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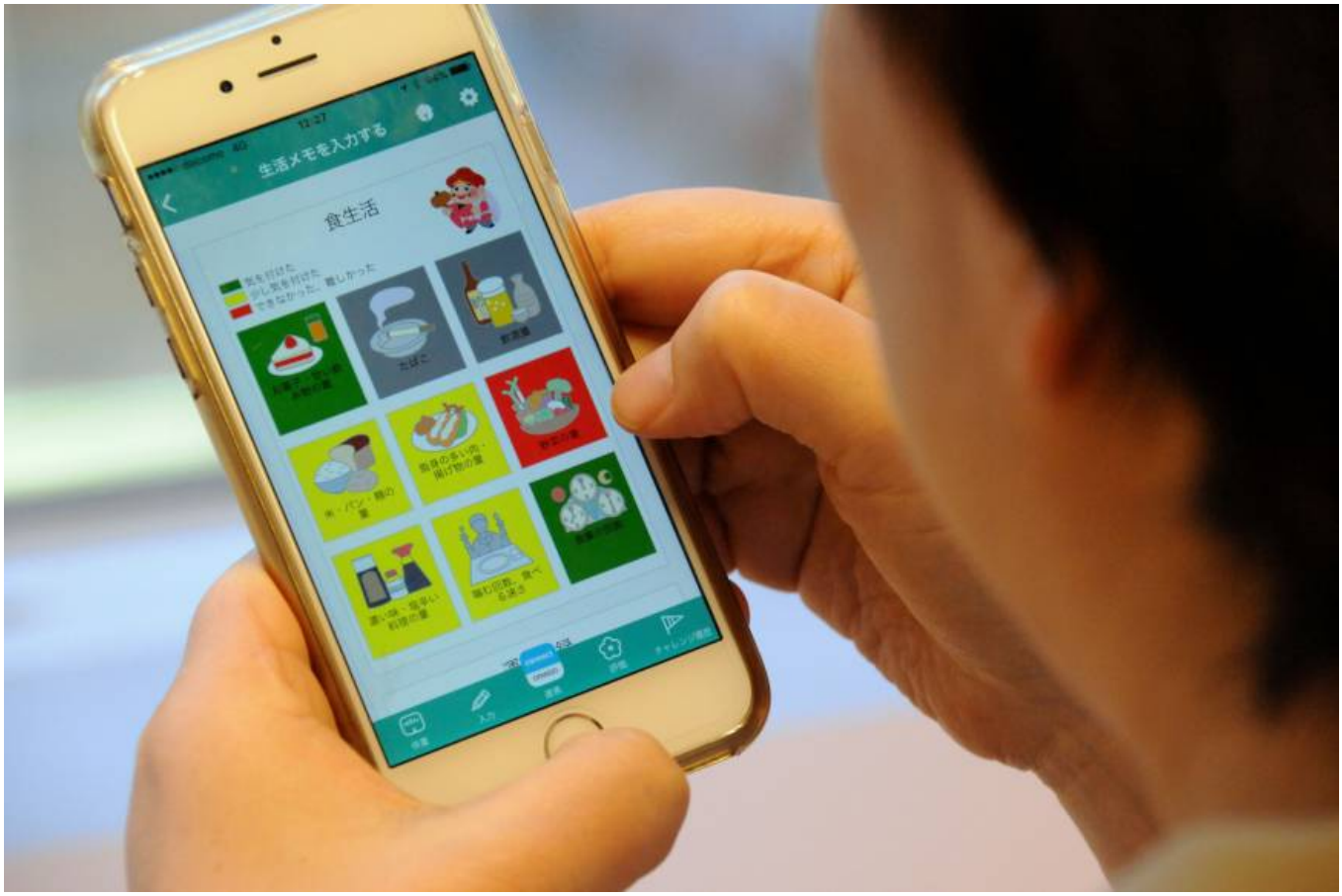

The Shichifukujin (Seven Lucky Gods) smartphone app is being used in what is dubbed the world's first large-scale study aimed at showing that digital health devices improve the condition of diabetes patients. | SATOKO KAWASAKI

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Japan doctors tap health-monitoring app to help diabetics keep dialysis at bay

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In September 2016, freelance journalist Yutaka Hasegawa touched off a firestorm of criticism after writing in his blog that diabetes patients receiving dialysis should pay for the treatment themselves instead of using public health insurance. He argued that it was their "corrupt" lifestyles that spawned the need for dialysis and that their medical expenses would "ruin Japan."

Many people took to the internet to slam Hasegawa over his misleading and abusive remark (not all diabetes is lifestyle-related). But it also shone a spotlight on the dire financial situation surrounding Japan's health care system, which is dealing with a rapidly graying population and a swelling ratio of diabetics.

According to the health ministry, 10 million people were "strongly suspected" of being diabetic in 2016, up from 6.9 million in 1997.

Also, in a report released in July, the ministry said Japan has the highest per capita number of people on dialysis among major countries, with diabetes treatment costing the nation ¥1.2 trillion a year, or 4.4 percent of all medical expenditures. According to the Japanese Society for Dialysis Therapy, 2,596.7 people per 1 million were on dialysis in the nation in 2016. Dialysis costs ¥400,000 per patient per month, posing "a big challenge for the nation's medical expenditures," the report said.

Against this backdrop, the government is seriously studying ways to stop diabetes patients from progressing to the dialysis phase.

Last month, doctors at the National Center for Global Health and Medicine in Tokyo, with help from medical institutions and health insurance unions across the country, launched what they called the world's first large-scale clinical study to examine whether using the internet of things is effective in keeping high blood-sugar levels at bay.

The researchers, sponsored by the state funding body Japan Agency for Medical Research and Development (AMED), have recruited 2,000 type 2 diabetes patients who are a step short of receiving dialysis and divided them into two groups: one fitted with a smartphone app and internet-connected medical devices, and the other without.

Type 2 covers more than 90 percent of all diabetes patients, experts say. Unlike type 1 diabetes, the cause of which is not known, type 2 diabetes is often associated with overeating, obesity, lack of exercise and stress.

During the two-year study, named PRISM-J, which started on Jan. 23, users will be asked to log their health data daily, including weight, blood pressure, kind of meals eaten, number of steps walked, and amount of exercise performed, through Bluetooth-connected devices. The data will be sent to a central database and shared with their doctors. They use a smartphone app called Shichifukujin (Seven Lucky Gods) developed by Dr. Kazuyo Tsushita of the comprehensive health science center at the Aichi Health Promotion Public Interest Foundation.

In a previous study conducted by the Aichi institute and covering nearly 200 people, users of the app were shown to be more successful in lowering their blood-sugar levels than nonusers.

The app features cartoon characters of seven gods including Ebisu that monitor walking habits, and Daikokuten, which checks one's diet. They send motivational messages tailored to each user, and alerts if they slack off on exercise or start to veer from their weight-loss plan.

In the PRISM-J study, patients will have blood tests taken at their doctors' offices every three months to have their blood sugar, pressure and fat levels and kidney and liver functions checked. Doctors will also review data sent from the internet of things devices and give advice.

The researchers said the ¥1.5 billion project is aimed at keeping patients engaged in treatment; at present, nearly 4 out of 10 diabetes patients drop out of therapy, citing reasons such as being busy at work or school, finding medical bills too costly or not feeling sick (even though the disease might be progressing without major symptoms). The government has set a target of having 75 percent of diabetes patients continue their treatment, which includes advice on exercise, diet and medications.

"This is an unprecedented undertaking, in terms of the size and duration of the project," said Dr. Kohjiro Ueki, director of the diabetes research center at the National Center for Global Health and Medicine and the head of the study. "Previous studies (that explored the use of the internet of things in diabetes care) lasted three months or six months at the longest."

Kazumi Nishikawa, director of the health care industries division at the Ministry of Economy, Trade and Industry, which jointly manages AMED with the health ministry and the education ministry, argued that the project is the first attempt to establish internet of things gadgets as medical tools, not toys for health and fitness geeks.

"Doctors see patients once a month, but cannot manage them between visits," Nishikawa said. "Wearable devices and apps are handy tools to monitor patients' conditions, but until now, those devices have not been reliable enough for professional use."

The results of the PRISM-J study will be published in a respectable medical journal in about two years, Nishikawa said, noting that, if the internet of things is indeed proven effective in diabetes care, it could be incorporated in clinical guidelines for treatments to be used by doctors. In the future, specifications for the devices could be standardized and made public so any manufacturer can develop them for clinical purposes. The devices could even be exported to other countries with high-risk populations, such as Russia and China, he said.

Dr. Hiroaki Kato, a guest professor at Digital Hollywood University in Tokyo who is versed in digital health, said he is all for promoting the internet of things in medical care and commends the PRISM-J project. He said such devices will be a common tool in many medical fields, citing the success of a smoking-cessation app in Japan. "It's like taking the doctor home," he said.

The challenge is getting everyone, including patients and doctors, to understand that digital health data cannot be trusted blindly, Kato said. "Even if the data show someone's heart rate has gone up to 200 beats per minute, it might be just that the person has just run a marathon. The data alone won't tell you under what circumstances patients were gauged. Everyone should share the awareness that data have their limits."

A Matter of Health covers current research, technology and policy issues relating to health in Japan.
