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A pet-type robot AIBO-assisted therapy as a day care program for chronic schizophrenia patients: A pilot study

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RESEARCH

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ABSTRACT

Background
AAT (Animal-assisted therapy) was developed to promote human social and emotional functioning as a day care program for psychiatric patients.

Aims
In this study, we performed AAT using a pet-type robot, AIBO for schizophrenic patients.

Methods
After obtaining informed consent, we performed the AIBO-assisted therapy for three schizophrenic (ICD-10, F20.x2) patients (male: 1, female: 2) whose medication did not change over the 8 weeks study period in a ward.

Results
It was found that the AAT using AIBO may be useful for the patients with negative and general psychopathological symptoms such as “Anxiety” and “Uncooperativeness”.

Conclusion
We make use of this result, and we want to develop the AAT program using a pet-type robot, AIBO which may be suitable for Japanese psychiatric patients.

Key Words
Animal-assisted therapy, AIBO, Schizophrenia, Day care program

What this study adds:

1. What is known about this subject?
Many psychiatric patients like animals, do not mind animals coming into the hospital, and think AAT may be useful as a therapy for a change.

2. What new information is offered in this study?
We suggested that AIBO-assisted therapy, in place of a dog, may be effective for schizophrenic patients with negative and general psychopathological symptoms.

3. What are the implications for research, policy, or practice?
Based on this result, we want to develop the AAT program using a pet-type robot, AIBO which may be suitable for Japanese psychiatric patients.

Background

In our recent study, we showed that many psychiatric patients like animals, do not mind animals coming into the hospital, and think animal-assisted therapy (AAT) may be useful as a therapy for a change. Also, it was shown that many psychiatric patients (82.7 per cent) like animals and

that they know about a pet-type robot (robotic dog), AIBO (SONY Corporation, Tokyo, Japan), and think that an AIBO is useful for therapy (Table 1 and Figure 1).[1,2]

Table 1: Schizophrenia patients' answers to the questions

Question	Yes	No idea	No	Non-response
Do you like animals?	397 (82.70%)		83 (17.30%)	1
Do you know a pet-type robot AIBO?	191 (40.20%)		284 (59.80%)	6
Do you think that AIBO is useful for therapy?	196 (41.80)	157 (33.50%)	116 (24.70%)	12

Figure 1: SONY homepage

Based on the result of our previous work, we propose using a pet-type robot, AIBO, to treat psychiatric patients including schizophrenic ones. Also, there have been few published studies on psychiatric patients with AIBO as a day care program.[3,4] Research to identify which AAT mechanism is effective and to define target populations has been needed.[5] Schizophrenia is one of the disorders in which an unfavourable outcome is associated with emotional withdrawal and a deficit in social functioning.

In this study, a survey to clarify the evaluation methods for AIBO-assisted therapy was performed for a total of eight weekly sessions. There has been a report of three chronic schizophrenic patients in which AAT with an AIBO was effective for especially negative and general psychopathological symptoms.

Method

After obtaining informed consent, we performed the AIBO-assisted therapy (Figure 1: ERF-310AW06J, made by SONY, Japan) for three schizophrenic (ICD-10, F20.x2) patients (male: 1, female: 2) whose medication did not change over the 8 weeks study period in a ward. The Subjects consisted of patients who did not change symptoms in other programs. The AAT was performed by veterinarians and medical staff, and a psychiatrist between other programs (e.g., art therapy and music therapy) for about an hour from 14:00 h every Tuesday eight times for two months. The primary outcome measure for the present study was a change in the State-Trait Anxiety Inventory (STAI), the psychiatrist rating the schizophrenic symptoms with Positive And Negative Syndrome Scale (PANSS); we conducted the clinical interviews, and the patients were rated as to the STAI and PANSS before the study and after two months of AAT treatment.[6–8]

They played with the AIBO together for about 20 minutes each time. The AIBO-assisted therapy sessions included greeting, petting, playing ball-games and teaching the AIBO to walk as activities of daily living (ADL), and the patients chose the actions for the AIBO, for example, taking a picture (Figure 1), which we supported. After all the eight programs had finished, the STAI interviews and PANSS rating were performed again.

The STAI and PANSS are explained below.

STAI

The State-Trait Anxiety Inventory (STAI) is one of the longest standing and most frequently used measures of anxiety, and it has been used in over 3,000 studies.[8] The scale has been translated into numerous languages, and the overall factor structure has been examined for a range of samples. STAI has been successfully applied to high school and college students, adults, military personnel, prison inmates, and a wide variety of psychiatric and medical patients. STAI is a tool that can measure both state (A-state) and trait (A-trait) anxiety. A-state is the strength of anxiety at the moment, and A-trait is the tendency of anxiety as a personality trait.[9] Existential fear is sensitive to both dispositionally (A-Trait) and situationally (A-State) based anxiety.[7]

PANSS

The Positive and Negative Syndrome Scale (PANSS) was developed as a more rigorous and objective method for evaluating positive, negative and other symptom dimensions in schizophrenia.[6] The PANSS assessment is based on behavioural information collected from a number of sources including: Observations during an interview; a clinical interview; and reports by primary care or hospital

staff or family members.

The rating provides summary scores on a 7-item positive scale, a 7-item negative scale and a 16-item general psychopathology scale, and the PANSS ratings should be based on all the information relating to a specified period, normally identified as the previous week. If an item is absent it is scored as 1, and increased levels of psychopathology are assigned scores from 2 (minimal) to 7 (extreme). The one who provides rating must determine the particular criteria for the anchoring points and assign the highest applicable rating point.

Results

The effects of AAT involving a robotic dog, AIBO, for the three schizophrenia patients (ICD-10, F20.x2) were as follows and as shown in Table 2.

Case 1: A female chronic schizophrenic patient was depressive, with general psychopathology symptoms such as anxiety and motor retardation (54 years old, 18 years of hospitalization). The anxiety, depression and motor retardation scale values for general psychopathology on the PANSS were respectively, 6, 5 and 6 before the first session, and had improved to 3, 3 and 3 by the 8th session of AIBO-assisted therapy. Her A-state STAI score changed from 47 to 45. She said, "The first time, I did not like playing with the robot because I was depressed and anxious. But I feel good while playing with AIBO now. It heals my mind."

Case 2: A male chronic schizophrenic patient had some negative symptoms such as emotional withdrawal and stereotyped thinking, and general psychopathology symptoms such as anxiety and active social avoidance (43 years old, 24 years of hospitalization). The emotional withdrawal, anxiety and active social avoidance scale values on the PANSS were, respectively 6, 6 and 6 before the first session, and had improved to 3, 4 and 4 by the 8th session. Also his A-state STAI score changed 61 to 45. He sang with the AIBO, and said, "I'm looking forward to the next AIBO-assisted therapy session. After I played with AIBO, I felt good. I enjoy it" The amount of conversation with his family, medical staff and patients increased.

Case 3: A female chronic schizophrenic patient had positive symptoms, delusion and hallucination, and general psychopathological symptoms, i.e., uncooperativeness and anxiety, in addition to negative symptoms such as emotional withdrawal, and a lack of spontaneity and flow of conversation (27 years old, eight years of hospitalization). The uncooperativeness scale value on the PANSS was 6 before the first session, and had improved to 4 by the 8th session. She said, "After I played with AIBO, I felt good. I enjoy it with other patients." Her A-state STAI score changed from 61 to 55.

Table 2: The anxiety, depression and motor retardation scale values for general psychopathology on the PANSS and A-state STAI scores before and after AAT with an AIBO

PANSS scale value (before→after)	Case 1	Case 2	Case 3
Anxiety	6 → 3	6 → 4	5 → 5
Depression	5 → 3	6 → 4	6 → 6
Motor retardation	6 → 3	5 → 5	6 → 5
Emotional withdrawal	6 → 5	6 → 3	5 → 5
Active social avoidance	5 → 5	6 → 4	5 → 5
Uncooperativeness scale values	6 → 6	6 → 5	6 → 4
A-state of STAI	Case 1	Case 2	Case 3
	47 → 45	61 → 45	61 → 55

Discussion

The present study suggests that AIBO-assisted therapy, in place of a dog, may be effective for schizophrenic patients with negative and general psychopathological symptoms. AIBO-assisted therapy proved a successful tool for improving schizophrenic negative and general psychopathological symptoms, enhancing socialization, reducing loneliness, and general well-being. It may be effective that contact of a patient and the staff increased through AIBO as a result.

It was reported that AAT might be associated with reductions in fear and anxiety.[10] It was also reported that by interacting with a robot pet, the communication, interaction skills, and activity participation of elder adults can be improved, and that robot-assisted therapy can be provided as a routine activity program with the potential to improve social health in residential care facilities.[11]

Actually, as for the effects of AAT, it was reported that Version 3 of the UCLA Loneliness Scale (UCLA-LS) at termination showed improvement compared with baseline scores before AAT in an elderly population in long-term care facilities, and the Scale for Social Adaptive Functioning Evaluation (SAFE) at termination showed improvement compared with baseline scores before AAT in schizophrenic patients.[3,12] The present case reports of the use of a robotic dog, support that, and demonstrate the therapeutic usefulness as a psychiatric procedure for fear and anxiety

reduction.

The A-state STAI score decreased in three patients. It is possible that the relationship between patients and therapists may influence the effects of AIBO-assisted therapy. One patient (Case 1) whose A-state STAI score not decrease so much said "I tense up during the AIBO-assisted therapy", but her depression and anxiety scale values for general psychopathology on the PANSS were improved. It is difficult to give a psychological description of a patient only on the basing of psychological assessments such as STAI. Therefore, it is necessary to investigate the patient's psychological factors including anxiety objectively, for example, by measuring chromogranin A (CgA), which is a biological material responding to stress, or by near-infrared spectroscopy (NIRS), which measures changes in the concentration of hemoglobin and permits measurement of cranial nerve activity in the prefrontal cortex.[4,13]

In future, impaired elderly persons including psychiatric patients may depend on a robot in care, while work forces are insufficient in the country which low birthrate and aging goes ahead through. In Japan, such an innovation is required for mental and physical care in clinical settings. Also, a pet-type robot does not involve the risk of bacterial infection, unlike animals.[14,15] Therefore, an AIBO may be useful in long-term care facilities for elderly psychiatric patients with negative and general psychopathological symptoms, while an aging society advances in Japan.

In this study, it was recognized that AIBO-assisted therapy induced reduction of schizophrenic negative and general psychopathological symptoms with the PANSS, however, we must pay attention to the STAI scores. Further research with more subjects with short and long years hospitalisation, detailed medical histories, and continuous many-program sessions are needed to assess the effects of A pet-type robot AIBO-assisted therapy/AAT on the mood state of patients, and to develop the systematic programs for Japanese day-care of not only schizophrenia, but also cases of alcohol dependents, mood disorders, disorders of psychological development.

Conclusion

In conclusion, we found that the AAT using AIBO may be useful for the patients with negative and general psychopathological symptoms such as "Anxiety" and "Uncooperativeness". We make use of this result, and we want to develop the AAT program using a pet-type robot, AIBO which may be suitable for Japanese psychiatric patients.

References

1. Iwahashi K, Waga C, Ohta M. Questionnaire on animal-assisted therapy (AAT): The expectation for AAT as a day-care program for Japanese schizophrenic patients. Int J Psychiatry Clin Pract. 2007;11(4):291–3.
2. Banks MR, Willoughby LM, Banks WA. Animal-assisted therapy and loneliness in nursing homes: use of robotic versus living dogs. J Am Med Dir Assoc. 2008 Mar;9(3):173–7.
3. Banks MR, Banks WA. The effects of animal-assisted therapy on loneliness in an elderly population in long-term care facilities. J Gerontol A Biol Sci Med Sci. 2002 Jul;57(7):M428–32.
4. Aoki J, Iwahashi K, Ishigooka J, et al. Evaluation of cerebral activity in the prefrontal cortex in mood [affective] disorders during animal-assisted therapy (AAT) by near-infrared spectroscopy (NIRS): a pilot study. Int J Psychiatry Clin Pract. 2012 Sep;16(3):205–13.
5. Burton A. Dolphins, dogs, and robot seals for the treatment of neurological disease. Lancet Neurol. 2013 Sep;12(9):851–2.
6. Kay SR, Fiszbein A, Opler LA. The positive and negative syndrome scale (PANSS) for schizophrenia. Schizophr Bull. 1987;13(2):261–76.
7. Walters GD. State–trait anxiety and existential fear: an empirical analysis. Pers Indiv Differ. 2001:30(8):1345–1352.
8. Grös DF, Antony MM, Simms LJ, et al. Psychometric properties of the State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA): comparison to the State-Trait Anxiety Inventory (STAI). Psychol Assess. 2007 Dec;19(4):369–81.
9. Nakazato K, Mizuguchi T. Development and Validation of Japanese Version of State-Trait Anxiety Inventory-A study with female subjects. Japanese Journal of Psychosomatic Medicine. 1982;22:107–12.
10. Barker SB, Dawson KS. The effects of animal-assisted therapy on anxiety ratings of hospitalized psychiatric patients. Psychiatr Serv. 1998 Jun;49(6):797–801.
11. Sung HC, Chang SM, Chin MY, et al. Robot-assisted therapy for improving social interactions and activity participation among institutionalized older adults: a pilot study. Asia Pac Psychiatry. 2015 Mar;7(1):1–6.
12. Barak Y, Savorai O, Mavashev S, et al. Animal-assisted therapy for elderly schizophrenic patients: a one-year controlled trial. Am J Geriatr Psychiatry. 2001 Fall;9(4):439–42.
13. Toda M, Kusakabe S, Nagasawa S, et al. Effect of laughter on salivary endocrinological stress marker chromogranin A. Biomed Res. 2007 Apr;28(2):115–8.

14. Khan MA, Farrag N. Animal-assisted activity and infection control implications in a healthcare setting. J Hosp Infect. 2000 Sep;46(1):4–11.
15. Kanamori M, Suzuki M, Tanaka M. Maintenance and improvement of quality of life among elderly patients using a pet-type robot. Nippon Ronen Igakkai Zasshi (in Japanese). 2002 Mar;39(2):214–8.

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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ETHICS COMMITTEE APPROVAL

The study was approved by the ethics committee of Azabu University, Japan. 0648.