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Diabetes Education for Patients with Hyperglycemia Not in Crisis Admitted to the Department of Internal Medicine (DIM) Ward

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INTRODUCTION

Diabetes mellitus (DM) is a disease in which a body’s ability to produce or respond to the hormone insulin is impaired, resulting in abnormal metabolism of carbohydrates and elevated levels of glucose in the blood¹. In Singapore, **one in nine** people aged 18 to 69 has diabetes, while **three in ten over the age of 60** have diabetes². The chronic hyperglycemia of DM is associated with long-term damage, dysfunction and failure of various organs, especially the eyes, kidneys, nerves, heart, and blood vessels¹. The progression to these complications is accelerated when DM is poorly controlled. In Singapore, two in three new kidney failure cases were due to DM. One in two people who had a heart attack and two in five people who had stroke had co-existing DM³. Long-term good control and management of DM is thus essential in preventing these undesirable downstream complications.

OUR AIM

Our group had identified four groups of diabetic patients amongst the inpatient SGH Dept of Internal Medicine (DIM) patients:

- Well-controlled DM
- Diabetic patients with hypoglycemic episodes
- Hyperglycemia in diabetic crisis
- Hyperglycemia not in diabetic crisis**

Of note, groups 2, 3, 4 will benefit from some form of intervention during their inpatient stay in order to improve long-term DM control. In particular, patient education is of importance, as lack of knowledge or insight regarding their disease condition often contributes to poor DM control. Patients in groups 2 and 3 are seen by diabetic nurse educators under the Dept of Endocrinology as they fulfill referral criteria. A large proportion of patients, however, belong to the 4th group and they often do not receive any form of intervention or education on their diabetes; leaving that unchecked might lead to a diabetic crisis in the future, or progressive DM complications. We thus aimed to identify these patients and to deliver DM education to **100%** of these patients while they are admitted inpatient to DIM.

METHODOLOGY

Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none">Patients with Type II Diabetes MellitusCapillary blood glucose > 10 for > 3 readings during admissionLatest HbA1c > 8%	<ul style="list-style-type: none">Nursing home residentsPatients with life-limiting diseaseBedbound or uncommunicative patientsPatients in diabetic crisis (DKA or HHS)

The project was piloted in SGH Ward 54, a designated DIM ward whereby all patients at this physical location are managed by one team of DIM doctors. Patients who fulfilled the above inclusion and exclusion criteria were approached for delivery of education on diabetes.

PDSA #1

An initial survey of 17 patients with DM was done to assess the knowledge gap of patients with regards to their understanding of DM (see Table 1). These survey questions were reflective of the various educational topics of diabetes. A Pareto chart analysis was done to determine which were the top topics that contributed to the majority of patients’ knowledge gap. Topics identified from this analysis were:

- Basics of diabetes (Q1, Q4)
- Complications of diabetes: eye and foot screening (Q7)
- Management of hypoglycemia (Q8)
- Diabetes medications (Q12)
- Travelling with diabetes (Q13)

References

- 1.Diagnosis and Classification of Diabetes Mellitus. American Diabetes Association. Diabetes Care 2004 Jan; 27(suppl 1): s5-s10.
- 2.National Health Survey 1998, 2004, 2010, Ministry of Health, Singapore
- 3.National Registry of Diseases Office, 2014, Singapore

PDSA #1

Table 1: List of survey questions given to DM patients to assess knowledge gap

No.	Survey Question	No. of patients who answered wrongly or did not know answer (N = 17)
1	Eating too much sugar causes you to develop diabetes.	13
2	The usual cause of diabetes is due to lack of effective insulin.	5
3	Excessive thirstiness and urination are signs of diabetes.	3
4	Diabetes can be cured.	11
5	Diabetes often cause poor blood circulation.	2
6	Poorly controlled diabetes can cause eye damage.	1
7	I do not have to go for eye or foot screening as long as I do not have any existing symptoms.	8
8	Milo can be used to treat hypoglycemia.	16
9	I do not have to exercise or eat right to control my diabetes, as long as I am taking my diabetes medications correctly.	1
10	When I am sick and do not have appetite to eat, I do not have to take my diabetes medications.	1
11	I have to monitor my blood glucose when I am sick.	0
12	I know what are the timings to take my diabetes medications.	8
13	I need to check in my diabetes medications (oral medications or insulin) when I travel overseas.	9

From 6 – 10 May 2019, DIM patients in SGH Ward 54 who fulfilled inclusion and exclusion criteria were given DM education verbally, with focus on the top 5 topics identified from the Pareto chart analysis. Patient education was done either as part of ward rounds communication or a short session after rounds.

LESSONS FROM PDSA #1

Initial plans were to develop formal teaching materials based on the top 5 topics as visual aids for patients. However it was noted that patients all had different needs and factors to account for their poorly controlled DM. Focusing alone on the top 5 educational topics might not be beneficial for all patients and some might have unmet needs. It would also be a time-consuming, labour-intensive process if DM education was conducted only by members from the project team alone and our outreach would be understandably limited, making it difficult for subsequent expansion and incorporation of other wards. One of the challenges was also to make the DM education relevant for the patient at the time of education delivery. This is because more often than not, these patients were usually admitted for other presenting complaints that might be their primary concern, and poorly controlled DM was just an accompanying comorbidity.

UPCOMING PLANS

Consensus from the team was that continuation of delivery of education by the team alone was not sustainable in the long run and we sought to focus on individualizing the identification of factors for uncontrolled DM for each patient with targeted follow up actions by the primary team managing the patient in hopes of improving long-term DM control in a broader group of DIM patients. The team is planning to develop an **acronym expansion** for use on the Citrix system as a screening tool for causes of hyperglycemia. The aim will be for DIM teams to utilize it in patients who fulfill inclusion and exclusion criteria, to identify factors contributing to the poorly controlled DM, as part of their daily clinical work. This also serves as a timely reminder to the managing team not to overlook reversible factors for patients’ hyperglycemia. Follow-up management plans will also be suggested for teams’ consideration for each cause identified.

I SO FITS

I – Insufficient medication (DM regimen not optimised)	F – Food and drinks
S – Steroids	I – Infection
O – Omission of DM drugs	T – Techniques of insulin injection
	S – Stress (physical/emotional)