Diabetes and Technology for Increased Activity (DaTA): Self-Monitoring Solutions for Health Promotion

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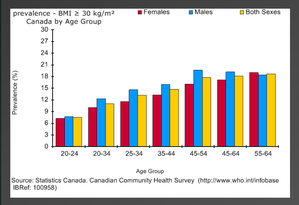
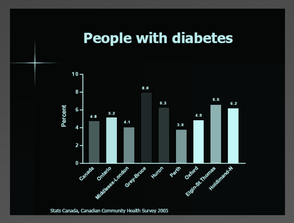
CHALLENGES

Health care provision deficits and increasing levels of chronic disease in rural and urban communities have prompted researchers and policy makers to search for feasible solutions.



Prevalence of measured adult obesity in Canada (calculated by height and weight) Statistics Canada, 2004.



Canadian, Provincial, and Regional/rural-based Diabetes Statistics. Source: Statistics Canada, *Canadian Community Health Survey*, 2005.

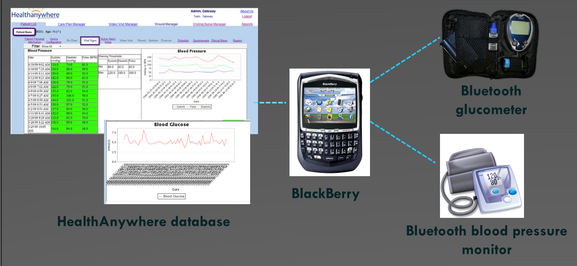
❖Rates of diabetes and cardiovascular disease are at epidemic levels in Ontario—especially in rural regions; Sedentary lifestyles are linked with increasing rates of chronic disease. This has caused an increased burden on health care systems and economies.

❖Patients at risk for developing diabetes may be unaware of how to make simple lifestyle modifications such as increasing exercise or improving nutrition. Exercise improves insulin sensitivity and enhances glucose tolerance. Exercise helps prevent obesity, a leading risk factor for type 2 diabetes.

❖Lifestyle recommendations are generally offered to patients in primary care and other community-based settings, but these recommendations are often not adhered to, or patients do not feel motivated to act on them.

SOLUTIONS

In order to address the health challenges in Ontario communities, we conducted pilot feasibility research—The Diabetes and Technology for Increased Activity (DaTA) study–in rural Southwestern Ontario. We incorporated methodology based on best evidence from health-related self-monitoring devices research and our systematic review work [1-6].



❖Twenty-four people with metabolic syndrome (type 2 diabetes, n=5) were enrolled in an eight-week intervention to assess the use of wireless self-monitoring technologies and a managed exercise for improving patient well-being and preventing the development of type 2 diabetes and cardiovascular complications (CVCs).


Weigh scale


Omron digital pedometer

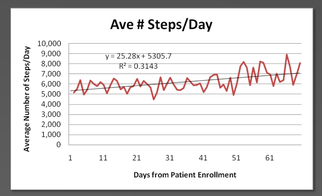

Suunto heart rate monitor

❖ Participants in the study used a BlackBerry™ as the primary wireless communication tool, which captured measurements from two Bluetooth-enabled health-monitoring devices—a blood pressure monitor and a glucometer. Readings were transmitted to a patient care database (Healthanywhere). The BlackBerry was also used to submit daily pedometer steps and weekly weight. A Suunto heart rate monitor belt was worn for various time periods to capture heart rate variability. Wirelessly transmitted measurements were monitored by the study investigators (via database) and by patients (via BlackBerry).

RESULTS

❖Improvements in clinical outcomes: weight loss, cholesterol levels, and heart rate during exercise.

❖ Improvements in physical activity: increased steps/day with the pedometer; improvements noted in physical activity "stages."



❖Improvements in overall sense of well-being, quality of life, and the motivation to increase regular exercise.

❖ All participants submitted home monitoring measures throughout 8-week intervention (>95% compliance on all measures). Most found the technologies easy to use and would want to continue using them; they felt that the study encouraged them to stay focused and motivated.

❖Many felt that being in the study increased their overall awareness of their health; in some cases, they found out about conditions or risk factors they had, but were not aware of.

❖ Based on feedback from end-of-study information sessions, participants felt motivated to continue to increase or maintain current exercise levels. Many felt remote self-monitoring devices were valuable two-way tools for communicating health data with their physicians. RPM devices provided them with a quick method for determining the status of their overall health and physical fitness (e.g., "a monthly physical").

POLICY

This form of interventional research has the following implications for health care quality, community health, and strategies for the prevention of diabetes and related CVCs:

❖***Prevention of disease and lifestyle modification***—the llogic model for Ontario's chronic disease prevention and management framework suggests the following [7]: "*More individuals and families should have increased knowledge of their disease processes and role as daily self-manager;*" "*Providers have increased knowledge, skills and tools to incorporate into their practices;*" and "*more providers are using electronic information systems and sharing information among team members, their clients, other health providers and settings*." Remote patient monitoring (RPM) may help facilitate these strategic planning initiatives in the following ways:

***Policy Pathway*: Improved Quality of Care**

- Health care system enhanced by integration of RPM technologies, based on demonstrated efficacy.
- Easily transferrable to other chronic diseases and conditions that require routine monitoring.
- Cost effectiveness—prevention vs. emergency.
- Healthier people across all types of communities.

***Policy Pathway*: A "Technology Prescription"**

- Patients become self-managers and "health technicians."
- Improved communication with primary care providers and data exchange with other care team members.
- Integration with existing database platforms, pharmacies, physician e-records, and other telehealth technologies.
- Objective method of health data collection—immediacy and accuracy of Bluetooth measurements.
- Subjective feedback and positive reinforcement—high value in viewing health measures regularly.

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