

Study on the Subjectivity of Medical Professionals Towards Pet Robots

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Abstract

Background/Objectives: The objective of this study is to understand the subjectivity of medical professionals in their perception of pet robots, describe the characteristics of each subjectivity type and understand the categorization of pet robots.

Methods/Statistical analysis: The Q methodology was applied. Twenty medical professionals (doctors or nurses) currently employed in a clinical setting were asked to categorize 56 statements on pet robots. The collected data were analyzed using QUANL PC Program.

Findings: In this study, there were six people with a factor weight of 1.0 or higher in Type 1, six such people in Type 2 and eight people in Type 3. An analysis of subjectivity towards robot pets using the PC QUANL program revealed three factors, with an explanatory power of 77.61%. The explanatory power was 65.65% for factor 1, 6.42% for factor 2, and 5.53% for factor 3. As such, factor 1 can be seen as explaining robot pets the most. The study results show that the perception towards pet robots were categorized along three factors. The subjectivity types were ‘those who support the emotional advantages’, ‘those who emphasize the ease of pet management’ and ‘those who emphasize the convenience from technological development’.

Improvements/Applications: This study provided data for the use of pet robots in clinical settings and education of medical professionals.

Keywords: *Pet robot, Medical professional, Subjectivity, Q methodology, Nurses*

Introduction

Simple intervention where animals are used as a tool to form a trusting relationship between the patient and the medical professional and to start communication strengthens the treatment environment, makes patients happy, increases their responsiveness and helps them stay in contact with reality. In addition, their sense of self-respect is also promoted and leads them to have more positive interactions with others, which increases sociability^[1]. Animal-assisted therapy conducted with the anticipation of positive aspects of intervention where animals are used is a part of a comprehensive treatment process that was designed to promote the physical,

social, emotional and cognitive functions of human beings. In general, animal-assisted therapy brings physical benefits such as lowered cardiac disorders or blood pressure, brings social benefits such as joy and harmony, as well as bringing emotional benefits such as decreasing loneliness. It also has a psychological benefit of increasing social activities. In particular, animal-assisted therapy for the elderly was found to reduce loneliness^[2].

But using live animals poses the issue of individual preference, risk of infection or allergies and trauma caused by animals. As such, they can be a threat to health to those with a weakened immune system such as children or the elderly. This has led to limited cases of application. If the patient is living alone, there may be difficulties of taking care of the animal^[3]. To address these issues, countries in Europe or Japan are developing robot pets. Intervention programs using robot pets

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can ensure a safe environment while maintaining or promoting the physical, mental and social health of the patient.

Medical professionals take up the largest share of work in a medical environment and are key personnel who have the most frequent contact with patients. As such, they need to provide safe and quality medical services within a limited time and in a fast-changing medical environment^[4]. The subjectivity of their perception towards patients in a nursing environment affect their nursing. Therefore, it is important to understand the perception of nurses or would-be nurses.

There is a lack of studies using robot pets on medical professionals. Q methodology starts from the perspective of the actor rather than the hypothesis of the researcher, and allows for understanding the characteristics of each type according to the structure of human subjectivity^[5]. Since the perception of medical professionals towards robot pets is a subjective and unique experience, Q methodology appeared to be appropriate in verifying the types of perception.

As such, this study seeks to provide basic data for the development of a differentiated education program, by understanding the structure of subjectivity towards robot pets from the perspective of medical professionals. The data will contribute to the development of an application program for robot pets in clinical settings and a Korean robot pet by medical professionals in the future.

Method

1. Selection of Q Population and Q Sample

Q The parent group was selected with a focus on students of nursing studies. To extract comprehensive statements on the effects of robot pets, review of literature from home and abroad, open-ended questionnaires and in-depth interviews were used. Through this process, 3 areas and approximately 200 Q parent groups were concluded. By bringing together the literature collected through literature review, a total of 100 Q parent groups were extracted. The Q sample extracted in this study was reviewed and revised to select highly distinctive 56 samples.

2. Q-sort and Data Analysis Method

The Q categorization takes the statements of the Q sample and asks the subjects selected through the P sample to normally distribute them, so that each

individual autonomously define robot pets^[6]. A Q card was used on 25 medical professionals to collect data. It took mostly 20-30 minutes for one subject to complete the Q categorization. The distribution of the Q sample categorized the statements selected through the Q sample from very strong agreement to very strong disagreement according to the importance. Statements on robot pets were categorized on a 14 point scale. Then an interview was conducted with the subject on the statements on the polar ends. For Q factor analysis, Principle Component Factor Analysis, varimax method was used. With a reference point of an Eigen value of 1.0, various number of factors were entered to get results and total explanation variance. The collected data had scores allocated from the Q sample distribution table. The converted scores were then used. The converted scores were coded in the order of Q sample numbers and processed with the main factor analysis by QUANL PC Program. Data analysis was done with the QUANL pc program.

3. Ethical consideration on research objects

The plan for this study was submitted to the Public Institutional Review Board designated by the Ministry of Health and Welfare before starting for ethical considerations related to subjects and received approval (P01-201812-23-007). Study subjects were described the objectives of the study and were guaranteed anonymity and confidentiality. They were also told that if they do not wish to share their personal information, it was not required. Contact information was given in case that they wanted to withdraw from the study at any time after completing the questionnaire. Questions unrelated to the study were also sincerely answered for ethical considerations.

It was also explained that subjects could withdraw from the study at any time after voluntary consent had been given. To uphold the rights of subjects and guarantee privacy, all collected data were anonymized and coded through Q sorting

Result and Discussion

1. Characteristics of each type towards robot pets

An analysis of subjectivity towards robot pets using the PC QUANL program revealed three factors, with an explanatory power of 77.61%. The explanatory power was 65.65% for factor 1, 6.42% for factor 2, and 5.53% for factor 3. As such, factor 1 can be seen as explaining

robot pets the most [Table 1]. Individuals corresponding to each factor are a group of people who have a similar response to robot pets.

Table 1: Eigen Value, Variance, and Cumulative Percentage

	Type I	Type II	Type III
Eigen Value	13.1308	1.2847	1.1059
Variance(%)	0.6565	0.0642	0.0553
Cumulative	0.6565	0.7208	0.7761

2. Analysis of each type

- Those who support the emotional advantages: There were a total of 6 people in Type 1. Those in Type 1 most strongly agreed with the statement, ‘I feel comfortable because interaction is done through sensors. (Z=2.39)’, ‘Responsibility is reduced.(Z=2.34)’, and ‘I don’t need to walk it.(Z=2.12)’. The statement that received the strongest disagreement were ‘I wish there would be a growth stage like a pet’, ‘I feel skeptical as a single button can erase all memories of the owner’, and ‘Even those who do not like pets can easily access it.(Z=-0.76)’.

The characteristics of Type 1 concern the emotional support received from robot pets that is similar to what can be received from live pets. They stated that there would not be any emotional lack because it’s a robot, and that when the robot pet is lost they would experience a similar feeling to the death of a pet dog. But they also said that robot pets can be seen as consumables in a society when even live pets are abandoned. They think that robot pets can be used for emotional support in a clinical setting, and that would be of help to the treatment of patients. This led to Type 1 being named ‘those who support the emotional advantages’.

- Those who emphasize the ease of pet management: There were a total of 6 subjects in Type 2. Statements that received the strongest agreement by Type 2 people were ‘My family likes it’ (Z=2.61)’, ‘It is convenient not to clean after them.(Z=2.48)’, and ‘With commercialization of robots, science and technology will further develop.(Z=2.40)’. The statements that received the strongest disagreement by those in Type 2 were ‘Even those who do not like pets can easily access it’, ‘I feel skeptical since all memories of the owner can

be erased with a single button’ and ‘It can remember the owner throughout its life.(Z=-0.75)’.

Type 2 individuals saw the advantages of pets in robot pets and are satisfied with the convenience in management as it saves the efforts, time or money required for raising pets. As such, they stated that it would be easier to apply robot pets in a clinical setting. Type 2 was named ‘those who emphasize the ease of pet management’.

- Those who emphasize the convenience from technological development: There were a total of 8 people in Type 3. The statements that received the strongest agreement by those in Type 3 were ‘I don’t have to worry about feeding the pet when traveling.(Z=2.42)’, ‘It costs a lot more when it is broken.(Z=2.25)’, and ‘No grooming is required.(Z=2.24)’. Statements that received the strongest disagreement by Type 3 people were ‘People who don’t like pets can easily access it’, ‘I wish it had a growth stage like pet animals’ and ‘I feel skeptical as all memories about the owner can be erased with a single button.(Z=-0.78)’.

Those in Type 3 were impressed with the scientific and technological development before robot pets and are interested in the benefits that would bring. They like that technological progress can help replace animals but are also worried about the downsides that may appear in the future. They are worried about humans being replaced by robots and human relations being undermined as a result of machines taking over. As such, Type 3 was named ‘Those who emphasize the convenience from technological development’.

Discussion

Type 1 are those who support the emotional advantages. They do not think that just because it is a robot the advantages of having a pet, such as emotional stability or maintenance of cognitive functions are undermined. They believe that emotional bonding can occur between the owner and robot pet and can even help in health management for the elderly living alone.

The social support function of animals is used as a way to meet the various health-related needs of the elderly. Animal-assisted therapy is found to have a positive effect on the mental state of the elderly with dementia^[7]. In other countries, animals are widely used in hospitals or nursing homes in the form of animal-assisted therapy (AAT) or animal-assisted activities (AAAs). AAT and AAAs are known to have an emotional effect of relaxing or motivating

the individual, as well as physical effects of improved vital signs or social effects such as improved communication between the admitted patient and nursing provider^[8].

Type 2 are those who emphasize the ease of pet management. Raising a pet requires time and money similar to raising a baby. In recent years, such animals are called as companions rather than pets, to emphasize the point that they live their life together with you. This signifies a shift from a concept of ownership to a concept of companionship^[9]. Basically, owners of such animals see the animals as an agent, that is more like a close friend or relative with whom they can have an affectionate relationship^[10].

Despite such positive benefits, most hospitals or nursing homes are concerned about allergies, infections, biting, scratching, diseases or stress of animals when applying animals to therapy^[11]. In particular, they can pose health threats to the elderly who have a weak immune system. There is also the challenges of taking care of animals^[12], making raising a pet difficult. In Korea, apartments being more common places a further restraint.

Type 3 are those who emphasize the convenience from technological development. This type is interested in the practical benefits brought by science and technology, as applied to robot pets. They believe that with scientific progress, there will be more convenience and life will become better. Meanwhile, they are concerned about undermined human relations and caretaking as robots replace humans. They feel melancholic about how emotions such as love, traditionally felt in human relations are now being shifted to come from machines.

People in this group see pets as providing psychological sense of stability and protection both at home and outside, the way a friend or companion would^[13], and as an object of affection similar to a family member. They also noted their satisfaction with the emotional intimacy they feel from their pets^[14]. Participants in this study think of their pets as family, get much consolation from them and considered taking care of them as important. They also noted that we need to think about whether such emotional aspects being met by machines or technology is going to be accepted by the elderly.

This study analyzed the subjective perception of medical professionals towards robot pets and categorized it into three types. The result showed that most medical professionals had a positive perception towards robot pets and saw the application of robot pets in a clinical setting as positive. When categorized by their characteristics, the perception of these medical professionals could be broken down into three types: Those who support the

emotional advantages, those who emphasize the ease of pet management, and those who emphasize the convenience from technological development.

This study on subjectivity can be used as basic data in developing measures to apply robot pets which are garnering increasing attention. Moreover, the presentation of the subjective structures and characteristics of each type is anticipated to help in developing education programs for medical professionals.

However, since convenience sampling was used and subjects were not selected by taking into consideration the factors affecting their perception towards robot pets, there is a limit to generalizing the study findings. As such, a follow-up verification of the types is needed by composing a Q sample with a variety of backgrounds in subjects.

Conclusion

This study provided the basic data required to adopt policies of applying robot pets, by categorizing the subjective perception of medical professionals towards robot pets. As this study analyzed the perception of medical professionals towards robot pets and verified the types, we anticipate educational programs that consider the characteristics of each type to be developed. In addition, it is suggested that a qualitative study be conducted to verify the various factors that affect the nursing of patients who would benefit from robot pets. It is also suggested that additional study be conducted by selecting samples that take into account various factors.

Ethical Clearance: Approved Public Institutional Review Board in South Korea(P01-201812-23-007).

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Conflict of Interest: Nil

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