About Nursing Care Robots Used in Japan

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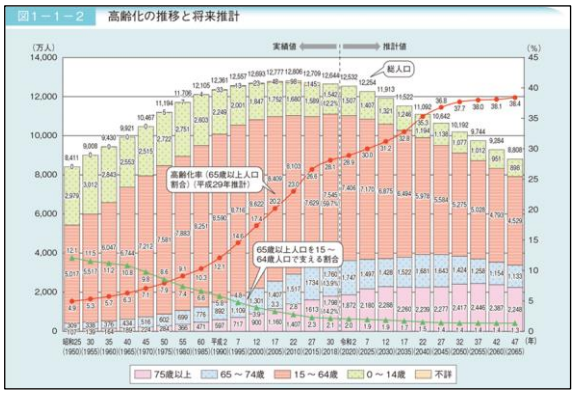
Abstract

The present report is going to introduce various types nursing robots being used mainly in long-term care homes for elderly people. As is already known, more than 28 percent of Japan's whole population is over 65 years old. This is the highest proportion in the world. It is estimated that by 2030 one in every three people will be 65 or older, and one in five people 75-plus years old. It is not difficult to imagine that Japan is going to face a serious shortage of caregivers. According to the estimate of the Ministry of Health, Labor, and Welfare, around 2.45 million workers will be needed in the nursing-care sector by that year, although the supply will probably not exceed 2.11 million, which leaves a shortfall of 340,000 caregivers. The Japanese government has been looking into the dependence on robotic technology as one of the major solutions for this problem. Today we are going to share the robotic view of elderly people's care which will steadily coming to us in the near future.

1. Background[2)6)]

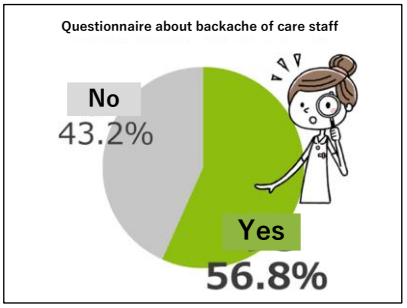


As we are learning to become nurses and public health nurses, we have come to realize the serious aging of Japan. The red line in this graph shows the aging rate in Japan. The aging rate in 2020 is 28.7%, which is an aging society.　The area to the right of the green circle is the future forecast.

Looking at the forecasts, it is expected that Japan's aging population will continue to rise.

First, I would like to talk about changes in average life expectancy and healthy life expectancy in Japan. The red line shows healthy life expectancy. Healthy life expectancy represents the period during which you can live without restrictions in your daily life. The difference between average life expectancy and healthy life expectancy is described as a limited period of daily life. The difference in the case of men is 8.84 years and for women it is 12.35 years. You will find that you will need help with long-term care and treatment. The rise in the aging rate and the difference between average life expectancy and healthy life expectancy indicate that aging in Japan is a serious problem.

Secondly, there is a shortage of staff in long-term care facilities. One of the causes is the increase in the elderly. In addition to that, there is a lot of physical burden on the caregiver. For example, supporting or hugging a person requiring long-term care is a physical burden. As you can see from the graph, 56.8% of the respondents answered "I have backache" in the questionnaire about backache of care workers. It exceeds the majority. There is also data that about 80% of all occupational illnesses that occur in the work of long-term care workers are backache. It can be said that the prevention of backache in the long-term care workplace is an important issue in terms of securing human resources.



Furthermore, the turnover of long-term care staff is increasing. Overwork was the reason for leaving the job. It is possible that stress builds up due to overwork and the physical and mental burden is increasing. Despite the increase in the number of elderly people, the number of employees leaving their jobs is increasing. The burden on the long-term care staff left behind may be further increased.

2. Various types of nursing care robots used in Japan

I thought that these Japanese long-term care problems were related to each other. The rising aging rate is leading to labor shortages and rising turnover rates. In addition, overwork due to labor shortages is driving the turnover rate to rise. In 2012, the government began to consider improvements to solve these problems. In 2014, the Abe Administration we launched a "new robot strategy" at the Robot Revolution Realization Conference. As a result, the development, production and introduction of nursing care robots are currently progressing in Japan. We decided to proceed with research with the aim of clarifying the merits and demerits caused by using nursing robots.

2.1. Nano mist bath[7)]

"Nano Mist Bath" is a bathing robot used by people who have difficulty bathing or walking or who have a heart condition. The robot itself is like a bathtub, and nano mist, which is smaller than normal mist, removes dirt from the body. It is also easy to move and can be installed anywhere with a household power supply and 4 liters of water. Therefore, it is possible to reduce the movement the bathtub when taking a bath, and it is possible to reduce the burden on both the care recipient and the caregiver.

2.2. iCarebot[1)]

First, the robot that provides automatic excretion support automatically performs the excretion process. A special cup is attached to the user, and when the special cup detects excretion, suction, washing, and drying can be performed automatically. The excrement is collected in a tank, and the caregiver flushes it

to a toilet or the like for disposal. And the best thing about this robot is that it saves the caregiver's excrement disposal. In addition, the user does not have to wait from excretion to processing. Therefore, it is a robot that is attracting attention because it can be expected to reduce stress on excretion.

A typical robot for automatic excretion support is "iCarebot". "iCarebot" is always clean and hygienic in the cup because excrement is processed immediately, it can be used without getting stuffy with a damp air drying function, and the excrement is sealed in a tank so there is an unpleasant odor in the room Not filled with. It has the feature of automatically recording the excretion history for 24 hours. "iCarebot" saves the trouble of disposing of excrement, reduces the burden on the caregiver, and reduces the mental burden.

2.3. Robots for transfer assist[4)]

This picture shows “Muscle Suit”. This is regarded as a robot. The feature of this robot is that it works with artificial muscles that operate with air. And, since it does not use electricity, there is no problem in using it in a wet place or in other situation like natural disasters. This robot can supplement the force of 25. 5kgf. Using a muscle suit will help prevent backache and improve movement efficiency.

2.4. Paro[3)]

"Paro" is a robot that looks like a seal. It helps elderly people get relaxed, reduce stress, and activate communication in the same way as real animals do. When interacting with real animals, people get fun and peace. Animal therapy is a method of actively using the animal to treat or prevent mental illness and to help rehabilitate the body. It has been shown that Animal therapy has psychological, physiological, and social effects in a variety of people from children to the elderly people. It has been demonstrated that "Paro" gives us the same effect as is given by animal therapy. The effect was scientifically recognized, and "Paro" was certified by Guinness in 2002 as "the robot with the most therapeutic effect”. People who have animal allergies can use Paro comfortably. It has norisk of infectious diseases, or accidents such as biting or scratching. Currently, Paro's research on robot therapy is being conducted not only at various facilities in Japan, but also at facilities and hospitals for the elderly in Sweden, Italy, France, and the United States.

2.5. Pepper[5)]

Pepper is one of the most popular communication robots which are developed in Japan. Pepper is

a humanoid robot that can recognize human emotions. It is about 120cm.It is equipped with AI called "emotion engine. It can estimate our emotions by analyzing our facial expressions and tones of voice, so that it can think on its own what kind of things to say and do. Exercise is mainly carried out in facilities for the elderly. According to the result of a questionnaire to care giver, 88% of them realized that mental and time burden was reduced, because "Pepper's guide and instruction in exercise allowed them to focus more often on assisting participants.

3. The introduction rate of robots in nursing care facilities in Shizuoka Prefecture

We investigated the introduction rate of nursing care robots in Shizuoka prefecture, where we live. 68 out of 583 facilities have introduced Protective Robot Technology / ICT. This percentage is 33.8%. Of these, the introduction rate of ICT equipment is high. In addition, the introduction of nursing care robots such as transfer assistance devices and communication robots introduced earlier has begun to progress. The main motives for the introduction are reducing the burden on staff, improving long-term care services, and improving the image of the workplace. On the other hand, the reasons for not introducing it are that the introduction cost is high, the effect of introduction is unknown, and it is difficult to use it.

4. Summary and further research

From these results, it was found that some facilities have not been introduced because the effects of the introduction are unknown and it is difficult to use them. Collected the opinions of the introduction of nursing care robot facility, to analyze the merits and demerits. And we need to think about how to increase the introduction rate of nursing care robots.

Currently in the middle of research. In the future, I would like to visit nursing care facilities that use nursing care robots, interview the merits and demerits+ of using robots, and proceed with research.

References

1) ALTON JAPAN Co.Ltd. HP.
2) Cabinet Office of Japan
https://www8.cao.go.jp/kourei/whitepaper/w-2019/html/zenbun/s1_1_1.html
3) Daiwa House Co.Ltd. HP.
4)INNOPHYS Co.Ltd. HP.
5) Kaigo Robot Online
https://kaigorobot-online.com/news/148
6) Minna no kaigo（Care for everyone）
https://www.minnanokaigo.com/enquete/no18/
7) Nursing Care / Life Support Robot Promotion Council HP.