Development of a Home-based Support System for Diabetic Patients

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Abstract—It is necessary for patients with diabetes mellitus (DM) to correctly interpret blood sugar levels from self-monitoring of blood glucose, to properly manage their blood sugar and to follow the medical advice of their physician. Accordingly, we developed a home-based support system for diabetic patients by which the patient can record his medical data and send the information to a medical institution using an Android smartphone. The patients can view various pieces of information such as prescription information with a smartphone. We anticipate that our newly developed system will be useful in supporting patients with DM at home.

I. INTRODUCTION

A 2011 survey by the Ministry of Health, Labor and Welfare of Japan estimated that 2.7 million people have diabetes mellitus (DM) in Japan. For the prevention of various complications, the patient should be managed not only by a specialist but also by himself, at home, to control his blood sugar levels better. Self-monitoring of blood glucose (SMBG) is a convenient means of checking blood sugar levels throughout the day. SMBG has now spread in all Japan. However, it is necessary for patients to correctly interpret blood sugar levels from SMBG, to properly manage their blood sugar and to follow the medical advice of their physician. Accordingly, we developed a home-based support system for diabetic patients by which the patient can record his medical data and send the information to a medical institution using a smartphone.

II. OUTLINE OF THE SYSTEM

The home-based support system was designed for use by a patient at home and a remote physician. This system is composed of a smartphone for the diabetic patients at home, a personal computer (PC) operated by a physician and a web server installed in the medical institution, as shown in Fig. 1. We developed this system using XML allowing data to be found and checked using a web browser in any environment. To support a patient with DM, we developed a system that enables management of the measured data, access to information from the medical institution and acquisition of instructions via e-mail from the physician. Patients can read the data being registered with the SQLite database of a smartphone. The physician can inspect the patient’s data on a PC after the data from the smartphone are transmitted to the server. The system administrator manages the information such as a prescription, on the server at the medical institution.

III. RESULTS OF DEVELOPMENT

We also developed the system on an Android smartphone. Patients being registered are entered into a new-patient registration form on the PC. Five items of information (today’s data, past data, hospital information, prescription information, and messages from the physician in charge) are prepared in the menu entry on the selection screen. Among these, the measured data (weight, blood pressure, and blood sugar level and insulin dosage) registration form is displayed by touching the “today’s data” button on the selection screen. The information is added to the database in the Android terminal and simultaneously sent to the web server by touching the transmission button.

IV. DISCUSSION AND CONCLUSION

In the present study, we developed a system that can support the management of a diabetic patient at home by a physician at a medical institution and the patient himself using an Android smartphone. Trials indicated that patients can easily use the system for data entry and receive instructions via e-mail from a physician with a smartphone. In addition, this system is more suitable for accumulating the data necessary to manage diabetes than conventional methods, such as paper-based data records. The home-based support system that we developed was requested, and evaluated by a few diabetic patients. The patients can view various pieces of information as a list, such as prescription information, medical history and measured data, with a smartphone. We anticipate that our newly developed system will be useful in supporting patients with DM at home.

REFERENCES


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