Clinical Impact of An Inpatient Diabetes Care Model
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Objectives
1. Examine the development of the role of the diabetes case manager model in the inpatient setting
2. Describe the development of the Diabetes Resource Nurse Program for acute care hospitals
3. Review outcome measures aimed at improving quality of care and reducing readmissions for patients with diabetes

The Nebraska Medical Center
- 624 bed not-for-profit academic medical center
- 5,758 employees
- 1,082 medical staff
- 450 medical residents
- National reputation in Cancer Care, Transplantation, Neurosciences

Impact of Diabetes on Hospitals
- The total estimated cost of diabetes in 2012 was $245 billion, with $176 billion attributed to excess medical expenditures
- Diabetes ranked #2, after circulatory diseases, as a hospital discharge diagnosis in 2005
- The absolute cost of hospital inpatient care for people with diabetes has risen from $58 billion in 2007 to $76 billion in 2012. However, hospital inpatient care costs have fallen from 50 percent to 43 percent of total direct medical costs

The Nebraska Medical Center Stats
- 25-32% of inpatients have diagnosis of diabetes (100-140 patients daily)
- Additional 10-15% have hyperglycemia requiring treatment
- Insulin prescribed in 50% of patients

Readmission Rates Higher for Patients with Diabetes
- Among 48,612 patients with congestive heart failure from 259 hospitals, 42% had diabetes
- All-cause rehospitalization was significantly greater for patients with diabetes than for patients without diabetes (31.5% vs 28.2%; P = .006)

Current Best Practices for Diabetes Care at Hospital

- Certification for “Advanced Inpatient Diabetes Care” from JC since 2010
- Standardized order sets that help guide practice
- Policies and Procedures
  - Hypoglycemia
  - Identification of Hyperglycemia
  - IV insulin
  - Subq insulin pump
  - Carb counting

Current Best Practices for Diabetes Care at Hospital (cont.)

- Resources:
  - Medical Director
  - Diabetes Services Director
  - 3.0FTE dedicated inpatient CDEs
- Identified blood glucose target range of 70-180mg/dl
- Glucose management metrics
  - Average daily glucose available at unit and patient level
  - Hypoglycemia rate for organization and unit level
  - Hypoglycemia audit process for severe lows, recurrent or prolonged hypoglycemia
  - Subscribe to SHM Glycemic Control Program for comprehensive glucose metric outcomes

Importance of Nursing Care for Improving Glycemic Control

- 24-hour coverage by nursing
- Nursing coordinates, and is aware of, the multiple services required by patient
  - Appropriate timing of POC glucose / Insulin administration and meal delivery / Amount of carbohydrate eaten
  - Critical Thinking: POC glucose results & coordination of glycemic orders
  - Recognition of hyper/hypoglycemia and appropriate management
  - What to do when TPN or tube feeding is interrupted
  - Appropriate patient hand off
  - Patient self-management education
  - Transition to Discharge

Factors Affecting Blood Glucose Levels in the Hospital Setting

- Increased counter-regulatory hormones
- Changing IV glucose rates
- TPN and enteral feedings
- Lack of physical activity
- Unusual timing of insulin injections
- Use of glucocorticoids
- Unpredictable or inconsistent food intake
- Fear of hypoglycemia
- Cultural acceptance of hyperglycemia

Nursing role is critical throughout hospitalization

Goals of Inpatient Diabetes Model Change

1. Quality Initiative – Improve the care of the patient with diabetes or hyperglycemia during hospital stay.
2. Improve transition of care for patient with diabetes/hyperglycemia to outpatient setting
3. Empower the nurse to be able to make educated decisions for patients with diabetes or hyperglycemia at the bedside.
4. Reduce the risk of adverse events
5. Reduce the risk for readmission to ER or hospital post discharge.

Inpatient Diabetes Management Program
Diabetes Case Managers (DCM)

- Assigned to med/surg units with highest population of patients with diabetes/hyperglycemia
- Case manage defined “high risk” diabetes population for discharge planning and transition of care
  - Adequate supplies
  - Self-management skills
  - Risk hospital follow-up (Provider for diabetes management, Education, Home Health)
- Use daily interactions and collaborations with medical and nursing team to improve glycemic management through ongoing education and increasing awareness of hypoglycemia and hyperglycemia
- Uncover opportunities in glycemic management and encourage medical team to make treatment changes in collaboration with physician
- Partner with Inpatient Case Managers, Social Work, Pharmacy, to meet needs of pt population

Diabetes Resource Nurses (DRN)

- Staff Nurses on units who receive comprehensive inpatient glycemic management education and act as resource/advocate for championing “Best Practice” bedside practices
- Role
  - “Pay it Forward” – Educate other staff
  - Disseminate information to Unit Based Council of education or initiatives
  - Participate in review of policies, procedures, tools, education for inpatient diabetes care
  - Participate in ongoing education updates
- Work in collaboration with Diabetes Case Manager in providing diabetes specific patient education

Diabetes / Hyperglycemia High-Risk Patients

- Self-pay patient with diabetes diagnosis
- New diagnosis type 1 or 2 DM, transplant-related diabetes, CF-related DM, steroid-induced DM
- New to insulin
- DKA admission
- Hypoglycemia admission
- Readmission due to diabetes - hypoglycemia or hyperglycemia

Staff RN Role in Diabetes Management

- Perform learning needs assessment, health literacy, setting and prioritization of goals
- Evaluate and update diabetes self-management skills assessment
- Partner with Diabetes Case Manager and Diabetes Resource Nurse in coordinating diabetes/glycemia needs
- Provide patient education for diabetes self-management skills to include
  - Medication (insulin administration and oral medication)
  - Blood glucose monitoring
  - Hypoglycemia recognition and treatment
- Utilize standardized diabetes patient education handouts

Nursing Diabetes Education Model
DRN Recognition and Incentives

- DRN Pin presented by Diabetes Services Medical Director
  "Piece of the Puzzle"
- Unit-specific bulletin board with pictures
- DRN representation on Glucose Management Team
- Complimentary registration to annual Diabetes Update Symposium

OUTCOMES

Daily Hypoglycemia Report

- Sent daily to Unit Managers, Leads, Quality Champions and Diabetes Case Managers
- DCM audits results
  - <50mg/dl
  - recurrent hypoglycemia
  - prolonged hypoglycemia
- Allows method to evaluate adherence to hypoglycemia policy
  - "Recheck BG 15min after treatment"

Hypoglycemia Management

Daily Blood Glucose Report

- Can evaluate BG control "at a glance"
- Sent daily to Unit Managers, Leads, Quality Champions and Diabetes Case Managers

Hyperglycemia Management
### Length of Stay

Diabetes and Non Diabetes LOS by Fiscal Year

![Graph showing Length of Stay](image)

### Readmission Rates by Fiscal Year

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Overall Readmission Rate</th>
<th>Readmission Rate for DM Patients</th>
<th>% DM Readmission of All Readmissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>14.6%</td>
<td>20.1%</td>
<td>36.8%</td>
</tr>
<tr>
<td>2012</td>
<td>14.1%</td>
<td>19%</td>
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</tr>
<tr>
<td>2013</td>
<td>12.8%</td>
<td>17.6%</td>
<td>39.9%</td>
</tr>
</tbody>
</table>

### Readmission Rates

#### 18 month Pre-intervention

- **All Discharged Patients**: N=34,472
- **DM Patients**: N=9520 (27.6%)
- **Readmitted Patients with DM**: N=1918 (20.1%)
- Pre-valence of Diabetes to Readmissions: *p<.0001*

#### 18 month Post-intervention

- **All Discharged Patients**: N=32,046
- **DM Patients**: N=9391 (29.3%)
- **Readmitted Patients with DM**: N=1653 (17.6%)
- Pre-valence of Diabetes to Readmissions: *p<.0001*

### Prevalence of Diabetes to Readmissions

#### 18 month Pre-intervention

- **All Patients**: N=9520 (27.6%)
- **Patients with DM**: N=1918 (20.1%)
- **Patients not seen by DCM**: N=7703 (80.9%)
- **Readmitted Patients with DM**: N=1653 (17.6%)
- **Patients not seen by DCM**: N=1382 (21.3%)
- *p<.0001*

#### 18 month Post-intervention

- **All Patients**: N=9391 (29.3%)
- **Patients with DM**: N=1718 (18.3%)
- **Patients not seen by DCM**: N=7673 (81.7%)
- **Readmitted Patients with DM**: N=271 (15.7%)
- **Patients not seen by DCM**: N=1382 (18.0%)
- *p<.0001*

### Diabetes Rates of Readmission

#### 18 month Pre-intervention

- **All Patients with DM**: N=9520 (27.6%)
- **Patients not exposed to DR**: N=7673 (81.7%)
- **Readmitted Patients with DM not seen by DCM**: N=1382 (18.0%)
- *p<.0001*

#### 18 month Post-intervention

- **All Patients with DM**: N=9391 (29.3%)
- **Patients not exposed to DR**: N=7673 (81.7%)
- **Readmitted Patients with DM not seen by DCM**: N=1382 (18.0%)
- *p<.0001*
Limitations

- During the analysis period all hospital readmission rates decreased significantly from 14.6% to 13.1% (p < .0001)
- Accuracy of readmission data dependent on physician documentation
- Excludes patients with hyperglycemia
- Readmissions are tracked for all causes and not necessarily related directly to diabetes
- Financial analysis of program was not completed

Implications

- The Diabetes Resource Nurse program can be easily replicated in other organizations and developed under the direction of Diabetes specialists
- “Nurses should be involved in all stages of improving diabetes care, because they will be doing the majority of the implementation of processes, and are central to any efforts for improvement” (Haas, 2006)

Next Steps

- Current DRN program continues to be offered 6 times per year to increase participation
- Using DRNs to help evaluate and implement other initiatives to improve diabetes care
  – Monitoring/Meal/Insulin delivery timing

Nursing role is critical throughout hospitalization