Project Title

Dietitian-led quality improvement project improves blood sugar control in peritoneal dialysis patients with poorly controlled diabetes mellitus

Project Lead and Members

Project lead: Dietitian Lim Jia Qi, Dietitian Yong Xin Nee

Project members:

- Dr. Lim Su Lin
- Dr. Lee Beng Huat Martin
- Dr. Hong Wei Zhen
- Diabetic care nurse (DCN) Tan Guat Kian Elaine
- DCN Nursyafiqah Bte A Yazid
- Nurse Manager Hui Soh Heng
- Peritoneal Dialysis (PD) nurse Audrey Anakgrifin
- PD nurse Qi Jing
- PD nurse Daw Mi Mi
- PD nurse Dorairaj Kirubai Rani
- PD nurse Ruziah bte Abdul Hamid
- Dietitian Sim Su Wan

Organisation(s) Involved

National University Hospital

Project Period

Start date: Jun 2018

Completed date: Jan 2019

Aims

Aim to reduce the percentage of peritoneal dialysis patients with poorly controlled diabetes mellitus (Hba1c >8%) from 18.6 % to a target of 14.0% within 4 months.

Background

Diabetes Mellitus (DM) is highly prevalent in end stage renal failure (ESRD) patients in Singapore. Poor glycemic control in peritoneal dialysis (PD) patients is a complex situation which has multiple contributing factors. A cross-sectional study conducted on the cohort of PD patients (n=183) in National University Hospital found the prevalence of poorly controlled DM (HbA1c > 8%) was 13.3% in September 2017, increased to 18.6% in May 2018. The increasing prevalence brought to a multi-disciplinary team effort to brainstorm on the root cause followed by possible action plans to tackle the issue. Input from nephrology PD doctors and PD nurses, endocrinologists and diabetic care nurse, and dietitians were combined to a new framework of care. This new proposed model of care with dietitians leading and coordinating the fragmented DM care brought to this PD DM Diet Quality Improvement Project.

Methods

Peritoneal Dialysis (PD) patients with poorly controlled DM (Hba1c >8%) were recruited for intervention. Root cause analysis was carried out and found to be (1) inadequate diet education and follow-up by dietitian, (2) lack of knowledge and support in self-monitoring of blood glucose (SMBG) (i.e. unaware of how to perform SMBG, could not afford to buy glucometer and test strips), (3) inadequate medical surveillance (i.e. lack of review on SMBG during clinic visit, lack of intensive or timely review of medication dosage and titration), (4) lack of knowledge and motivation in DM self-care (i.e. defaulted follow-up, did not perform SMBG, non-compliance to medication, incorrect administration of insulin). The following strategies were implemented to address the gaps: (1) Diet issues and importance of medication compliance were addressed by dietitian during face-to-face dietetics consultation. (2) Dietitian educated and motivated patients to perform structured SMBG and food record for two consecutive days in a week. Subsequent review of SMBG and food record was done bi-weekly via phone calls, emails or clinic visits. Discounted glucometer and test strips were provided to help reduce patients' financial burden if necessary. (3) For patients with suboptimal blood glucose control despite compliance to diet advice and medication, their SMBG records were sent to doctors in charge for review and medication titration. (4) For

patients who were not competent in DM self-care, dietitian referred patients to consult the diabetes care nurse (DCN) for DM self-care assessment and education.

Results

The percentage of PD patients with poorly controlled DM had reduced from 18.6 % to 12.5% in September 2018 patient cohort (n=176) and 10.4% in January 2019 patient cohort (n=173).

Lessons Learnt

1) Holistic assessment (dietary, social support, financial, compliance to medicines or treatments, patient's self-care knowledge and attitude) and care coordination by dietitian help patients achieve better blood sugar control.

2) Reduced efficacy of insulin treatment due to lipohypertrophy (hardening lump under the skin caused by incorrect insulin injection technique) is a common yet neglected problem in peritoneal dialysis patient's population.

3) Estimated manpower needed is 1-2 hours per week per dietitian for a span of minimum 4 months to follow up 8-10 peritoneal dialysis patients to achieve improvement in blood sugar control.

4) Peritoneal dialysis patients who are >80 years old are not included in this project/initiative in view of limited benefits.

5) Dietitian has limited expertise in medicines titration and insulin injection techniques, hence support from doctors and diabetes team (diabetes pharmacist and diabetic care nurse) are necessary. The coordination of care between different parties poses challenges in logistic, communications and time management.

Conclusion

Dietitian-led DM management quality improvement initiatives had effectively reduced the prevalence of poorly controlled DM in the cohort of PD patients.

Additional Information

This successful project has formed the foundation for developing protocol and pathway to enhance diabetes care in patients on peritoneal dialysis.

Project Category

Care Redesign, Clinical Improvement, Quality Improvement

Keywords

Care Redesign, Clinical Improvement, Quality Improvement, Nephrology, Nursing, Endocrinology, Allied Health, Root Cause Analysis, Compliance, Patient Education, Tan Tock Seng Hospital, Diabetes Care, Dietitian, Peritoneal Dialysis, Diabetes Mellitus, Self-Monitoring Blood Glucose

Name and Email of Project Contact Person(s)

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Quality Improvement Project : Project /CPIP/ CQIP Category

Report by : Lim Jia Qi, Yong Xin Nee
Start Date : June 2018   End Date: Jan 2019

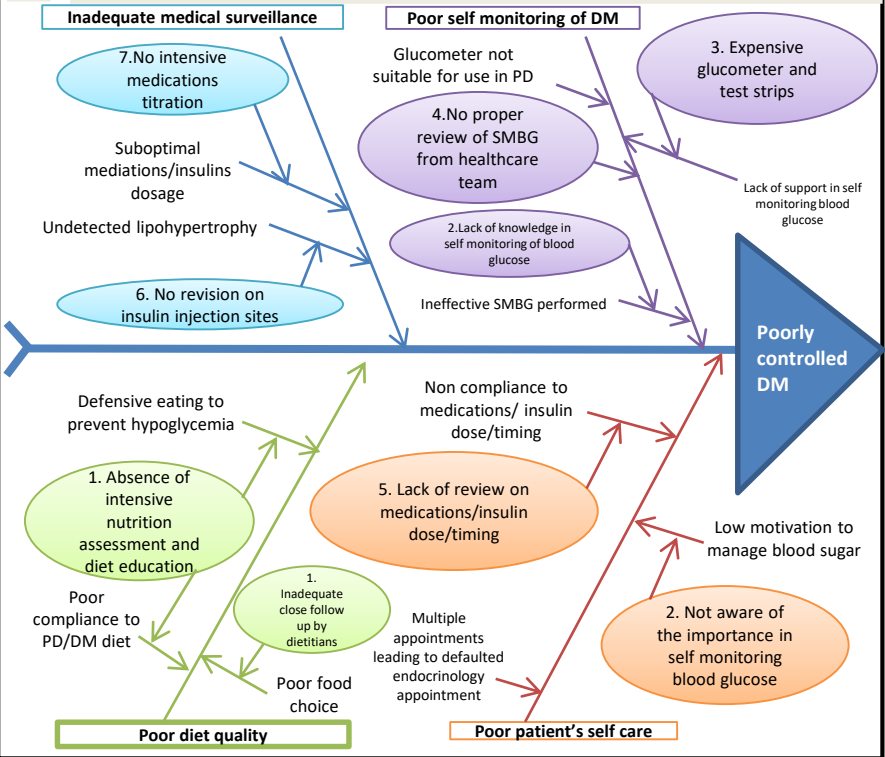| Project Title 10	Improve blood sugar control in peritoneal dialysis (PD) patients with poorly controlled diabetes mellitus (DM)		
Department	Dietetics, Nephrology, Endocrinology	**Duration**	8 months
Team Leaders	Lim Jia Qi, Yong Xin Nee (Dietetics)	**Sponsors / Facilitators**	
Team Members	Dr. Lim Su Lin, Dr. Lee Beng Huat Martin, Dr. Hong Wei Zhen, Dr. Sek Su-Yen Kathleen, Diabetic care nurse (DCN) Tan Guat Kian Elaine, DCN Nursyafiqah Bte A Yazid, NM Hui Soh Heng, Audrey Anakgrifin, Qi Jing, Daw Mi Mi, Dorairaj Kirubai Rani, Ruziah bte Abdul Hamid, Sim Su Wan		

A: Define the Problem

Poor glycemic control in peritoneal dialysis patients is a complex situation which has multiple contributing factors. Based on cross sectional data analysis in Sept 2017 and May 2018, the percentage of peritoneal dialysis patients (PD) with poorly controlled DM (Hba1c >8%) has increased from 13.3% to 18.6 % in PD patients cohort.

B: Goal

Aim to reduce the percentage of PD patients with poorly controlled DM (Hba1c >8%) from 18.6 % to a target of 14.0% within 4 months.
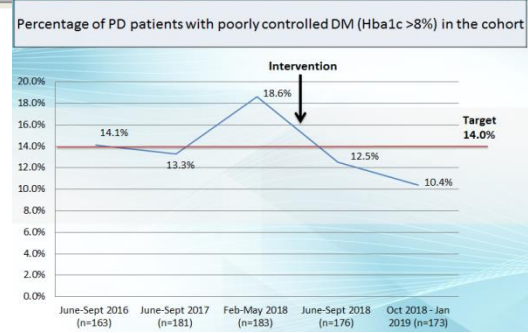
C: Problem Analysis

Inadequate medical surveillance

7. No intensive medications titration

Suboptimal mediations/insulins dosage

Undetected lipohypertrophy

6. No revision on insulin injection sites

Poor self monitoring of DM

Glucometer not suitable for use in PD

4. No proper review of SMBG from healthcare team

2. Lack of knowledge in self monitoring of blood glucose

Ineffective SMBG performed

3. Expensive glucometer and test strips

Lack of support in self monitoring blood glucose

Poorly controlled DM

Defensive eating to prevent hypoglycemia

1. Absence of intensive nutrition assessment and diet education

Poor compliance to PD/DM diet

1. Inadequate close follow up by dietitians

Multiple appointments leading to defaulted endocrinology appointment

Poor food choice

Poor diet quality

Non compliance to medications/ insulin dose/timing

5. Lack of review on medications/insulin dose/timing

Low motivation to manage blood sugar

2. Not aware of the importance in self monitoring blood glucose

Poor patient's self care

D: Interventions & Action Plan

Problem	Intervention	Date of Implementation
1	Provide intensive nutrition assessment and diet education for PD patients with poorly controlled DM	**Jun 2018 – Jan 2019** Dietitian Jia Qi and Xin Nee
2	Motivate, assist and educate on a structured self monitoring blood glucose and food log	
3	Provide discounted glucometer and test strips sponsored by pharma company	
4	Follow up and review on self monitoring blood glucose and food log bi-weekly via email/phone consults/clinic visit	
5	Review on medications/insulin dose, timing and compliance	
6	Assess, educate and correct insulin injection site and technique	Dietitian/DCN
7	Titration of medications/insulin based on self monitoring blood glucose reports	Dietitian/ Doctors

E: Benefits/ Results

Percentage of PD patients with poorly controlled DM (Hba1c >8%) in the cohort
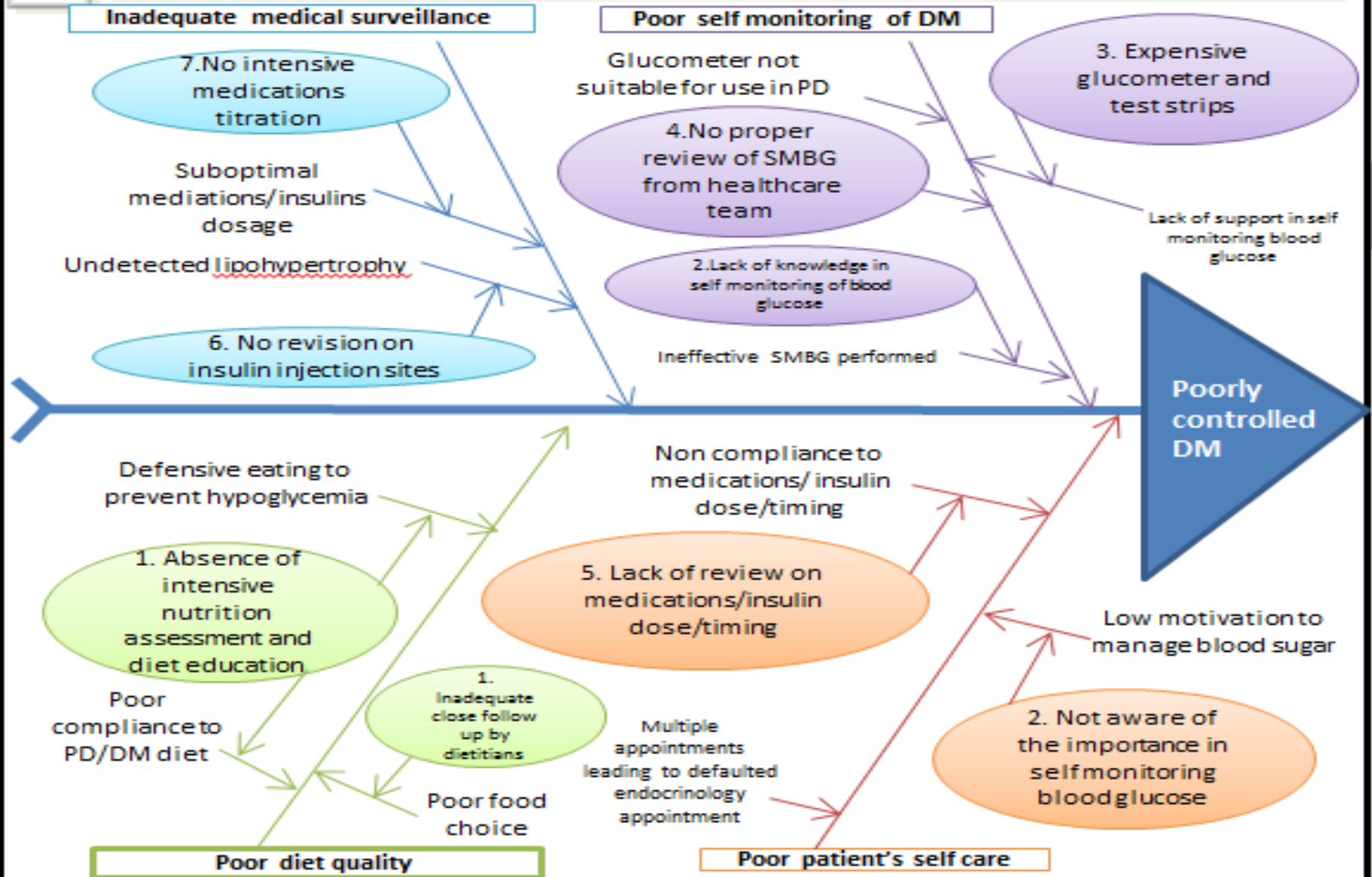

The percentage of poorly controlled DM had reduced from 18.6% to 12.5% after intervention.

It had further reduced to 10.4% in Jan 2019.

F: Strategy for Spreading/Sustaining

Workflow of patient education and follow-up care plan have been developed and implemented in subsequent clinic visits.
Spreading: New PD patients with DM will be educated by DM pharmacist on DM medicines administration and SMBG before or at the start of PD initiation.

C: Problem Analysis

Inadequate medical surveillance

Poor self monitoring of DM

7. No intensive medications titration

Glucometer not suitable for use in PD

3. Expensive glucometer and test strips

Suboptimal mediations/insulins dosage

4. No proper review of SMBG from healthcare team

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2. Not aware of the importance in self monitoring blood glucose

Poor food choice

Poor diet quality

Poor patient's self care

SMBG: self monitoring blood glucose   PD: peritoneal dialysis   DM: diabetes Mellitus

D: Intervention and action plan

Problem	Intervention	Date of Implementation
1	Provide intensive nutrition assessment and diet education for PD patients with poorly controlled DM	**Jun 2018 – Jan 2019** Dietitian Jia Qi and Xin Nee
2	Motivate, assist and educate patients on a structured self-monitoring of blood glucose and food log	
3	Provide discounted glucometer and test strips sponsored by pharma companies	
4	Follow up and review self-monitoring blood glucose and food log bi-weekly via email/phone consults/clinic visit	
5	Bi-weekly review on medications/insulin dose, timing and compliance	
6	Assess, educate and correct insulin injection site and technique	Dietitian/DCN
7	Titration of medications/insulin based on self monitoring blood glucose reports	Dietitian/ Doctors

Intervention #2 Motivate, assist and educate on a structured self monitoring blood glucose and food log

Example of patient's self monitoring blood glucose and food log. This helps to optimize diet and insulin titration.

Intervention #3 Provide discounted glucometer and test strips sponsored by pharma company

Recommendation Letter for Glucometer
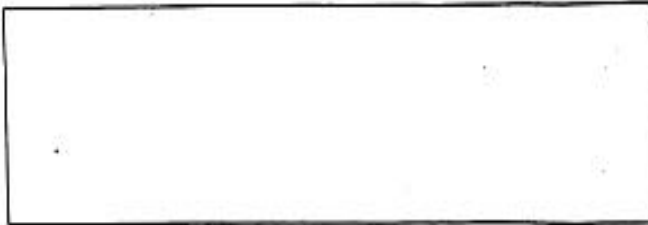
The Above Person (Please tick one)

- ☐ Is a newly diagnosed Type 1/ Type 2 Diabetic Patient
- ☐ Has just started on insulin therapy
- ☐ Others _____

He/ She is entitled to a FOC FreeStyle Optium Neo Meter Starter Kit* with the purchase of 1 x 25's Optium Glucose Strips at $37.20 (after GST) from NUH Retail Pharmacy.

*Kit consists of meter, carrying case, lancing device & 10 lancets.
*Kindly call ~~Yvonne~~ @ ~~98601254~~ for assistance
          Irene 91147923

Recommended by

_____
Diabetes Nurse Educator
Signature & Clinic Stamp

Discounted price of glucometer and test strips set at $37.20 instead of $120.00 encourage patient to have the suitable glucometers and test strips to perform self monitoring blood glucose

Intervention #6 Assess, educate and correct insulin injection site and technique
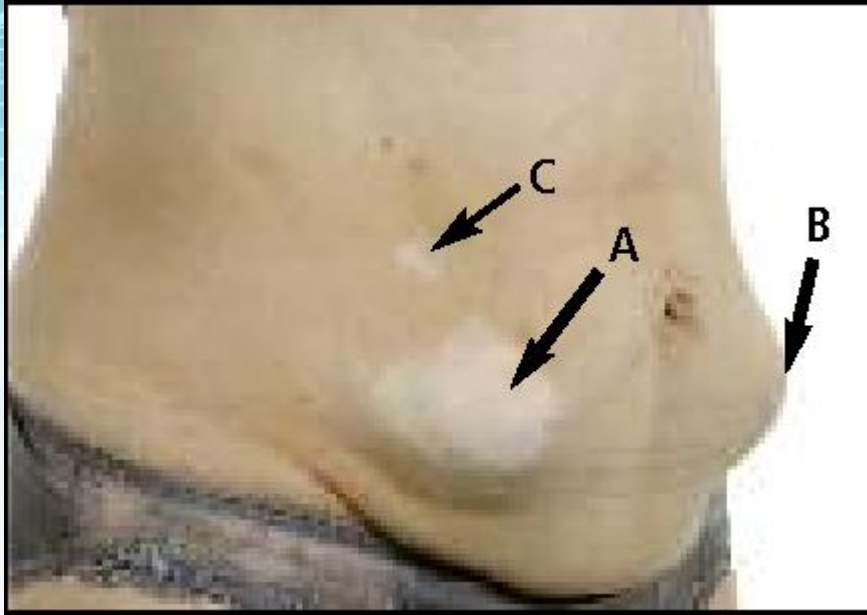

A,B,C: Examples of lipohypertrophy

Lipohypertrophy is a lump under skin caused by accumulation of extra fat at the site of many subcutaneous insulin injections. Insulin injected at the site of lipohypertrophy is absorbed unpredictably. This can result in poor blood sugar control. Hence avoiding insulin injections at hyperlipotrophy sites is important to ensure effective insulin treatment.
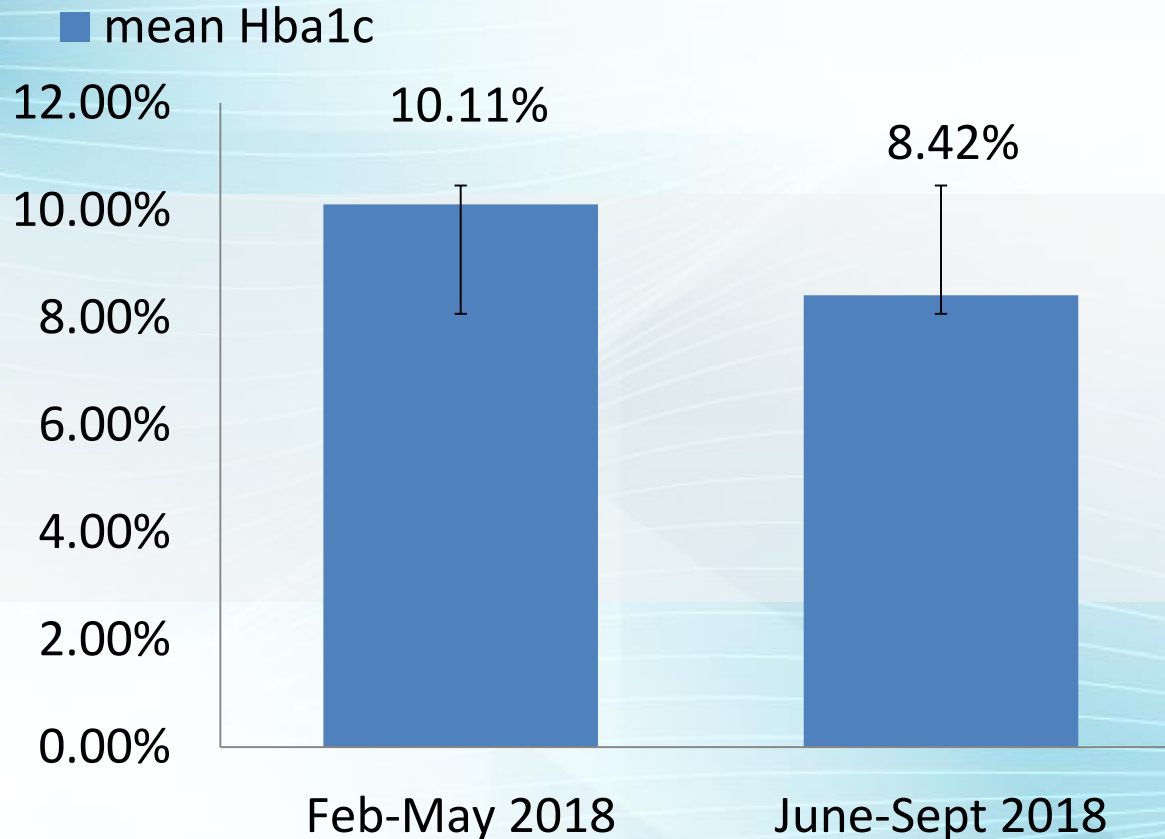
E: Result

Percentage of PD patients with poorly controlled DM (Hba1c >8%) in the cohort
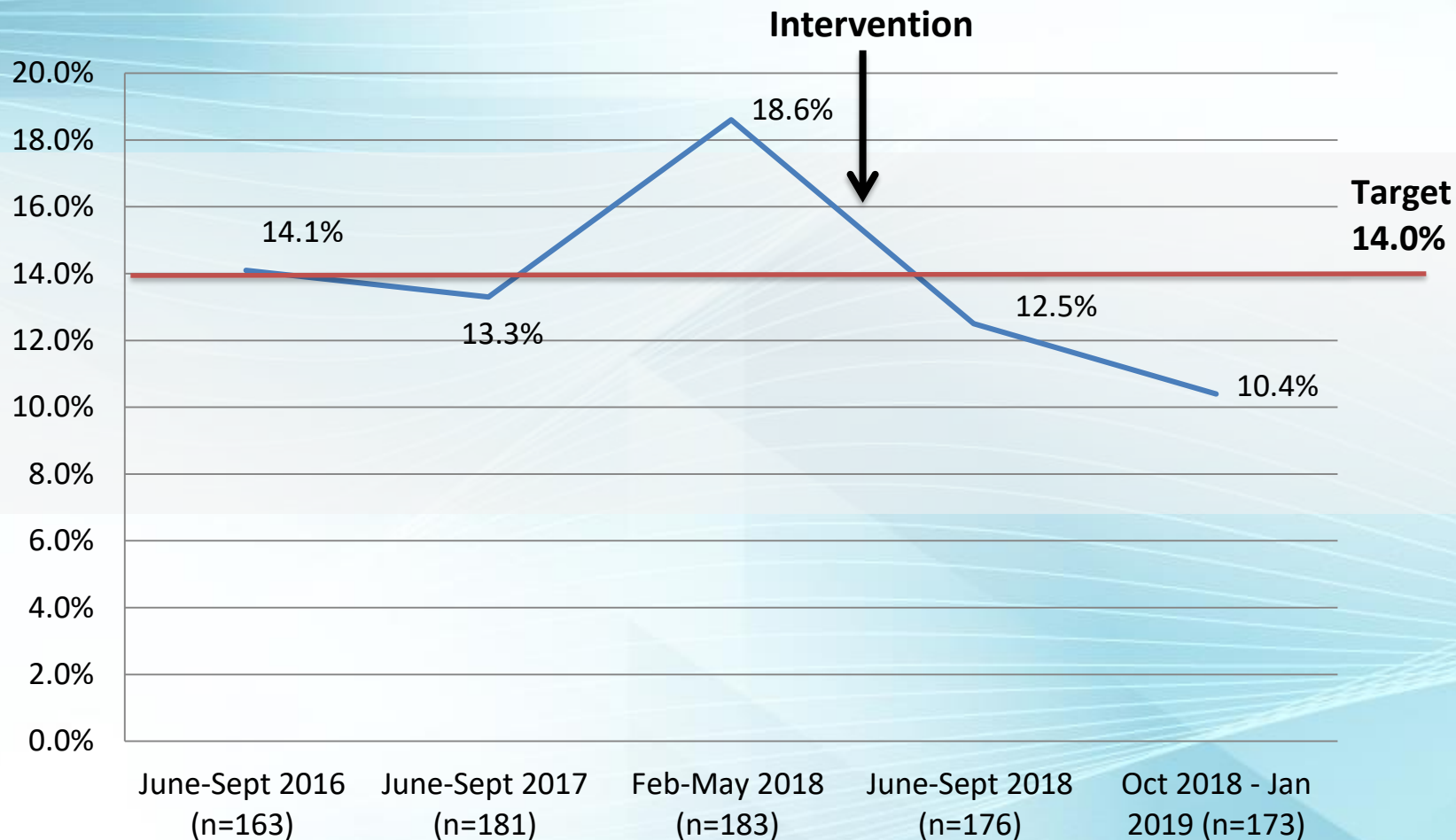
Additional Result

Mean Hba1c of PD patients with poorly controlled DM in the intervention group

■ mean Hba1c

10.11%

8.42%

Mean Hba1c of PD patients with poorly controlled DM was reduced by 10.11 ± 1.86% to 8.42 ± 1.36% with targeted intervention