THE EFFECT OF BUNDLED INTERVENTIONS ON SELF-MANAGEMENT SKILLS FOR PATIENTS WITH DIABETIC FOOT ULCERATIONS

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Objectives

Learner Objectives:

At the conclusion of this presentation, participants will be able to:

• Recognize the benefit of habitual, early teaching and reinforcement of proactive, preventative measures for patients with diabetes.

• Support the development and delivery of simple steps focused on behavioral changes, utilizing a bundled approach intervention, for translation into measurable, improved results for patients with diabetes.

• Inform future nursing research and study.
Background

An estimated 29.1 million Americans have diabetes. Diabetes is the leading cause of lower limb amputations and the seventh leading cause of mortality.

Foot ulcerations are a common and significant health problem for patients with diabetes, often leading to these amputations. The potential (and often eventual) loss of a limb from these ulcerations, creates a major impact on quality of life.
Problem statement:

Foot ulcerations are a significant health problem for diabetics

• May result in:
  • decreased physical functioning,
  • decreased social interaction,
  • potential loss of income,
  • increased pain and depression
Underlying progressive symptoms may involve disease processes that impact the development of diabetic foot ulcerations, and cause delayed healing, including:

- peripheral vascular disease
- neuropathy
- restricted joint mobility
- poor glycemic control
Purpose

The purpose of this project was to examine the self-management skills of patients with diabetes who have a preexisting ulceration, and to determine the impact of a evidence-based program with high intensity, nurse-administered foot care intervention bundle upon self-management knowledge, skills and outcomes for diabetic patients with existing foot ulcerations.
Focus was on the prevention of foot ulcerations and improvement of diabetic self-management, and to establish validation in the effectiveness of a bundled approach.
Step One of the EBP process:

Practice Question

What is the Scope of the Problem and Rationale for Intervention?

Diabetic ulcerations can run the gamut from superficial skin breakdown and localized infection to necrosis, systemic infection and potential gangrene and/or amputation.
Multiple factors contribute to the breakdown of skin integrity involved in ulcerations:

- Inadequate attention to diet and control of hyperglycemia
- Diabetic associated peripheral neuropathy limits or alters sensation such that patients may not be aware of foot injuries and infection
- Peripheral arterial disease, which impairs circulation, can affect injury healing and the maintenance of skin integrity due to poor tissue perfusion and nourishment.
- Impaired glucose levels affect the equilibrium
- Chronic inflammation influences healing and coagulation
An ineffective knowledge base and poorly executed foot self-care behavior may directly lead towards increased foot problems, the development of ulcerations and amputation of lower extremities.
Several inter-related factors may affect the effectiveness of educational programs directed at self-management of diabetes:

- Social determinants of health
- Health literacy
- Failure to tailor intervention approaches to individual patient requirements
- Patient choice and decision making in establishing priorities for self-care management
Step Two of the EBP process: Evidence

Review of Literature

- Based on JHN-EBP criteria, evidence was reviewed of interventions to promote diabetic patient self-management to prevent the development of foot ulcerations.
- In addressing need for standardized effective interventions, evidence pointed to enhancing foot care practices with a **bundled approach**, and supported implementation of nursing interventions to promote patient self-management of diabetes.
Clinical guidelines supported simple measures:

• periodic foot examination
• institution of basic foot hygiene
• implement of measures to protect feet from injury and infection
• seeking prompt clinical care in the event of injury
• tight glycemic control
• troubleshooting potential problems
Step three of the EBP Process: 
Overview and Translation

Methodology

• Implementation was conducted at a wound clinic of a local hospital, as part of an EBP practice initiative.
• A repeated measures approach was used with the Nurse-Administered Foot Care Intervention Bundle, conducted during routine patient care visits.
Sample Selection Procedure

All patients met the following criteria within a two month period for recruitment:

- diagnosis of type 2 diabetes mellitus,
- current foot ulceration,
- patient receiving care through the hospital wound care center,
- 18 years of age or older,
- able to speak, read, and understand English,
- and access to a working telephone.

Final sample size was 39 patients.
Nurse-Administered Foot Care Intervention Bundle

Formalized as standard patient care and teaching for patients with diabetes

• Consisted of evidence-based "bundled" practices associated with diabetic foot care, self-management knowledge and skills. Addressed factors related to managing diabetes as a chronic disease:
  • diabetic foot care issues
  • ideal foot care behaviors
  • management of aspects of diabetes that are relevant to prevention and healing of diabetic foot ulcers: food planning, medications and insulin administration, maintenance of glycemic control, and risk factor reduction

• Each participant received a resource package containing general tools supporting foot care (hand held mirror, nail clippers, foot cream), nutritional information, and written materials pertinent to the specific interventions.
Composite Measurement of Variables

• Calculated from the values assigned to certain response questions and demonstration/teach back of skills offered to this population of patients in the form of bundled interventions.

• Values from responses and demonstrations were analyzed using a repeat measures ANOVA.

• Paired sample T-tests demonstrated significant affect on target outcomes of decreased ulceration size and decreased HgbA1C levels.
Design and Sequence of Activities associated with Implementation and Evaluation of the NA-FCIB

Participant Project Entry

NA-FCIB Initiation

NA-FCIB Reinforced Intervention

NA-FCIB Reinforced Intervention

Participant Completion

Michigan Neuro.Screening, Patient Demographic, Diabetes Specific Assessment, Foot Care Knowledge and Skills

Updated Pt Demographics, Diabetes Specific Assessment, Foot Care Knowledge and Skills

Updated Pt Demographics, Diabetes Specific Assessment, Foot Care Knowledge and Skills

Updated Pt Demographics, Diabetes Specific Assessment, Foot Care Knowledge and Skills
Data Collection/Procedures

- After initial pretest of foot care knowledge, the Intervention Bundle was administered and explained/reviewed/demonstrated (teaching and packet re foot care skills, risk reduction, glycemic control and problem solving activities).

- Foot care knowledge questions were readministered and tested, and patient’s demonstration of foot care skills were evaluated at each subsequent visit.

- Demographics were reviewed at each visit to show changes in lab results (i.e. HgbA1C), diabetes treatment (changes in medications, new complications) and diabetic foot health (stage of foot ulcer, treatment modifications, new ulcers).

- Patient answers and skills were evaluated using a checklist indicating satisfactory (2 points) /unsatisfactory (0-1 points) at each visit. Scores for individual elements were summed for a combined score.

- Reinforcement of the components of the bundled intervention were completed after each subsequent retesting as well. Final testing compared pre/post testing of project.
RESULTS

• Results of this project showed consistent statistical significance of less than .02 on the bundled interventions themselves, as well as improvement in ulceration size and HgbA1C levels. As shown by the results of the hypothesis testing, the project had discernable benefits at increasing self-management for patients with diabetes.

• This bundled intervention improved patients' knowledge, and reported foot care behaviors. Self-reported practices increased as a result of the interventions and their repetition.
Understanding of Self-Management, Before and After Bundled Intervention

Percentage Changes
Changes to Ulceration Size and HgbA1C
Pre and Post Testing

Ulceration Size

HgbA1C

pre-test
post-test
PROJECT EVALUATION

• Identified obvious need for the program; participants were well engaged
• Acceptance and follow-up from the staff were among the more challenging features of the project
• Areas to promote motivation and participation were identified
• Timeline for the project was achieved with adequate sample sizing of participants, and only one participant was lost to follow-up.
• Process evaluation and implications for next step actions include plans for a good handoff to primary care, with follow through of teaching, and adequate long-term follow-up for reinforcement.
Interventions were simple and based on repetition of interventions. Following the 3 month intervention, participants were able to verbalize numerous areas of concern, or where their attention should be focused.
Implications for Subsequent Work

- Other demographic components could be included in the future: incorporation of smoking cessation literature, formalized discussion of glycemic control and ongoing diabetic classes offered by the clinic.

- Adding patient education level as a proxy for literacy implications may be evaluated, pertaining to presentations and best learning environments.

- Future projects could follow HgbA1C and ulceration sizes historically and prior to intervention, thus establishing the changes in levels following the intervention over a longer period of time.
Limitations

• The sample size and selection of patients
• HgbA1C is excellent measurement of blood sugar control but slower to change, and needs to be followed as long term, serial measurement.
• Additional variables such as education level, use of tobacco products, obesity or weight differences, attendance at prior diabetic classes, and socioeconomic issues were not addressed in this project and may prevent the generalizability of results.
• Majority of patients seen in this clinic were those with type II diabetes, and findings cannot be generalized outside of this sample.
• Patients with type I diabetes were excluded in the original design of the project, as it was felt that more severe, metabolic complications related to disease process might have impacted results.
• Limited length of time for project
Recommendations

• Good handoff to primary care
• More projects to examine effect of other factors such as BMI, smoking habits, or other possible variables.
• Use of motivational interviewing techniques
• Ongoing training when new staff members brought on, or as in-services. Staff reeducation re new medications, meal planning/control issues.
• Phone reinforcement appeared to keep patients on track

Recommendation is for a simple approach, with bundled interventions targeting straightforward changes that patients could make in their everyday lives. The use of multiple methods—visual, auditory, interactive—and the integration of teaching with care could potentially have increased effectiveness.
Implications for Nursing

This project has focused on a change in nursing practice and the positive influence nurses can have on the healthcare outcomes of patients with diabetes.

- This simplistic, education-focused approach has shown promise in preventing further complications and possible amputations.
- Complications related to diabetes may have many long-term health consequences; as shown in this project, nursing can have a profound effect in addressing these consequences with simplistic, repeated reinforcement of diabetes education precepts.
- By taking more initiative and becoming more involved with patient teaching, the focus from health professionals switches from reactive to proactive.
Conclusion

• Evidence supported habitual, early teaching and reinforcement of proactive, preventative measures that patients can take

• Simple steps and behaviors from the bundled intervention translated into measurable, improved results, with better understanding for patients with diabetes to have lasting self-management skills and behaviors, improved coping skills and improved, trending HgbA1C and ulceration sizing measurements.
References


