CENTRE FOR HEALTHCARE INNOVATION

CHI Learning & Development System (CHILD)

Project Title

Drop the high, Drop the low: Leading paradigm change for Safer Diabetes Care

Organisation(s) Involved

Tan Tock Seng Hospital

Project Period

Start date: Jan 2014

Additional Information

- APAC Forum 2016 in Sydney, Australia: Best Poster Award in "Leadership: Leading People, Projects, Campaigns" Category
- Presentation at IHI-BMJ Conference in Singapore 2016
- NHG Team Recognition Award 2017

Project Category

Patient Safety, Quality Improvement

Keywords

Patient Safety, Quality Improvement, Quality Improvement Methodology, Safe Care, Care Redesign, Nursing, Endocrinology, Diabetic, Hypoglycaemia, Medication Prescription, Standardized Prescribing, Standardized Monitoring, Catered Nutritional Intake, Insulin Dosage, Maintaining Dietary Intake, Staff Education Programme, Inpatient Diabetes Control, Medication, Inpatient, General Surgery, Acute Surgical Ward, Reduce Hypoglycemia Rates, Multi-Disciplinary Team, Tan Tock Seng Hospital , Driver Diagram, Singapore Healthcare Improvement Network, Institute for Healthcare Improvement, Swim-lane Analysis, Singapore Improvement Network, Institute for Healthcare Improvement, Plan-Do-Study-Act

Name and Email of Project Contact Person(s)

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Asian Hospital Management Awards

*Required Fields

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PATIENT SAFETY

(Projects or programs to keep a patient SAFE, such as use of right equipment, infection control, minimize slips and falls and prevention of sentinel events.)

This award is for outstanding projects to assure patient safety in the diagnosis and delivery of care. This includes, reporting, management and prevention of sentinel events; medication errors and infection control. Please provide details of the demonstrable improvement and how this was recorded. More weight is given to how much the project or program improved patient safety and if there are measurements to back this up.

Complete All Information Below:

Project Title (Maximum 256 Characters): **Drop the high, Drop the low: Leading paradigm change for Safer Diabetes Care**

Date Project Started (Maximum 128 Characters) (i.e. May 24, 2015):
1/9/2014

Department Name (Maximum 256 Characters): **Endocrinology, Nursing Service, Office of Clinical Governance**

Names of Key Staff Involved in this Project (Maximum 512 Characters) (Separate names with comma): **Hoi Shu Yin, Zhuang Sijia Brenda, Timothy Quek Peng Lim, Candice Leong, Lian Xia**

1. **Provide some background as to how the project originated e.g. what problem/opportunity were you faced with. (Maximum number of words – 350)**

The most common acute side effect of many anti-diabetic medications is hypoglycaemia. Severe hypoglycaemia can lead to serious adverse outcomes such as neuroglycopenic brain injury and mortality. The prescribing and administration of such medications are even more complex in the inpatient environment, where rapid major changes in patient condition and nutrition are the rule rather than the exception. Proper, timely use and the cessation of these medications are key to ensure patient safety.

There are many available international guidelines for inpatient diabetes control. However, adopting them and implementing the recommendations in their entirety without consideration of their suitability to our local context would not be effective or even safe. These guidelines need to be contextualised to address implementation issues such as local workforce, training, health systems, equipment, access to services, etc. They may even need to be adapted so that the care would be relevant to our environment.

Due to the complexity of Diabetes Mellitus (DM) surgical patients, we have observed that hypoglycaemia tends to occur in this group of patients when transiting from diet to Nil-By-Mouth (NBM) protocol. An acute surgical ward, Ward 11D was set up as our pilot site.

Our data showed that 15% of general surgery patients in our pilot site has one or more episode of hypoglycaemia (<4mmol/L).

2. **Describe what was required to address the aforementioned problem/opportunity. Outline what your targets/goals were. Also, provide an overview of the team that was put together to undertake this. (Maximum number of words – 250)**

Prior to implementation, a gap analysis was conducted.
The following key areas were identified to reduce hypoglycaemia rate in the ward:

1. Standardised prescribing and monitoring
2. Matching nutritional intake to insulin dosing
3. Maintaining dietary intake based on blood sugar levels
4. Staff educational programmes

A driver diagram was developed by the core team to provide clarity on the change package that was to be implemented.

As one of the participating institutions of the Singapore Healthcare improvement network (SHINe), we aligned our goals with the set 30% reduction in harm from April 2014 to 2017.

Pilot Site Aim: To achieve 30% reduction in the percentage of General Surgery patients on insulin and/or OHGAs with blood glucose outside acceptable range (<4, >16 mmol/L) in 1 year.

Spread/Enhancement Aim: To achieve 30% reduction in the percentage of Capillary Blood Glucose (CBG) < 4mmol/L and > 16 mmol/L out of Total number of CBG in patients with orders of insulin and/or OHGAs in all inpatient units (excluding ICUs) and Medical Ambulatory Centre by December 2017.

Our core improvement team includes an endocrinologist, pharmacist, diabetic nurse educator, nursing quality manager and hospital quality facilitator. The team is part of a national large scale improvement initiative to reduce harm and is trained by the Institute for Healthcare Improvement (IHI) faculty in improvement methodology. A local improvement team comprising a general surgeon, ward nurse clinician, senior nurse manager, senior staff nurse, ward pharmacist was also formed at ward 11D to institute practice changes.

3. Outline the steps or stages of the project and how these were executed by the team. (Maximum number of words – 200)

In our project, we adopted the IHI Model for Improvement to drive change.

The Plan-Do-Study-Act (PDSA) cycle was adopted to conduct rapid tests of change on a small scale using the 1-3-5 principle. In iterative cycles of learning from each test of change, changes leading to improvement was scaled and implemented in the ward.

The core team crafted a concept of the insulin bundle and set a time-interval target of 15 minutes. The local team communicated and reinforced the expectation on the role of the Principal Nurse (RN).

Swim-lane analysis on the diet process was critical to the successful implementation of the morning diet coordination process.

Kitchen was engaged to label diet trays of patients on insulin. This helped nurses to prioritise diet serving to achieve the target time-frame.

A NBM protocol was implemented to ensure that Type 2 DM patients are appropriately managed whilst on NBM in preparation for surgery. The NBM protocol was uploaded to the intranet and displayed on work stations to facilitate accessibility. The nurses integrated the protocol as part of daily ward round discussion.

Snacks were introduced to DM patients with borderline low capillary blood glucose at 10pm.

4. Demonstrate the results of the project and how this improved patient safety. Present quantifiable information such as before and after measurements and percentage improvement. (Maximum number of words – 200)

After successful implementation of these changes in the pilot site, scale up and spread/enhancement of the changes was carried out throughout the hospital. Monitoring of process compliance and outcomes are ongoing. Wards who do not meet the target of process and outcomes are coached continually.

1) Pilot Site (Ward 11D)
   Hypoglycaemia: **33% reduction** from baseline
   Baseline: 15% *(Percent of surgical patients with 1st episode of CBG < 4mmol/L)*
   Post intervention median: 10%
2) 38 Spread Sites
   Hypoglycaemia (Capillary Blood Glucose < 4 mmol/L): **17% reduction** from baseline
   Baseline: 1.53% *(Percent of CBGs <4 mmol/L out of total number of CBGs)*
   Post intervention median: 1.26%

Severe Hypoglycaemia (Capillary Blood Glucose < 2.5 mmol/L): **31% reduction** from baseline
Baseline: 0.08% *(Percent of CBGs <2.5 mmol/L out of total number of CBGs)*
Post intervention median: 0.06%

The wards showed a sustainable reduction in hypoglycaemia rates and good performance on process measures. Hyperglycaemia rates (measured as a balance measure) did not increase during this period.

5. **Please give any other information, including third party testimonial regarding your project which you think would help convince the judges that this project (or program) should win this category. (Maximum number of words – 300)**

Awards

- Asia-Pacific (APAC) Forum 2016 Best poster Award in "Leadership: leading people, projects, campaigns" category, 2016.
- National Healthcare Group (NHG) Team Recognition Award 2017 (Gold) in recognition of our contributions towards excellent team performance aligned to NHG's strategic initiatives.

Recognition

- Our project was presented at the IHI-BMJ (Asia) International Forum on Quality and Safety in Healthcare (Sep 2016).

As one of the leading organisations in the safe use of hypoglycaemic agents in SHINe, we have been invited to share our experiences and learnings with other SHINe participating institutions through SHINe learning sessions. Institutions participating in SHINe have also adopted some of our interventions.