IMPROVING THE MANAGEMENT OF POORLY CONTROLLED DIABETIC PATIENTS ON INSULIN IN PKDKP

QLL 121

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1.0 SELECTION OF OPPORTUNITIES FOR IMPROVEMENT

1.1 Problem Prioritization

No	Topic	S	M	A	R	T	Total
1	Low number of diabetic patients on insulin therapy with HbA1c<10%	31	30	28	34	26	149
2	Poor workflow in assessing asthmatic patient's inhaler technique during admission	24	20	24	22	20	110
3	To improve waiting time in OPD pharmacy	18	22	20	20	16	96

12 Group Members *(Rating Scale: 3 = High, 2 = Moderate, 1 = Low)*

1.2 Justification

S — **SERIOUSNESS**
Increasing number of poorly controlled diabetic patient on insulin with HbA1c >10%

M — **MEASUREABLE**
Number of diabetic patient on insulin with HBA1C<10%

A — **APPROPRIATENESS**
- Better patient understanding towards disease
- Results in better patient care

R — **REMEDIABLE**
Remedial measures can be implemented to help increase number of diabetic patient on insulin to achieve HbA1c <10%

T — **TIMELINESS**
This study can be carried out within three years

1.3 Introduction

Klinik Kesihatan Johol, Klinik Kesihatan Terachi and Klinik Kesihatan Senaling are 3 out of 8 primary care clinics located in Kuala Pilah district, Negeri Sembilan. The prevalence of Type 2 Diabetes Mellitus in Kuala Pilah district demonstrates that the highest total numbers of patients with HbA1c>10% are patients from **Klinik Kesihatan Johol (17.83%)** followed by **Klinik Kesihatan Juasseh (17%), Klinik Kesihatan Kuala Pilah (15.43%), Klinik Kesihatan Terachi (15.28%) and Klinik Kesihatan Senaling (14.49%).** Because of this reason, this study was chosen to be carried out in Klinik Kesihatan Johol, Klinik Kesihatan Terachi and Klinik Kesihatan Senaling.

1.4 Literature Review

It is important for people with diabetes to monitor their blood sugar levels however only 26.3% of people with diabetes adhere to this habit.
[Diabcare 2013]

Early intensive insulin therapy in patient with newly diagnosed T2DM coulld have outcomes for recovery and maintenance of beta-cell function and protected glycemic remission , if compared with oral hypoglycemic agents.
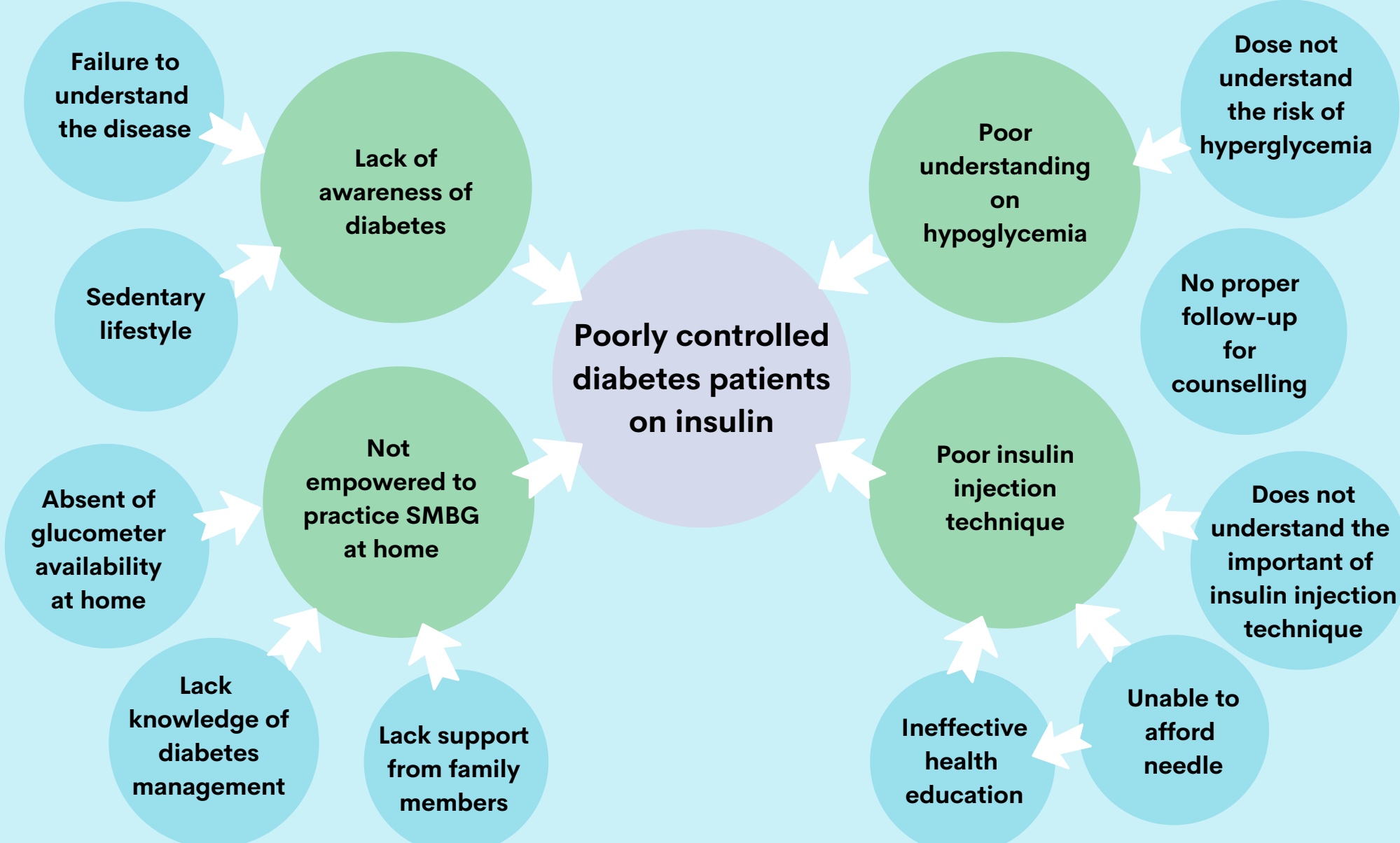*[Weng J, Li Y, Xu W, et al. 2008]*

Insulin remains the most effective glucose lowering therapy in T2DM.
[Maria Rotella C, Pala L, Mannucci E. 2013]

In the recent decade, early initiation of insulin has been recommended when glycated hemoglobin levels are>10% or blood glucose levels are 300mg/dL (16.7mmol/L).
[Manoj C et al. 2023]

1.5 Problem Statement

- Verification study done in 8 primary care clinics in Kuala Pilah showed that 30% of T2DM patient with insulin therapy achieved HbA1c<10%. 3 primary clinics showed the highest percentage of number of patient with HbA1c>10% which are KK Senaling, KK Johol and KK Terachi.
- An opportunity for improvement exist in the primary care clinics beginning with identification of patient's uncontrolled blood glucose with specific target and ending with the referral of patients requiring diabetic health education to pharmacist.

1.6 Cause-effect Analysis

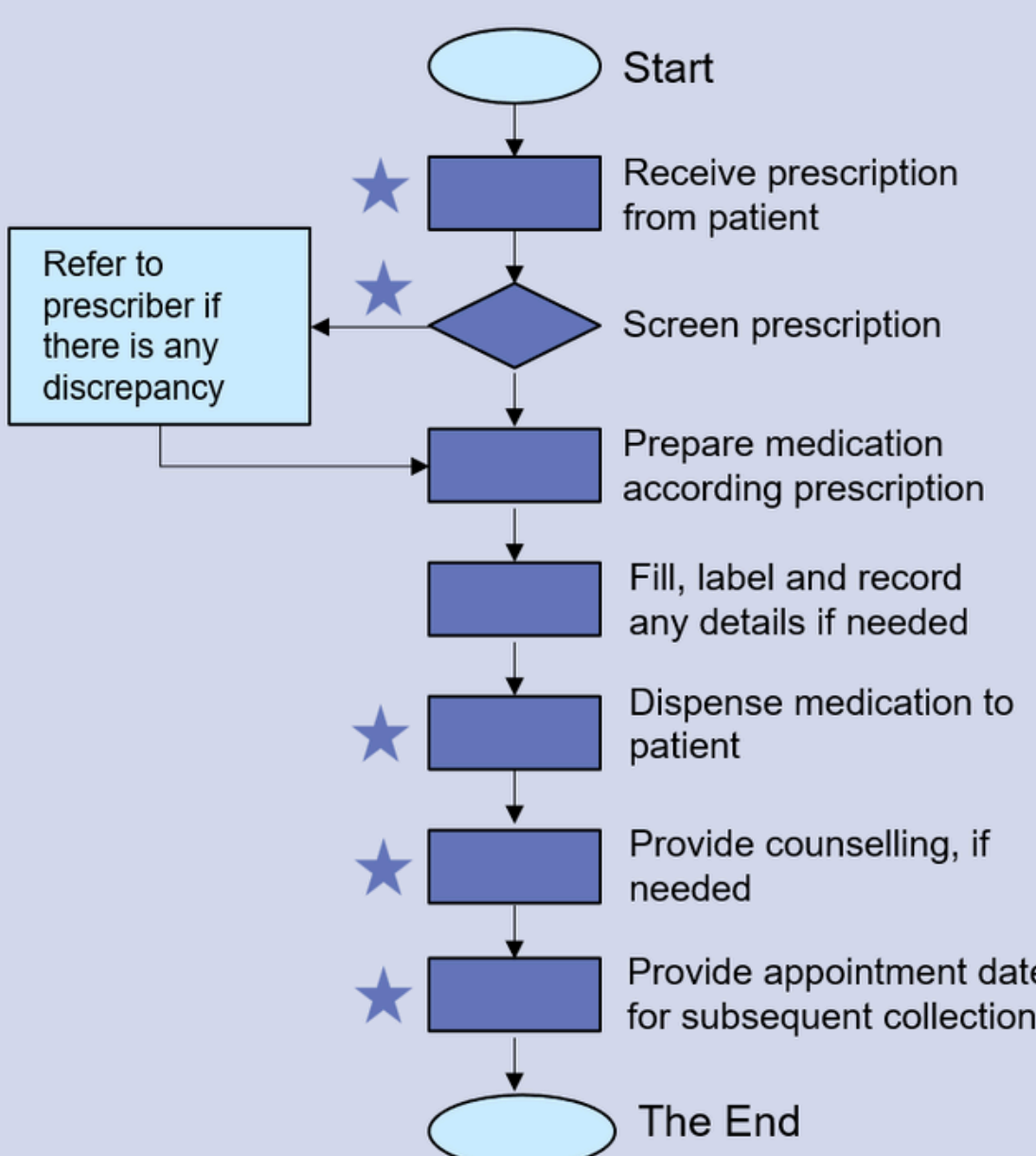Central: **Poorly controlled diabetes patients on insulin**

- Failure to understand the disease
- Lack of awareness of diabetes
- Sedentary lifestyle
- Absent of glucometer availability at home
- Not empowered to practice SMBG at home
- Lack knowledge of diabetes management
- Lack support from family members
- Poor understanding on hypoglycemia
- Poor insulin injection technique
- Ineffective health education
- Dose not understand the risk of hyperglycemia
- No proper follow-up for counselling
- Does not understand the important of insulin injection technique
- Unable to afford needle

1.7 Objectives

GENERAL OBJECTIVE
To improve the management of poorly controlled diabetic patients on insulin with HbA1c>10% in PKDKP

SPECIFIC OBJECTIVES
1. To determine the percentage of poorly controlled diabetes patients on insulin with HbA1c>10%.
2. To Identify factor contributing to unimprovement of poorly controlled diabetes patients on insulin.
3. To formulate and implement remedial measures.
4. To evaluate the effectiveness of remedial measures.

2.0 KEY MEASURES FOR IMPROVEMENT

2.1 Process of Care

Start → Receive prescription from patient → Screen prescription (Refer to prescriber if there is any discrepancy) → Prepare medication according prescription → Fill, label and record any details if needed → Dispense medication to patient → Provide counselling, if needed → Provide appointment date for subsequent collection → The End

NOTE: ★ Indicate critical step for intervention

2.2 Indicator and standard

Standard:
10% (FMS concensus)
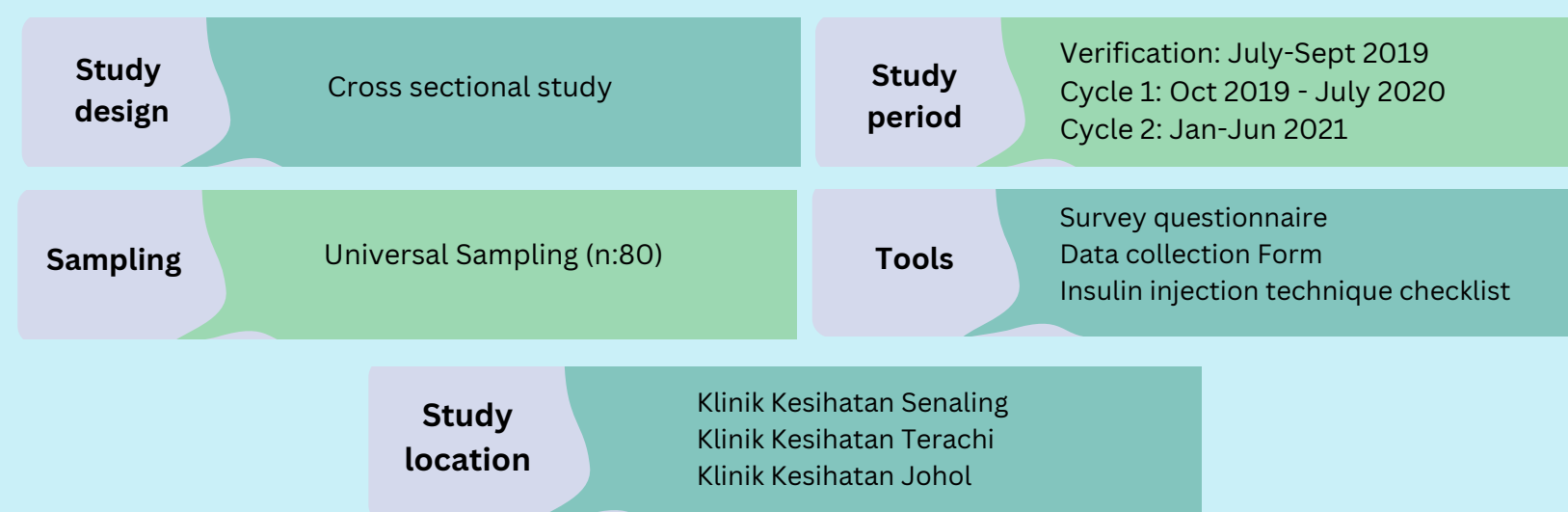**Indicator:**
Percentage of patient with HbA1C level > 10%:

$$\frac{\text{Number of diabetes patients on insulin with HbA1C level<10\%}}{\text{Total number of diabetes patients on insulin}} \times 100\%$$

2.3 Model of Good Care

No	Process	Criteria	Standard
1	Receive Prescription from doctors	Acknowledge referred uncontrolled diabetic patients from doctors using referral criteria	100%
2	Screen prescription	Check for validity of prescription particularly on changes in medication regimen	100%
3	Dispense medication to patient	Use 5R's to dispense medication to patient - To emphasize on SMBG at home	100%
4	Counselling on changes in medication regimen	Enroll patients into diabetic health education program	100%
5	Provide a subsequent collection date for medication to patient	Ensure follow up on patient's diabetic management upon each collection of medication	100%

3.0 PROCESS OF GATHERING INFORMATION

3.1 Methodology

Study design	Cross sectional study	Study period	Verification: July-Sept 2019 Cycle 1: Oct 2019 - July 2020 Cycle 2: Jan-Jun 2021
Sampling	Universal Sampling (n:80)	Tools	Survey questionnaire Data collection Form Insulin injection technique checklist
Study location	Klinik Kesihatan Senaling Klinik Kesihatan Terachi Klinik Kesihatan Johol		

3.2 Data Collection Tool

- Survey questionnaire
- Insulin technique assessment checklist
- Patient HbA1c was traced from their medical record

4.0 ANALYSIS AND INTERPRETATION

Pre-remedial phase showed that only **30% of diabetic patients on insulin therapy achieved HbA1c<10%.** The contributing factors that lead to poorly controlled of diabetic patients on insulin are, low empowerment of patient to self-monitor their blood glucose at home (74%), poor utilization of glucometer for insulin self-dose adjustment (73%), lack of disease awareness (65%) and poor insulin injection technique (47%).
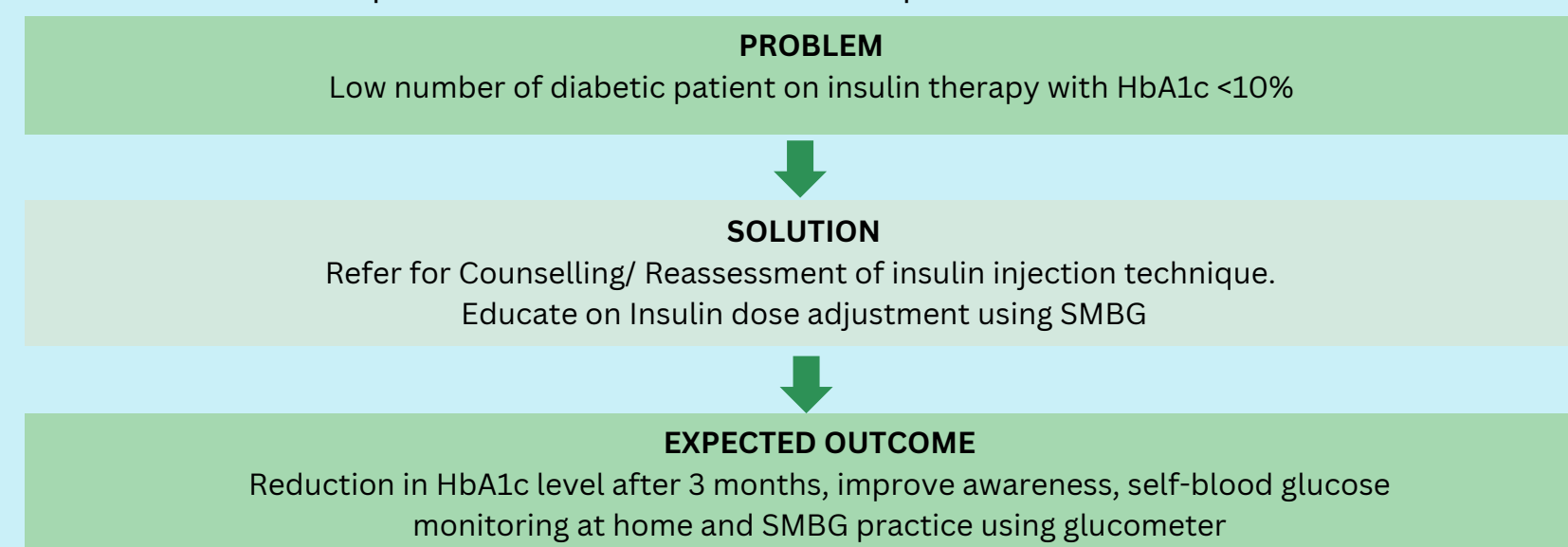
5.0 STRATEGIES FOR CHANGE

5.1 Verification

A survey questionnaire had been distributed to all the recruited patients which consist of 4 parts which are: Demographic data (PART 1), Disease awareness (PART 2), Self-blood glucose monitoring and symptom management (PART 3) and Insulin technique assessment checklist (PART 4)

PCPI (Poorly controlled patient on insulin) survey questionnaire
The survey form were validated by FMS and KJF PKD Kuala Pilah

Insulin Injection Technique Checklist
The checklist was adapted from standard KKM insulin technique checklist

5.2 CYCLE 1

A new **clinic flow protocol** was created with the involvement of doctors, pharmacist and diabetic educators. This will allow doctors to refer patient that fits the criteria for pharmacist review.

PROBLEM
Low number of diabetic patient on insulin therapy with HbA1c <10%

↓

SOLUTION
Refer for Counselling/ Reassessment of insulin injection technique. Educate on Insulin dose adjustment using SMBG

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EXPECTED OUTCOME
Reduction in HbA1c level after 3 months, improve awareness, self-blood glucose monitoring at home and SMBG practice using glucometer

PROJEK QA PKDKP 2019
UNIT FARMASI
TOPIC: To improve management of poorly controlled diabetic patient using insulin
OBJECTIVE: To reduce the rate of uncontrolled blood glucose among patients on insulin
INTERVENTION: To develop a structured diabetic health education for uncontrolled diabetic patients

Referral criteria for uncontrolled diabetic patient to pharmacy:
1) Availability of **glucometer**
AND
2) Patient and caregiver has the knowledge and willingness to perform self monitoring blood glucose
AND
3) Patients that are using insulin
AND
4) HbA1c value > 10%

Referral form

Referral Form

Insulin self-dose adjustment flow chart

HbA1c Table

HbA1c Values	
Date	Before intervention
Date	After intervention

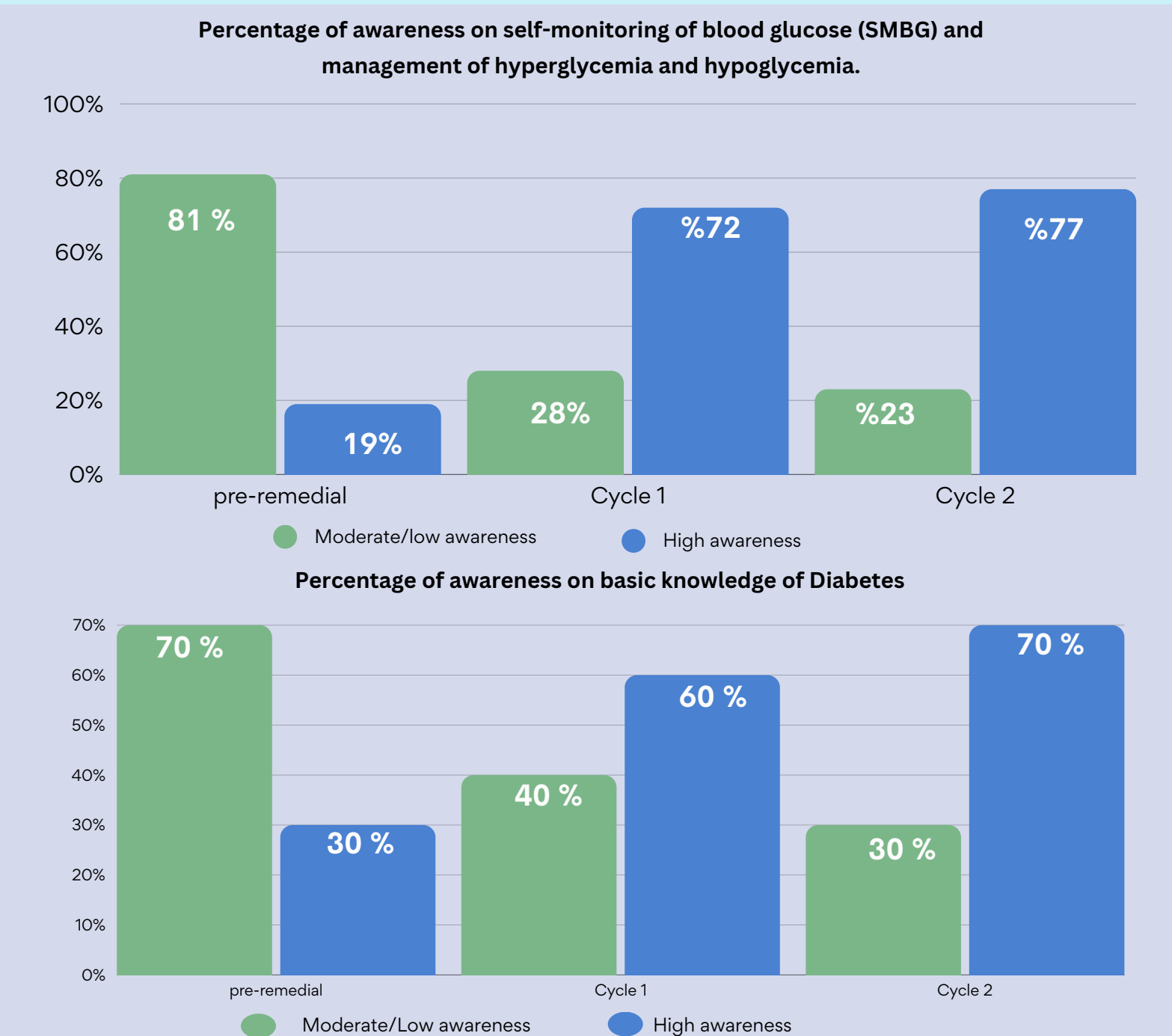**HbA1c data collection form**

5.3 CYCLE 2

Diabetes Camp was organized in collaboration with other diabetic educators, doctor and medical officer to educate patient on diabetes, the medications, lifestyle management, self-blood glucose monitoring at home and self-dose adjustment of insulin.
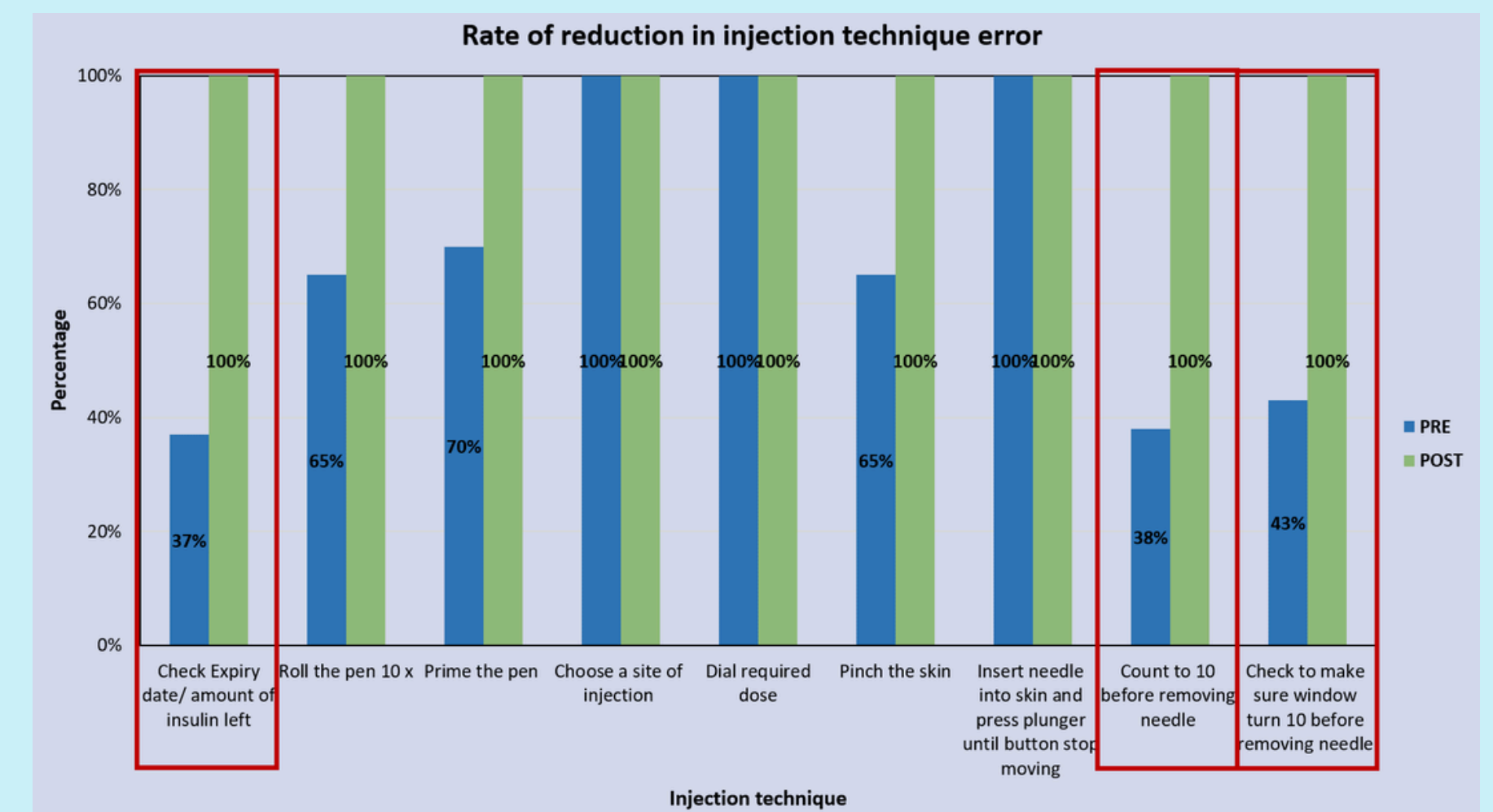

6.0 EFFECTS OF CHANGE

6.1 Improve awareness on diabetes, self-monitoring blood glucose (SMBG) and management of Hyperglycemia and hypoglycemia symptoms.

Percentage of awareness on self-monitoring of blood glucose (SMBG) and management of hyperglycemia and hypoglycemia.
- pre-remedial: Moderate/low awareness 81%, High awareness 19%
- Cycle 1: 28%, 72%
- Cycle 2: 23%, 77%

Percentage of awareness on basic knowledge of Diabetes
- pre-remedial: Moderate/Low awareness 70%, High awareness 30%
- Cycle 1: 40%, 60%
- Cycle 2: 30%, 70%

Graph 1.1 and graph 1.2 have shown improvement of awareness on diabetes, self-monitoring blood glucose at home and management of hyperglycemia and hypoglycemia symptoms among targeted diabetic patients.

6.2 Improve rate of reduction in injection technique error

Rate of reduction in injection technique error
Injection technique: Check Expiry date/ amount of insulin left (37%), Roll the pen 10 x, Prime the pen, Choose a site of injection, Dial required dose, Pinch the skin, Insert needle into skin and press plunger until button stop moving, Count to 10 before removing needle (38%), Check to make sure window turn 10 before removing needle (43%)
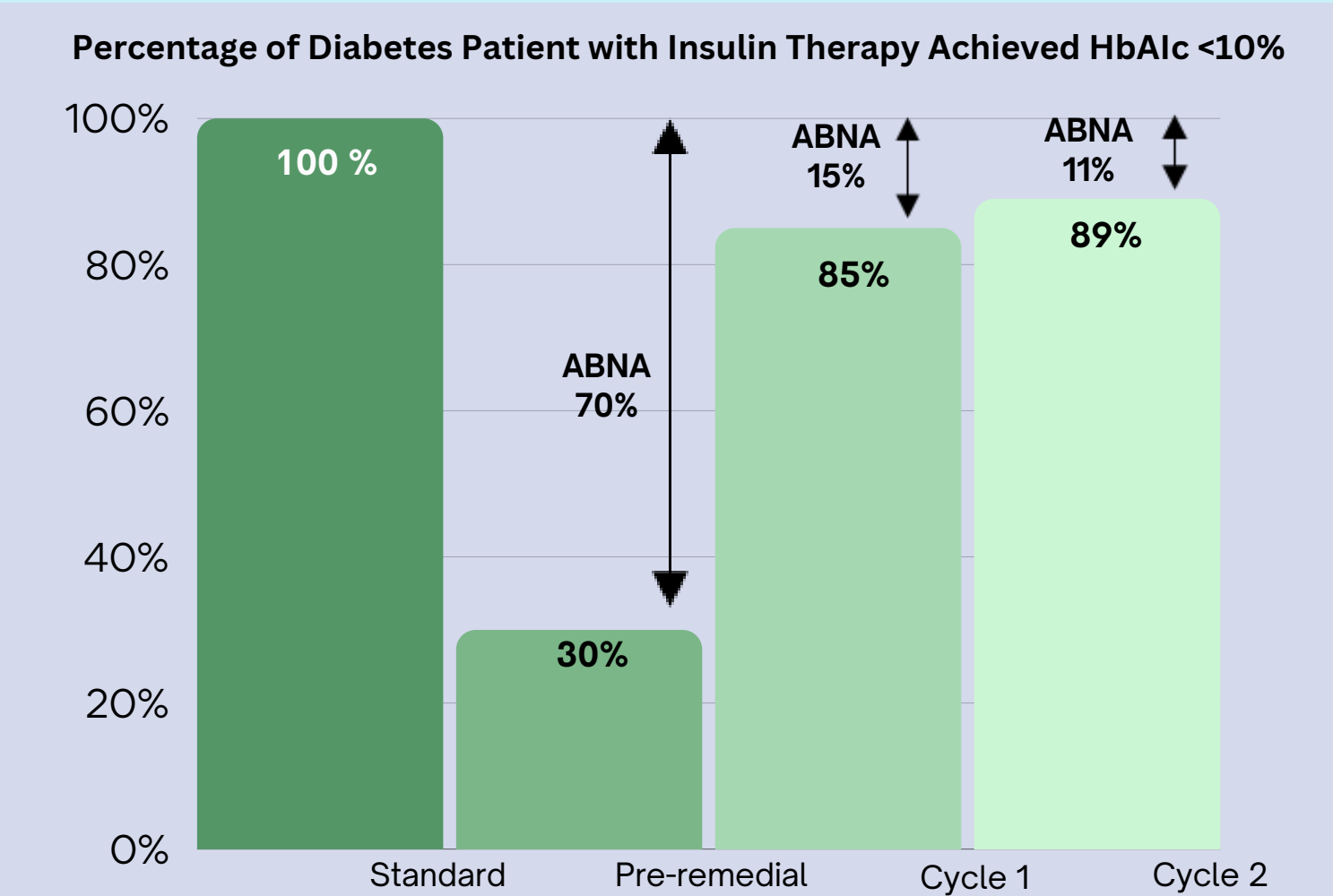
Graph 1.3 have shown that post intervention reassessment of insulin injection technique has demonstrated a 100% rate of reduction in injection technique error.

3 Insulin injection technique highlighted	PRE	POST
Check Expiry date/ amount of insulin left	37%	100%
Count to 10 before removing needle	38%	100%
Check to make sure window turn 10 before removing needle	43%	100%

Table 1 have shown the percentage of pre-remedial and post remedial phase for three insulin injection technique with highest improvement in percentage

6.3 Achievable Benefit Not Achieved (ABNA)

Percentage of Diabetes Patient with Insulin Therapy Achieved HbA1c <10%
- Standard: 100%
- Pre-remedial: 30% (ABNA 70%)
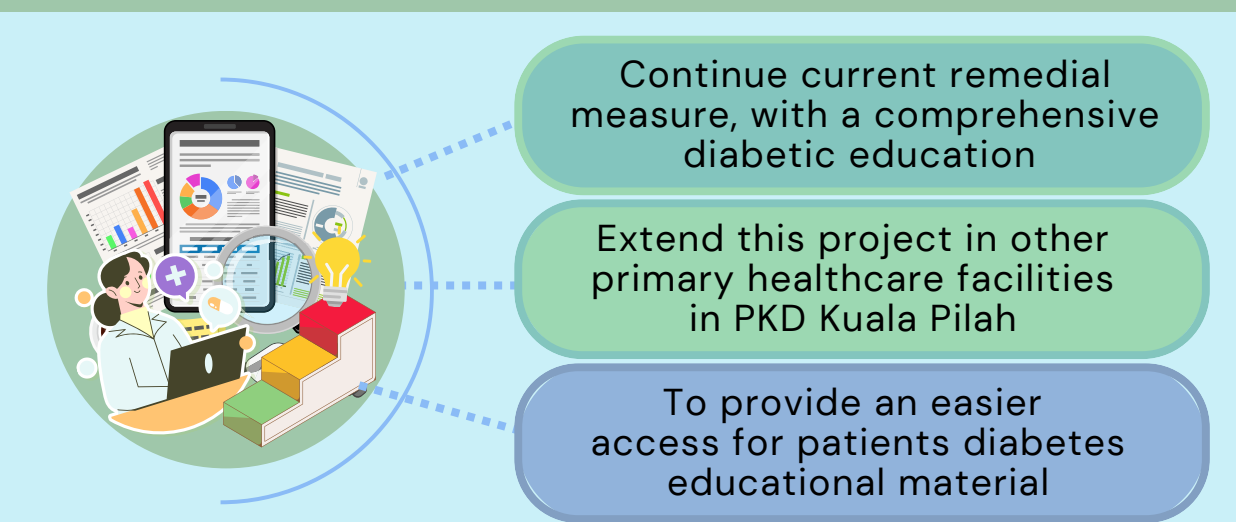- Cycle 1: 85% (ABNA 15%)
- Cycle 2: 89% (ABNA 11%)

Graph 1.4 have shown the percentage of diabetic patients on insulin with HbA1c<10% was increase from 30% to 85% in Cycle 1 and from 85% to 89% in Cycle 2. ABNA was reduced from 70% to 15% in Cycle 1 and from 15% to 11% in Cycle 2.

7.0 CONCLUSION

- Percentage of diabetic patient with insulin therapy and HbA1c <10% had increase from 30% to 85% in cycle 1 and further improve to 89% in Cycle 2.
- The implementation of remedial measures such as developing new clinic flow protocol, structured diabetic education, insulin technique reassessment and insulin self-dose adjustment has manage to reduce the percentage of patient under insulin treatment with HbA1c > 10%.
- The collaboration of doctors, pharmacist and diabetic educators could improve patient care by sharing the resources and expertise for better outcome.

8.0 THE NEXT STEP

- Continue current remedial measure, with a comprehensive diabetic education
- Extend this project in other primary healthcare facilities in PKD Kuala Pilah
- To provide an easier access for patients diabetes educational material

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