Using Glucose Patterns to Improve Diabetes Care in LTC Settings

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OBJECTIVES
1. Outline the development of an instructional module to train LTC nurses in a method to evaluate glucose data, compare results to clinical practice guidelines, and communicate findings to primary care providers.
2. Describe the impact of a pilot implementation of this module on the practice patterns of LTC nurses and on the facility.
3. Identify opportunities to implement module content and to improve the quality of diabetes management in other LTC settings.

INTRODUCTION
• Effective management of diabetes in long-term care (LTC) requires team communication
• In primary care the patient is taught to assume responsibility for diabetes self-management
• LTC nurses assume responsibility for care, but do not receive training about glucose goals or how to interpret glucose trends
• Organizational factors impact how chronic diseases are managed in the LTC setting

THEORETICAL FRAMEWORK
The Chronic Care Model

CONCISE LITERATURE REVIEW
• 26% of patients have diabetes at the time of nursing home admission
• Clinical practice guidelines establish glucose goals for managing older adults with diabetes
  American Diabetes Association (2009)
  American Medical Directors Association (2008)
• LTC nurses need education concerning glucose goals and training in the management of hyperglycemia
  Reischk (2005)

CONCISE LITERATURE REVIEW
• The primary goal for all patients with diabetes is to reduce glucose variability and normalize hyperglycemia
  Marasco, Samos & Pandya (2008)
• Hemoglobin A1c alone is insufficient for evaluating diabetes control and should be used in conjunction with plasma glucose data to identify patterns and to understand glucose variability
  Alam, Wennhala & Wennhle (2005)
• QI initiatives are needed in LTC to bring diabetes to the foreground in chronic disease management
  Zarowitz, Tangekas, Hollenack & O'Shea (2006)
RATIONALE FOR PROJECT
- Glucose monitoring is routinely done for residents with diabetes
- Nurses follow protocols that address critical values
- Glucose log sheets are often inaccessible and/or difficult to read
- Preliminary organizational needs assessment showed deficits in:
  - Continuity of care between facility nurses and attending providers
  - Documentation systems
  - Staff education and training related to diabetes management
- Physician feedback indicated support

QUALITY IMPROVEMENT QUESTIONS
1. Does presentation of an evidence-based module lead to increased nursing knowledge about glucose management goals, acquisition of skills for evaluating glucose trends, and improvement in nurse-provider communication for patients with diabetes in LTC?
2. What are organizational challenges or gains related to implementation of this content?

METHODS
SETTING:
- 151-bed nursing care facility in the Midwest region of the U.S. was used as the site for a pilot quality improvement project to train nurses in a methodology for improved glucose management and team communication

STUDY POPULATION:
- All nurse managers and staff nurses were invited to participate in an educational session and follow-up guided discussion
- Participants were licensed RNs and LPNs employed by the facility
- N=14 nurses who participated in the project

EDUCATIONAL MODULE DESIGN:
- Learning and change objectives were identified
- Annotated PowerPoint presentation was developed and reviewed for content validity by an endocrinologist and a geriatrician
- Content included:
  - Methodology for interpreting plasma glucose data
  - Parameters for comparing results to clinical practice guidelines
  - Protocols for communicating findings to providers
- Sample worksheet for analyzing glucose trends was constructed
- Guided discussion questions were formulated

MEASUREMENT:
- A pre-test, post-test and practice session were used to access changes in knowledge and skills
- Questions were tested for content validity by 2 certified diabetes nurse educators
- Mean scores for the pre-test / post-test were compared

ASSESSMENT OF CHANGE:
- A focused discussion group addressed the impact of the teaching intervention 10 weeks after module implementation
- An organizational assessment tool was used to evaluate baseline and terminal systems characteristics that influence diabetes care management - PCRS
IMPLEMENTATION TIMELINE
- KUMC Human Subjects Committee Program determined that the project was exempt from IRB approval
- Two instructional sessions were held: one for nurse managers 11/09 and one for staff nurses 12/09
- Guided discussion with nurse managers and the director of nursing occurred 2/10

OUTCOMES / RESULTS

PRE-/POST-TEST:
Comparison of participant knowledge before and after module session:

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>8.000</td>
<td>14</td>
<td>1.41</td>
<td>0.378</td>
</tr>
<tr>
<td>Posttest</td>
<td>9.214</td>
<td>14</td>
<td>0.97</td>
<td>0.261</td>
</tr>
</tbody>
</table>

OUTCOMES:

ANALYSIS OF GUIDED DISCUSSION:
- Themes: Changing Clinical Behavior
  - Empowerment
  - Communication
  - Advocacy
  “The biggest gain is to the patient. We are more likely to approach the provider because we are more educated”
- Themes Gaining Knowledge
  - Seeing the big picture
    “I’ve used the formula and it works. It is very handy for reducing things down to something everyone understands.”
  - Bringing diabetes to the forefront
    “Diabetes gets lost here - it has brought diabetes back to the front of our awareness”

DISCUSSION

Study Questions:
- The instructional module did result in increased knowledge about glucose goals, provided new skills that empowered nurses and resulted in improved team communication
- Implementation lead to insight about organizational challenges and gains related to chronic disease management

DNP Leadership:
- Organizational change was facilitated by transforming problems into desired outcomes (network-building and facilitating the emergence of new patterns of behavior)

DISCUSSION

Limitations and Strengths:
- Pilot project was done in one facility with a small sample
- Nurse managers and the director of nursing became key change agents
- Facility demonstrated openness to change
- Sample worksheet was adopted as a template for improving the organizational documentation system, implementation is pending

DISCUSSION

Plans for Improvement and Sustainability
- Further refinement of pre-test/post-test questions is needed to produce stronger outcomes data
- Module content changes will be based upon changing evidence and experience
- Facility is willing to continue partnership to expand training to other LTC nurses
- Facility would like to conduct a research study to evaluate long-term effects on individual resident glucose control
CONCLUSIONS

• Advanced practice nurses serving as evidence-based experts can translate clinical practice guidelines into clinical applications to improve diabetes management in LTC
• A pilot module to train LTC nurses in a technique for evaluating glucose data and comparing results to diabetes management goals was found to improve nurse knowledge and confidence
• Systems change is possible when there is DNP leadership and organizational support for improved chronic disease management

APPLICATION TO PRACTICE

• LTC nurses with the ability to interpret glucose patterns and evaluate diabetes management results can advocate for improved outcomes for residents with diabetes
• The module developed for this pilot project can be used in other LTC settings as a catalyst for individual and systems-level change related to improved chronic disease management.

MODULE: Using Glucose Patterns to Improve Diabetes Care
Special Considerations for LTC Residents

Individualized Goals may be recommended based upon:

• Longevity (age – life expectancy)
• Complications and co-morbidities
• Hypoglycemia unawareness
• Patient/family preferences

Applying Glucose Goals

ADA Guidelines provide a starting point:
• Fasting or pre-meal: 70-130 mg/dL
• 1-2 hours after meals: <180 mg/dL

The glucose log tells the story:
• Select one line of readings – note when readings were done (fasting, before-meal, after-meal)
• Look at the last 7-14 days of numbers

Finding the pattern
• Range
  – Lowest to the highest number
• Median
  – Middle number in the group
• Mean
  – Average = total value of all the numbers, divided by the number of readings
Example: Finding the Range

- Range:
  - Lowest number = 166
  - Highest number = 230

Range = 166-230

Example: Finding the Median

Median = 215

Example: Finding the Mean

Mean (Average) = 
\[
\frac{230+166+217+215+206+227+188}{7} = 207
\]

Mean = 207

Interpreting the Patterns

- Range (variability) = 188-230
- Median (middle value) = 215
- Mean (average) = 207

Compare to the goals or standards:

- Fasting or pre-meal? (Goal < 130)
- Post-meal? (Goal < 180)

Is the patient at goal?

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REFERENCES

Questions?