Study finds that mobile phone technology helps patients manage diabetes

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An interactive computer software program appears to be effective in helping patients manage their Type 2 diabetes using their mobile phones, according to a new study by University of Maryland School of Medicine researchers. The study is being published in the September issue of the journal *Diabetes Care*. The study, one of the first to scientifically examine mobile health technology, found that a key measure of blood sugar control – the amount of hemoglobin A1c in a person's blood – was lowered by an average of 1.9 percent over a period of one year in patients using the mobile health software. The findings support the further exploration of mobile health approaches to manage many chronic conditions, including diabetes.

"These results are very encouraging," says Charlene C. Quinn, Ph.D., R.N., an assistant professor of epidemiology and public health at the University of Maryland School of Medicine and the principal investigator. "The 1.9 percent decrease in A1c that we saw in this research is significant. Previous randomized clinical trials have suggested that just a 1 percent decrease in A1c will prevent complications of diabetes, including heart disease, stroke, blindness and kidney failure."

The study indicates that using mobile phones, the Internet and other mobile communications technology to keep patients healthy may have broad applications to help patients and their physicians manage many health conditions.

"Mobile health has the potential to help patients better self-manage any chronic disease, not just diabetes," Dr. Quinn explains. "This is one of the first large, reported, randomized clinical studies examining the mobile health industry, which is rapidly growing. The U.S. Food & Drug Administration just last month released draft guidance on how it intends to regulate the field. Our results can help define the science behind this new strategy for disease management."

People with Type 2 diabetes either do not produce enough insulin to convert sugar into energy or their cells ignore the insulin. A key measure of blood sugar control is the amount of hemoglobin A1c in a person's blood. A1c is a molecule in red blood cells that binds itself to blood sugar. The higher the level of sugar in the blood, the higher the level of A1c.

An A1c test provides a snapshot of a patient's average daily blood glucose levels over the previous two to three months. The American Diabetes Association recommends that a person's A1c be less than 7 percent. Most Americans with Type 2 diabetes have an average level of more than 9 percent, which greatly increases their risk for complications.

"We tell patients that they can meet these goals if they eat a healthy diet, exercise daily and take their medication as directed, but we don't really give them the tools to do that," says Dr. Quinn.

The yearlong study enrolled 163 patients with the help of 39 primary care doctors in Baltimore County, Baltimore City, Montgomery County and Anne Arundel County. Patients were divided into four groups based on the research assignment of their physician. Three patient groups received mobile phones loaded with the diabetes management software and the fourth group served as a control group. All patients in the study received a free blood glucose meter and testing supplies.

The software examined in the research provided real-time feedback on patients' blood sugar levels, displayed medication regimens and served as a "virtual coach." A patient's blood sugar test results were sent wirelessly from a blood glucose monitor to the mobile phone. If the level was too low or too high, the software on the phone prompted the person to take steps to correct it. The system also analyzed blood sugar levels and other patient information and sent computer-generated logbooks and suggested treatment plans to the patients' primary care doctor.

Provided by University of Maryland Medical Center