Telehealth in Rural Montana: Promoting Realistic Independent Self-Management of Diabetes

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Fondly known as “the last best place,” Montana ranks 44th nationally in state population, fourth in land mass, and third for lowest population density in the United States. The state has only three counties with a population > 50,000; 53 of its 56 counties are defined as rural. Primary care providers (PCPs) who provide the bulk of diabetes care in rural areas experience multiple challenges, including limited health care resources, geographic isolation, and limited access to diabetes education centers. Diabetes is a prevalent and costly disease with significant morbidity and mortality. New health care delivery strategies to increase rural patients’ access to care are needed.

Billings Clinic (BC) is a 272-bed hospital and 225-physician regional multi-specialty group practice. Through its Eastern Montana Telemedicine Network (EMTN), BC provides telehealth care to patients living in rural areas in eastern Montana and parts of Wyoming and the Dakotas. The BC Center for Clinical Translational Research (CTR) was established in 1999 to help promote healthier living and improve management of chronic disease.

In 2002, CTR, in collaboration with EMTN, initiated a diabetes management project called Promoting Realistic Individual Self Management (PRISM) to enhance diabetes care in rural communities. The 4-year project study was funded by the National Institute of Diabetes and Digestive and Kidney Diseases. The objective of the PRISM project was to implement and evaluate the effectiveness of a nurse practitioner-led multidisciplinary team approach to enhance diabetes care through patient empowerment and improved self-management in close conjunction with patients’ PCPs in both urban and rural settings. The goals were to achieve American Diabetes Association (ADA) standards for vascular risk factor control and to improve patient self-management skills and patient satisfaction.

This article describes the design and implementation process of the telehealth component of the PRISM program and selected program outcomes, including patient and provider acceptability, program and technology satisfaction, and self-reported patient self-management behaviors.

Program Design

The 3-year telehealth component of the PRISM program was conducted in five rural Montana clinics with two to nine PCPs serving 30–300 diabetes patients per year. Telehealth linked diabetes providers in Billings with patients in rural communities using real-time, two-way interactive video conferencing. Diabetes educators in Billings used a document stand that allowed items placed on the stand to be projected full size onto the screen. Telehealth connections were secure, and consultations were strictly confidential. PRISM telehealth team members included a family nurse practitioner (FNP), two registered nurse certified diabetes educators (CDEs), a registered dietitian (RD), and a licensed clinical social worker (LCSW).

Program evaluation used a pre-/post-intervention design. Patient satisfaction and self-management...
data were collected at baseline and 1, 2, and 3 years after the intervention. Study inclusion criteria included 1) referral by a PCP, 2) age ≥ 21 years, 3) type 2 diabetes diagnosis (International Classification of Diseases, Ninth Revision, codes 250.xx), 4) at least one uncontrolled vascular risk factor per ADA guidelines (A1C ≥ 7%, blood pressure ≥ 130/80 mmHg, and LDL cholesterol ≥ 100 mg/dl), and 5) a willingness to participate. All communication among the multidisciplinary team members and rural patients was accomplished using telehealth technology with occasional follow-up phone calls.

At project initiation, the PRISM team traveled to each rural clinic to explain the program objectives, methods, and collaborative nature of the initiative to PCPs and staff. Program development included establishing local trust, identifying key rural staff members to assist with patient visits and data-sharing needs, and creating educational materials and communication forms. Areas where the rural clinics needed to adjust office workflow processes to accommodate the program were identified, and the team worked with the clinics to make necessary changes. Effective interaction among the PRISM team and rural clinic PCPs and staff members was paramount and involved understanding the telehealth technology and working to overcome telehealth scheduling challenges and other barriers. Rural PCPs identified preferred methods (i.e., telephone or e-mail) for communicating with the team.

In conjunction with rural PCPs, the program focused on identifying and managing uncontrolled vascular risk factors and using patient-centered care to overcome barriers to self-management related to psychosocial issues such as depression and lack of knowledge or physical issues such as obesity or inactivity. Providing patient-centered care required learning to move from content-driven education to patient-driven encounters. Motivational Interviewing (MI), an effective evidence-based approach to overcoming the ambivalence that keeps many people from making desired changes in their lives, was incorporated into the PRISM team approach to encourage active, involved patients. This included evaluating readiness-to-change behaviors. Staff MI training included telehealth sessions presented by an academic and clinical expert in the field of diabetes self-management. These skills required time to develop, and ongoing training included reading, role-playing, and case discussion during team meetings.

**Key Lessons**
From January 2006 to December 2008, 202 referrals were made from the five rural clinics. Fifty-six were excluded because of patient refusal or study exclusion criteria. Another 28 did not have sufficient data for analysis. The demographics of the remaining 118 patients available for analysis are described in Table 1.

**Challenges facing and lessons learned by the PRISM team**
The idea of working as a team was challenging. In the first months of the study, education was provided using a traditional didactic method without a unified team approach. Patient-centered care and MI were introduced over time, tentatively tested, and eventually accepted as a superior model of care. In MI, rather than taking a didactic approach, the clinician guides the patient toward his or her goals by helping the patient express reasons and motivations for change.

The transition from provider- to patient-centered care can best be described through an example. Early in the program, while still using provider-centered care, an obese patient stopped coming to sessions because of his perception of “being pressured to exercise too much.” Later, after MI had been implemented, another obese patient developed fun ways to be active and learned the benefits of activity through new glucose monitoring skills.

The team had many preconceived barriers to using telehealth technology. Table 2 presents perceived barriers to using telehealth technology. The demographics of the remaining 118 patients available for analysis are described in Table 1.

**Table 1. Telehealth Patient Baseline Demographics (n = 118)**

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<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
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<tbody>
<tr>
<td><strong>Female</strong></td>
<td>69</td>
<td>58</td>
</tr>
<tr>
<td><strong>Diagnoses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>84</td>
<td>71</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>85</td>
<td>72</td>
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<tr>
<td>Depression</td>
<td>29</td>
<td>25</td>
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<tr>
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<th>Mean ± SD</th>
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<tr>
<td><strong>Age (years)</strong></td>
<td>61.3 ± 11.6</td>
</tr>
<tr>
<td>Time since diabetes diagnosis (years)</td>
<td>6.6 ± 8.1</td>
</tr>
<tr>
<td>A1C (%)</td>
<td>7.7 ± 1.5</td>
</tr>
<tr>
<td>LDL cholesterol (mg/dl)</td>
<td>96.3 ± 36.9</td>
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<tr>
<td>Diastolic blood pressure (mmHg)</td>
<td>74.3 ± 10.7</td>
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<tr>
<td>Systolic blood pressure (mmHg)</td>
<td>132.0 ± 15.8</td>
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<tr>
<td>BMI (kg/m²)</td>
<td>35.3 ± 7.7</td>
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</table>
introduced. Care conferences were developed that included the team and a patient, or a team member, a patient, and the patient’s PCP. Telehealth educational groups with invited specialists were formed, including psychosocial support and weight loss groups. A life coach position was developed in the second study year when the team realized participants might be more receptive to working on self-management barriers with a coach rather than with a traditional social worker. The team approach was further advanced by weekly team meetings to discuss patient barriers and progress and to develop plans of care.

Overall, team members felt the program was very successful. They learned valuable skills and developed an appreciation of each others’ strengths and contributions. Positive feedback from patients was a source of pride. The team became very comfortable with the telehealth technology. As reported in 177 satisfaction surveys completed by team members during periodic reevaluation sessions, 98% of respondents felt the picture and sound quality were clear of the telehealth technology, and 97% felt that telehealth was a useful tool for patient diabetes management and education.

Challenges in integrating PRISM into rural clinic practice
The goal of the PRISM program was to work closely with rural PCPs to enhance patients’ diabetes self-management through efficient communication and collaboration. Patients were encouraged to follow up with their PCPs at least quarterly. Rural PCPs were generally accepting of the program and referred patients in need of diabetes co-management throughout the program. Some PCPs were extremely engaged in the program, joined telehealth sessions with their patients, and were vocal in their support of the program. On the other hand, a few rural PCPs were open to use of the team for patient education but ambivalent about the FNP’s involvement in their patients’ care, especially concerning medication adjustments. This issue was PCP-specific and partially solved with increased team/PCP communication.

From the rural clinic office perspective, program implementation was initially challenging. Busy clinical office schedules resulted in some clinics having difficulty with patient preparation, including placing patients in rooms, taking their vital signs, and providing them with PRISM educational materials. Extra time was also required to copy and

<table>
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<tr>
<th>Care Team’s Perceived Telehealth Barriers</th>
<th>Program Responses to Barriers</th>
<th>Outcomes</th>
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<tbody>
<tr>
<td>Patients will not be comfortable with the telehealth technology.</td>
<td>Raised awareness regarding use of new technology with both patients and staff.</td>
<td>This perceived barrier was not realized. Patients quickly adapted to technology and shared personal or sensitive issues even more openly than in face-to-face sessions.</td>
</tr>
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<td>There will be difficulty scheduling telehealth sessions between PRISM providers and rural participants.</td>
<td>One person was assigned to coordinate EMTN, PRISM staff, and patient schedules.</td>
<td>Scheduling improvements were made, but it remained a time-consuming task.</td>
</tr>
<tr>
<td>Telehealth technology will be difficult for staff to learn.</td>
<td>EMTN provided technology training and support.</td>
<td>This perceived barrier was not realized. Staff members easily learned to use telehealth technology.</td>
</tr>
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<td>Conducting multiple-site group visits will inhibit interactive discussions because of the nature of the technology (i.e., the screen shows only one site at a time).</td>
<td>Program staff focused on facilitation skills in a telehealth environment.</td>
<td>This perceived barrier was not realized. Patients learned to work with the technology, enabling them to interact effectively with patients at other sites. In fact, friendly rivalries between sites developed and contributed to group success.</td>
</tr>
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<td>Staff will have difficulty translating manual skills and the use of diabetes care tools using telehealth technology.</td>
<td>Program staff focused on learning to use telehealth technology tools (e.g., a document stand for printed education materials), demonstrating techniques for using blood glucose monitors and insulin pens, choosing injection sites, drawing up insulin, and recognizing proper food portions. PowerPoint presentations were also easily projected through video conferencing.</td>
<td>This perceived barrier was generally not realized. In most cases, patients were able to learn manual skills using telehealth technology.</td>
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fax patient information (e.g., laboratory results and PCP dictations). However, through open communication and joint problem-solving, these challenges were ultimately overcome.

**PRISM patients: satisfaction and improved self-management**

Patients reported high levels of satisfaction with the program and the technology. Participants felt that the ability to participate in a team approach to diabetes management without traveling was beneficial. Most took advantage of multiple team visits (the mean number of annual visits was 11), and many actively participated in the diabetes support and weight loss groups. As reported in post-telehealth session surveys, 100% of patients (n = 181; patients with multiple reassessments could have answered the survey multiple times) reported feeling comfortable learning health information using this technology and said they understood the information as if it were imparted in person, and 99% felt the technology picture and sound were clear.

At 12-month intervals, patients completed a Diabetes Care Survey, using 5-point Likert scales (e.g., strongly disagree to strongly agree or poor to excellent, as described in Table 3). Compared to baseline, patients reported improvements in diabetes care of 30–200% 1 year after the intervention.

**Case Example**

An important goal of the PRISM telehealth program was to enhance services in rural areas with limited specialized diabetes services. The case of “John,” who was referred to the program by his PCP and then requested that his wife “Jane” also participate, illustrates the success of the program.

John’s goals were weight and blood pressure reduction, which he took on with fierce determination. John made use of every service of the program, meeting with a team member at least monthly. However, as a very extroverted person, John identified that he does best in group settings.

PRISM provided the opportunity for him to participate in four group education sessions, several support groups with other rural communities, and a 12-week weight-management program, which were all services unavailable in his small community. John was soon competing with other participants and proudly boasting about his daily walking routine of 10,000 steps and his 30-lb weight loss.

Although Jane had similar goals, as the matriarch of the family, she tended to care for other family members and place her needs second. The intimacy of a small community inhibited disclosure of her situation. Jane’s stress-related eating was best treated by joint telehealth visits with the RD and life coach. She

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<th>Table 3. Diabetes Care Survey, Baseline Versus 1 Year After PRISM Intervention (n = 118)</th>
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<tr>
<td><strong>Satisfaction with diabetes care</strong> (agree or strongly agree)</td>
</tr>
<tr>
<td>“I am very satisfied with the diabetes care I receive.”</td>
</tr>
<tr>
<td>“The diabetes care I received last few years is just about perfect.”</td>
</tr>
<tr>
<td><strong>Communication with and among providers (good or excellent)</strong></td>
</tr>
<tr>
<td>“Keeping me informed about what the next step in care would be”</td>
</tr>
<tr>
<td>“Communications between the providers caring for me”</td>
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<tr>
<td>“Different health care providers being up to date on my current treatments and recent test results”</td>
</tr>
<tr>
<td><strong>Self-management</strong> (good or excellent)</td>
</tr>
<tr>
<td>“Knowing who to ask when I had questions about my health”</td>
</tr>
<tr>
<td><strong>Diabetes symptoms</strong> (better or much better)</td>
</tr>
<tr>
<td>“How much have your diabetes symptoms changed in the past 6 months?”</td>
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participated twice in the weight-
management program and had
periodic supportive phone sessions
with the life coach. Jane developed
new skills to separate work and fam-
ily stresses and found exercise to be
an effective stress reducer.

John’s and Jane’s progress was
relayed to their PCP through e-mails
and shared electronic health records.

Conclusion
The PRISM program demonstrated
a positive impact on diabetes self-
management and patient satisfaction
by bringing a multidisciplinary team
into rural clinics and working closely
with rural PCPs and their patients
to improve diabetes care. Telehealth
proved to be an effective and satis-
factory means of communication
with rural patients, allowing multiple
team members and even multiple
rural telehealth sites to participate
simultaneously.

Both patients and team mem-
ers found the technology to be an
effective tool for diabetes manage-
ment interaction. Patients reported
improvement in self-management
in the areas of glucose monitor-
ing and diet management. Regular
contact with the rural clinic sites
including mutual planning and
problem-solving helped to minimize
or eliminate challenges in program
implementation.

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