore, two dolls were delivered to the dementia patients after dinner and the patients' activities were recorded. The experimental periods were between 6 and 7 pm on two consecutive days. The GBS score for the patients gathered in the hall, including those patients who were attending the therapeutic program, ranged from 31 to 95 points. After the patients had assembled in the hall (at 6:10 pm) two therapists each held a doll in their arms for 40 min, after which the dolls were withdrawn. The patients' responses were monitored for the first 10 minutes, the following 40 minutes during which the doll was presented, and the final 10 minutes of the hour. The activities of patients were observed by the OTR and classified into five categories (no reaction, glance, taking care of the doll, and communication with other residents, wandering and agitating), and the total counts of each category were recorded.

A separate study was made of an individual patient who has shown the highest interest in the dolls during the therapeutic program. The GBS score of this patient was 31. She was monitored after dinner from 6 pm to 8 pm over 4 successive days, with and without intervention with dolls. On the day of intervention, at 6:10 pm the therapist held a baby-like doll in her arms for 40 min. The patients' responses were monitored for the first 10 minutes, the following 40 minutes during which the doll was presented, and the final 10 minutes of the hour after the doll had been withdrawn.

The Ethics Committee of the Fujimoto-Hayasuzu Hospital approved the study, and

written informed consent was obtained from patients or their families.

RESULTS

Therapeutic study

Excluding patients with no reaction, the total activity scores were 308, 289, and 261 for Dolls A, B and C, respectively. Total activities indicated that doll therapy was affecting dementia patients and capturing their interest. The highest epochs observed in our experiment seemed to depend on the facial appearance and fabric of the dolls. The scores for the four different activities are shown in Figure 2. In general, care-taking and close observation were the two most frequently observed activities. Differences among the three dolls were found for 'care taking'. Dolls A and B acquired a higher score when compared to doll C. In contrast, no significant differences were found for 'close observation' and for communication. Care-taking was manifested through leaning forward, greeting, beckoning, holding out or shaking hands, coming close to, touching, carrying, carrying while supporting the doll's neck, carrying and calling out, carrying and stroking the doll's head, carrying and hitting the doll's body, carrying close to the face, carrying close to the doll's breast, sitting while supporting the doll's neck, sitting, calling out, hitting the table, clapping hands, clapping knees, holding up, shaking and calling out, sitting and calling out, clasping the doll's hand, passing a hand over the doll's face, passing a hand over the doll's head, putting on the cap, taking off the cap, holding close to the cheek, and placing hands over the doll's hands. The most frequently observed care-taking activities were touching and calling out to the dolls.

General environment

Dolls A and B were delivered to the dining hall and presented to the patients. The patients showed interest in the dolls but insisted that they were too cute to touch. Normally, only mothers and fathers (in this case the OTR) carry babies in their arms, and therefore, only those patients who sat or walked near the OTR showed significant interest in the dolls. During the two days of

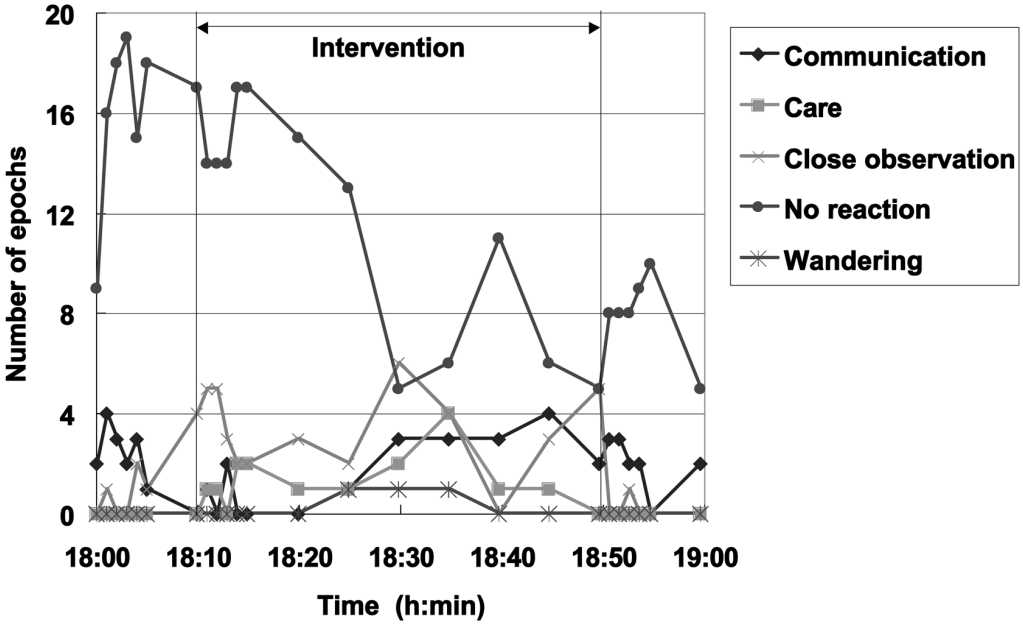
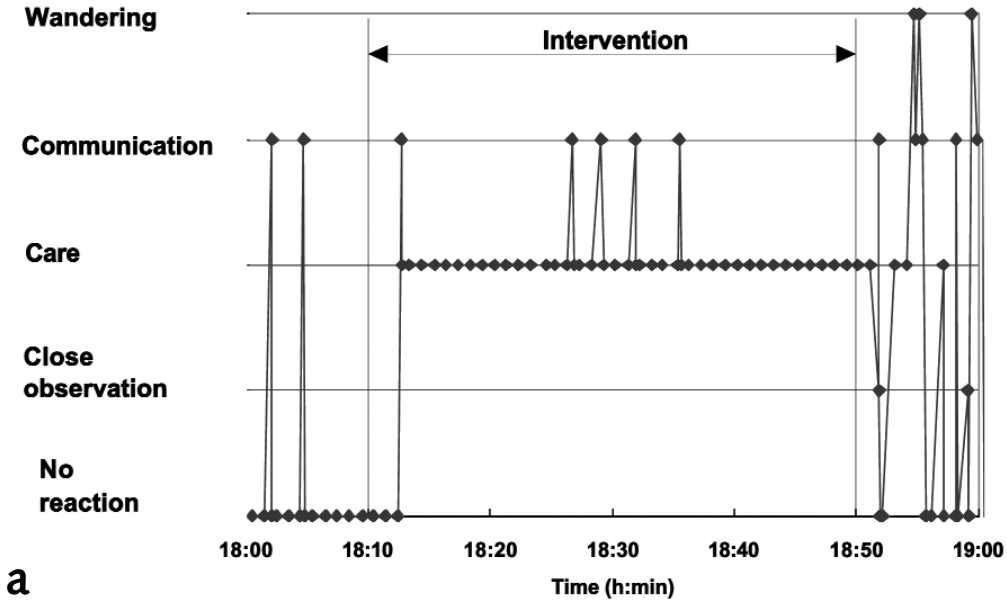


Figure 3. Activities of patients after dinner, following intervention with baby dolls.

the experiment, a maximum of 21 patients (3 males and 18 females) on the first day, and 16 patients (2 males and 14 females) on the second day, participated. The number of participants gradually decreased during the study (Figure 3).



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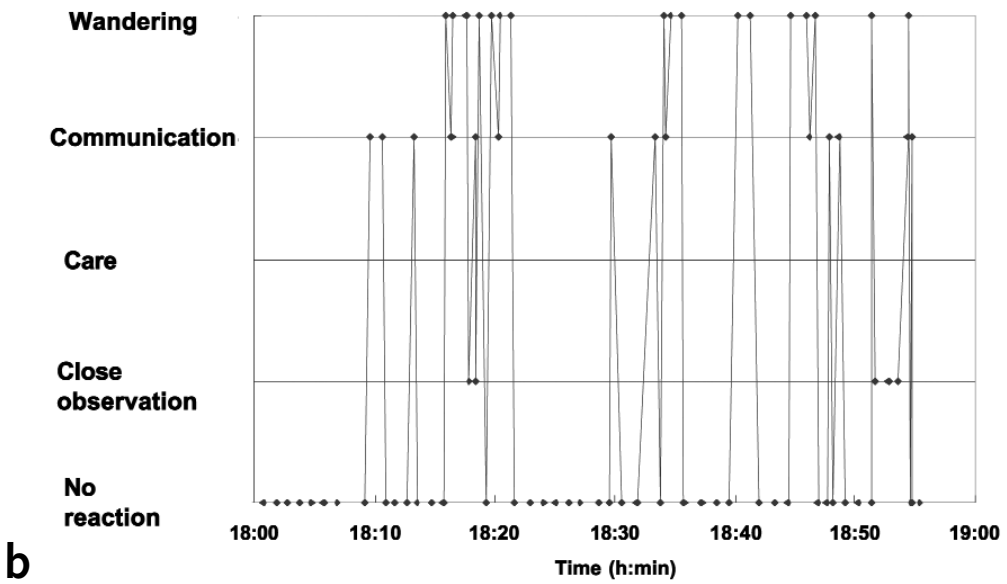

Figure 4. A typical example of a patient with a strong reaction to Doll A: (a) Exposed to the doll (shaded area is 40 min exposure time); (b) Not exposed to the doll.

Moreover, in the opinion of the OTR and the assistant, when a patient in the hall was carrying a baby doll in her/his arms, patients communicated more easily, and were more likely to engage in conversation.

In addition, group size affected reactions to the dolls. During the therapeutic program, the contact time was shorter and the patients had appeared more nervous of one another. One male patient in particular had a somewhat reserved manner towards female patients in the group. On the other hand, when only one patient, male or female, remained in the therapy room, he/she would make close contact with baby dolls. Two groups of patients were clearly distinguishable: one group was interested in the dolls and the other was not. The baby dolls were freely available in the hall, thus allowing patients who were interested in the dolls to make frequent contact with them.

We monitored the activities of an individual patient with (Figure 4a) and without (Figure 4b) intervention with Doll B. She took extensive care of the baby doll during the intervention period. However, in the absence of the doll, she became agitated and tended to wander around, while during doll intervention she was calm and gentle.

DISCUSSION

We have studied the application of VEs to diversional therapy and intervened with the baby doll as a therapeutic tool to substitute a real baby. The aim of diversional therapy is to cure disease symptoms, to increase motivation, to remove pain, and to alleviate frustration. In addition, patients look happier and are more expressive, and this enables them to communicate better with others, promotes their social functioning, and stimulates their senses and perceptions.

In the therapeutic study, we found that the doll therapy is efficient in the program for severe dementia patients. The patients never became weary of the dolls. It is difficult for them to recognize differences between real babies and dolls, and they are willing to take care of a baby doll.

We noticed in the therapeutic study that Dolls A and B elicited higher level responses than Doll C. Therefore, we discarded Doll C for the second study. In our opinion Dolls A and B had more realistic facial qualities and figures.

The main findings and consequences of our study may be summarized as follows. Dolls A and B felt and looked like real babies to severe dementia patients, mainly because of their perceived cuteness.

Touching the dolls was another important issue. One of the dolls (Doll A) was made of silicon, which mimics the skin texture of a real baby. In these experiments, it was important to maintain the temperature of the silicon doll close to human body temperature. Since it has been reported[10] that some severe dementia patients tend to eat hair, it seems preferable for the doll's hair to be painted. A commercial therapeutic baby doll that is made in Australia has no hair; it is a 20-cm, soft-plastic baby doll, which is washable and comes without any accessories such as woolly hair or detachable parts[7].

The highest level of interest shown in the baby dolls resulted in them being loved and treated in a friendly manner by both genders. In addition, the patients took care of the dolls as if they were real babies, a situation that is known as the 'doll phenomenon' or 'mothering'. We performed this study in a rural area of Japan where men do not generally take care of young babies. Nevertheless, the male patients loved the baby dolls. In our study, great attention was paid to patients' personal histories. A baby doll might not be suitable for every individual, and it might be necessary to assess patients for caring attitudes.

In most environments, a pet robot or a live pet can move among patients and attract

their attention. However, in this case the OTR delivered a virtual baby in the form of a baby doll, which affected only patients nearby. This caused a gradual decrease of the number of participants in the dining hall of the study. The baby doll was effective in eliciting responses from individuals, but we must also consider applications that affect larger groups of patients.

A doll is a very simple and inexpensive piece of technology, as compared to a pet robot or even a natural, living pet. In our study, the baby-doll therapy was effective. We conclude that this inexpensive doll is effective in promoting healing and motivation in patients with dementia. However, further studies are needed (a) to examine the timing of delivery and withdrawal of the doll; (b) to vary the therapeutic programs in the nursing home after intervention with the baby doll; (c) to compare baby-doll therapy with conventional therapeutic programs; (d) to assess the burden on caregivers and nurses; and (e) to develop alternatives to the baby doll.

Finally, a quantitative evaluation of intervention with dolls requires further discussion. Questionnaires and time studies are common methods of performing qualitative evaluation. However, physiological parameters must be analysed for quantitative evaluation. Electroencephalograms, blood pressure, and heart rate measurements can be carried out on children and healthy elderly people[5]. The appearance of specific electroencephalograms, and fluctuations in blood pressure and heart rate can be used as indices of successful treatments. However, attaching a sensor or transducer to the body of a severely demented patient is impossible, and new types of sensors are needed to evaluate these effects of therapy.

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