Clinical Challenges and the wellbeing of a person with diabetes

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Diabetic foot syndrome

- 2–3% of PWD develop a foot ulcer/year
- 25% lifetime risk of developing a foot ulcer
- Foot ulcers precede 84% of all nontraumatic lower limb amputations in PWD
- Diabetic-associated lower-extremity ulcers are responsible for 92,000 amputations annually in US
- Annual incremental healthcare costs ranged from $11,710 to $16,883 per patient with a foot ulcer in US (2014)

DIABETES IN CANADA

- Every 3 minutes another Canadian is diagnosed with diabetes.
- 29% of Canadians are currently living with diabetes or prediabetes.
  - This will rise to 33% by 2025 if current trends continue.
- Today 3.4 million Canadians are estimated to be living with diabetes.
- Diabetes is costing the country $14 billion per year.
- 2025: That number is expected to reach more than 5 million people in the next 10 years.
  - In 10 years it will cost approximately $17.5 billion per year.

At least 1 in 10 deaths in Canadian adults was attributable to diabetes in 2008/09.

diabetes.ca | 1-800-BANTING (226-8464)
What are the quality indicators?

- Pain reduction,
- Physical function and ambulation,
- Infection reduction, Reduced bioburden
- Time to heal and Percent wound area reduction in 4-8 weeks.
- Reduced social isolation, Reduced depression
- Reduced recurrence
- Amputation reduction
- Cost of treatment
What is wound healing?

- 30% reduction in 4 weeks? for all wounds?

A retrospective, secondary data analysis of 777 patients with lower leg ulcers from the Wounds Studies database was used consisting of 6 studies (2 randomized control trials, 2 cohort studies, and 2 pre-post evaluations of evidence-based practice implementation) conducted prospectively between 1999 and 2009, examining the treatment and delivery of care for patients with leg ulcers in Canada.
Venous leg ulcers

healing rate (% surface area reduction)

Weekly ↓ in surface area:
- All Participants (N=777): 4.8%
- Month 3 Healed (n=328): 8.3%
- Month 6 Healed (n=50): 8%

Monthly ↓ in surface area:
- All Participants (N=777): 19.3%
- Month 3 Healed (n=328): 33.4%
- Month 6 Healed (n=50): 31%
What about pressure injuries?

- Scoping review: Stage 3 and Stage 4 pressure injuries (pressure ulcer, bed sores, pressure injury, decubitus ulcer, pressure sore)
- 7 Studies met inclusion criteria
- 6 randomized studies and 1 non-randomized
- 134 patients in the control groups and standard wound care groups
- All studies included Stage 3 injuries and 6 studies included Stage 4 injuries
Percentage of Surface Area Closure by Week 4

- Adunsky & Ohry (2005): 17%
- Dwived et al. (2016): 34%
- Mustoe et al. (1994): 17%
- Nussbaum et al. (2013): 20.8%
- Price et al. (2000): 15.2%
- Sirvastava et al. (2014): 9%
Healthcare utilization in Ontario residents with diabetes who undergo lower limb amputation

Kevin Woo, PI
Elizabeth VanDenKerkhof, Tim Pauley, Farzana Haq, Genevieve Pare
Funding: MOHLTC Applied Health Research Question (AHRQ)
Objectives

1. Describe the demographic, clinical characteristics of patients with diabetes undergoing lower limb amputation in an acute care facility in Ontario.

2. Compare the frequency and risk of visits to ER and hospitalizations (for all cause) 1 & 5 years after sx, between patients who were discharged to rehab vs. home, while controlling for confounders.
Demographic and clinical characteristics (n=14,544)

- 69% male; 31% female
- Mean age = 67 (SD 12)
- Duration of diabetes: mean = 11.7 years (SD 5.7)
- 68% of all amputations were in diabetics (14,733/21,641)
- 1,045 (7.2%) deaths post-op during their hospitalization.
- Above knee amputation = 2,828 (19.4%).
Discharge destination by surgery types

- Above knee (2828)
- Through knee (102)
- Below knee (5238)
- Ankle joint (57)
- Partial foot (6319)
- Total (14,544)

- Rehab
- Home Care
- LTC, CCC
- Death
Mortality: 1 and 5 year

1-yr and 5-yr mortality includes deaths in the year of surgery and the following year(s), therefore in some cases the follow-up could be up to 2 years, or up to 6 years, respectively.
39% patients were discharged home and 61% to a rehab facility

*includes through knee amputation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Home (n=1583)</th>
<th>Rehab (n=2509)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (SD) age</td>
<td>64 (13)</td>
<td>67 (12)</td>
</tr>
<tr>
<td>Female (n (%))</td>
<td>431 (27)</td>
<td>728 (29)</td>
</tr>
<tr>
<td>Surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Above knee*</td>
<td>442 (28)</td>
<td>653 (26)</td>
</tr>
<tr>
<td>Below knee</td>
<td>1141 (72)</td>
<td>1856 (74)</td>
</tr>
<tr>
<td>Major ADGs (med, IQR)</td>
<td>3 (2-4)</td>
<td>3 (2-4)</td>
</tr>
<tr>
<td>Duration diabetes (mean, SD)</td>
<td>11.2 (5.7)</td>
<td>11.7 (5.8)</td>
</tr>
</tbody>
</table>
Major lower limb amputation – above, through and below knee, n=4092: frequency distribution of 5-yr ED visits

- 12% did not seek ED care;
- 50% made ≥4 visits;
- 25% made ≥13 visits;
- 10% made ≥137 visits.
Major lower limb amputation – above, through and below knee, n=4092: Frequency distribution of 5-yr admissions

20% were not admitted; 50% had ≥2 admissions; 25% had ≥4 admissions; 10% had ≥6 admissions;
High risk of 1 and 5 year ED use stratified by discharge status (cohort 2, n=4092)

*Adjusted for age, sex, LHIN, income quintile, rurality, duration of diabetes, comorbidity

<table>
<thead>
<tr>
<th>Discharge status</th>
<th>No. (%) visits</th>
<th>Unadjusted</th>
<th>Adjusted*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>≥1</td>
<td>RR</td>
</tr>
<tr>
<td>Home (n=1583)</td>
<td>791 (50)</td>
<td>792 (50)</td>
<td>1.00</td>
</tr>
<tr>
<td>Rehab (n=2509)</td>
<td>1347 (54)</td>
<td>1162 (46)</td>
<td>0.93</td>
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<tr>
<td></td>
<td>≤3</td>
<td>≥4</td>
<td>RR</td>
</tr>
<tr>
<td>Home (n=1583)</td>
<td>810 (51)</td>
<td>773 (49)</td>
<td>1.00</td>
</tr>
<tr>
<td>Rehab (n=2509)</td>
<td>1287 (51)</td>
<td>1222 (49)</td>
<td>1.00</td>
</tr>
</tbody>
</table>
High risk of 1 and 5 year admission stratified by discharge status (cohort 2, n=4092)

*Adjusted for age, sex, LHIN, income quintile, rurality, duration of diabetes, comorbidity

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<th>Discharge status</th>
<th>1-YR Admissions</th>
<th>5-YR Admissions</th>
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<tr>
<td></td>
<td>No. (%) visits</td>
<td>Unadjusted</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>≥1</td>
</tr>
<tr>
<td>Home (n=1583)</td>
<td>1218 (76)</td>
<td>365 (24)</td>
</tr>
<tr>
<td>Rehab (n=2509)</td>
<td>1851 (74)</td>
<td>658 (26)</td>
</tr>
<tr>
<td></td>
<td>1025 (65)</td>
<td>558 (35)</td>
</tr>
<tr>
<td>Rehab (n=2509)</td>
<td>1543 (61)</td>
<td>966 (39)</td>
</tr>
</tbody>
</table>
After controlling for confounders, e.g., morbidity, admission to rehab (vs. home):

- Slightly reduced risk of 1-YR ED use (5%, NS)
- 8% (1-16) increased risk of 5-YR ED use
- 16% (3-31) increased risk of 1-YR admission
- 15% (3-24) 5-YR increased risk of 5-YR admission
Diabetes and self management

- Management of diabetes requires comprehensive and lifelong behavioral modifications.
- People with diabetes are often portrayed as ‘non-compliant’ and blamed for their lack of will-power to make healthy choices.
- Internalization of stigma may deepen the feelings of failure, embarrassment, disempowerment, low self-efficacy, and fear of being judged, preventing people from seeking help, discussing their difficulties openly (even with their health care providers), and adhering to self-care.
Inter-professional involvement

Communication

Persons with diabetes

Self management

Knowledge translation

Health policy: funding, access to care (macro)

Community action: research & education (meso)

Supportive environment: family, workplace, health care (micro)

Improved population health outcomes

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According to a 2012 survey, 61% of adult Internet users searched online and 39% used social media to obtain health information [1].

Posted messages and dialogues that were abstracted from 15 Facebook groups focused on diabetes management, almost 30% of the content was related to the exchange of emotional support among members of a virtual community [2].

Mobile health (mHealth) refers to the use of mobile phones and other wireless technology for disease management.

No study has examined the use of a smartphone software application as a community-based intervention to promote healthy lifestyle rehabilitation and reduce disability associated with diabetic foot disease.
Outcomes?

- Online foot club: better knowledge in diabetes, higher levels of empowerment, and express lower self-stigma.
- Next step: APP
- Self management foot app for skin assessment
- Developing countries: Ethiopia, Nigeria