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Effectiveness of a nurse-led insulin tele-titration program on diabetes control in primary care



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Introduction:

The Joint Asia Diabetes Registry has estimated that around 19.4% of those diagnosed with diabetes are treated with insulin (Kong et al., 2020). Research has shown that it takes several years to reach therapeutic insulin doses and many remain on insulin doses that are inadequate for optimal diabetes control (Chun, Strong & Urquhart, 2019). Hence, it is important to consider interventions that can mitigate this issue faced by insulin users.

A review conducted by Tchero et al. (2019), demonstrated that insulin adjustments done through telephone calls are effective in optimising diabetic control when compared to a control group (Hedges'g = -0.37, p < 0.001). This is supported by findings from a study done by Lemelin et al. (2020). A pilot study was conducted in a polyclinic where nurses used a similar intervention for patients on insulin. In this intervention, insulin dose adjustments were made through regular phone calls in order to optimise diabetes control.

Aims:

- Enable optimisation of insulin therapy in patients with type 2 diabetes
- Reduce the risk of macro and microvascular complications of type 2 diabetes
- Reduce risk of hypoglycaemia and hyperglycaemic crisis

Methodology & Intervention:

Recruitment	Inclusion Criteria: <ul style="list-style-type: none"> • Type 2 diabetes on insulin • Patient / caregiver able to do home glucose monitoring • Able to answer phone calls during clinic operating hours • Completed at least 4 tele-titrations between reviews 	Exclusion Criteria: <ul style="list-style-type: none"> • Age < 21 or > 79 years • Pregnant • Frequent hypoglycemia
Teleconsult Day	Nurse calls patient / caregiver to assess for: <ul style="list-style-type: none"> • Compliance to medications • Hypoglycemia • Home glucose readings • Lifestyle (e.g. diet, exercise) *Insulin dose is then adjusted according to glucose readings (see Insulin Protocol below)	
Clinic Review	<ul style="list-style-type: none"> • HbA1c and fasting glucose review at the next clinic appointment • Review of insulin injection technique (as needed) • Determine if further tele-titration is indicated 	

The protocol for insulin dose adjustment is as follows:

Basal insulin protocol:

Pre-breakfast	Titration
>7 mmol/L	Increase 2U ON
<5 mmol/L	Decrease 2U ON

Pre-mixed (mixtard/novomix) protocol:

Pre-breakfast	Titration	Pre-dinner	Titration
>7 mmol/L	Increase 2U ON if 10pm >5 mmol/L	>7 mmol/L	Increase 2U OM if pre-lunch >5 mmol/L
<5 mmol/L	Decrease 2U ON	<5 mmol/L	Decrease 2U OM

Basal bolus protocol:

Pre-breakfast	Titration	2 hours Post meals	Titration
> 7 mmol/L	Increase basal dose 2U	>10 mmol/L	Increase pre-meal bolus dose 2U
< 5 mmol/L	Decrease basal dose 2U	< 7 mmol/L	Decrease pre-meal bolus dose 2U

In addition to the insulin titration protocol as above, nurses will consult doctors for patients on more complex insulin regimes, who have hypoglycaemia episodes or with highly variable glucose readings.

Patient Demographics:

A total of 85 patient records from January 2019 to December 2020 were reviewed and included in this study.

	N	%		N	%
Gender			Race		
Male	45	52.9	Chinese	45	52.9
Female	40	47.1	Malay	24	28.2
Age			Indian	15	17.6
21-39	11	12.9	Others	1	1.3
40-49	12	14.1	Insulin Regime		
50-59	32	37.6	Basal	57	67.1
60-69	21	24.7	Pre-mixed	18	21.2
70-79	9	10.7	Basal bolus	10	11.7

Results:

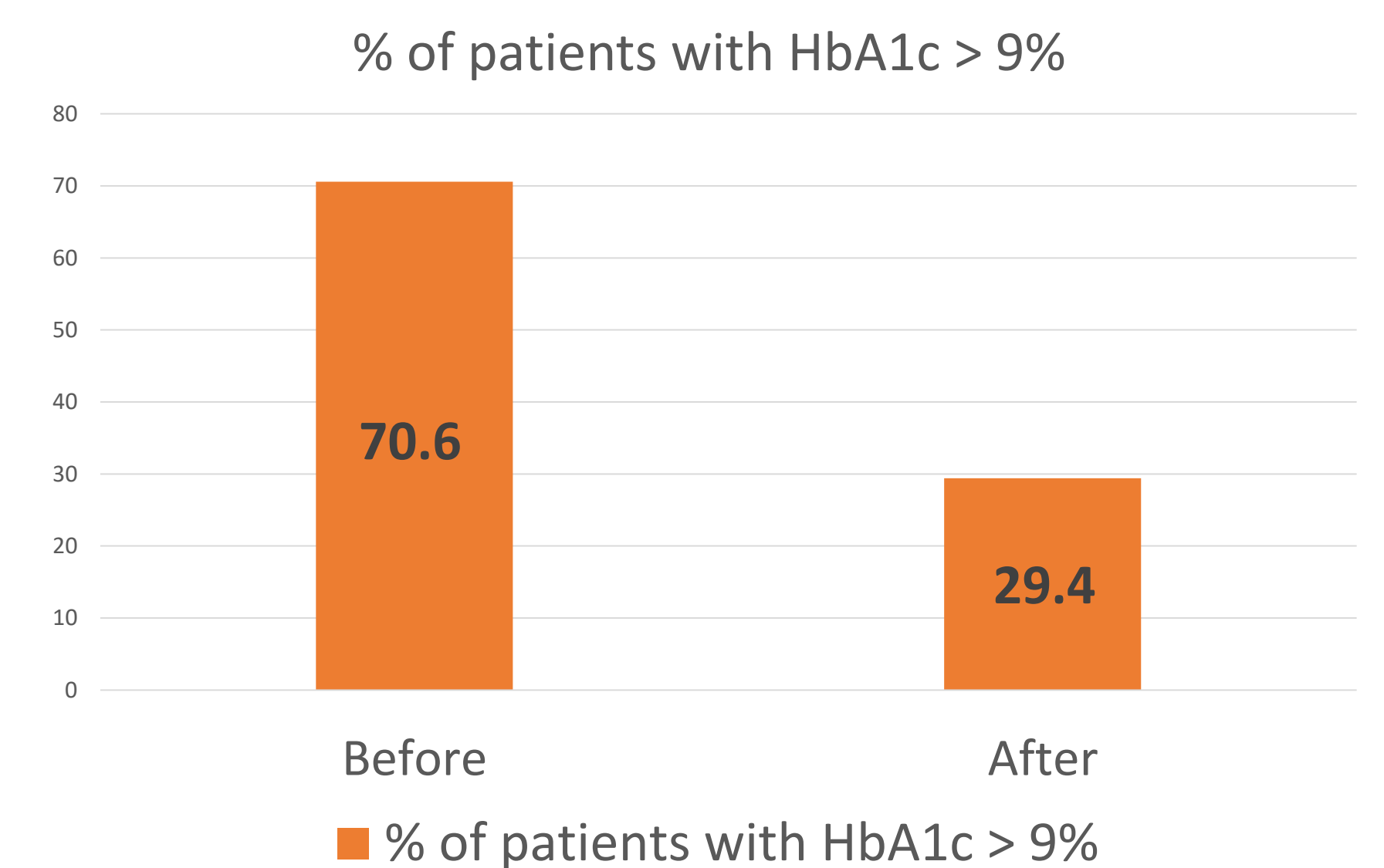


Results show that **80%** of patient's HbA1c improved post-intervention.

The mean HbA1c also showed a statistically significant improvement after the tele-titration program:

	Paired samples t-test				
	Mean	Standard Deviation	t	df	Sig. (2-tailed)
Pre-HbA1c	10.1	1.7	7.04	83	p < 0.001
Post-HbA1c	9.2	1.7			

This study also found that number of patients with HbA1c > 9% reduced post-intervention.



Conclusion:

- Significant improvements in HbA1c reaffirmed effectiveness of nurse-led telephone consultations for optimising glycaemic control for patients on insulin.
- Following this encouraging outcome, the intervention could be rolled out to other clinics to benefit more diabetic patients

Limitations/ Recommendations:

- It would be valuable to assess diabetic control over time to determine sustainability of HbA1c improvements and if further tele-consults would contribute to maintaining optimal HbA1c.
- This study is limited by a small sample size and a larger study should be conducted to run more in-depth analysis on sub-groups to assess the intervention's effectiveness for different patient groups.

References:

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