



Community-based Lytic Dwell Protocol for Tunnelled Haemodialysis Catheter (THC) Dysfunction: A Multi-Centre Quality Improvement Initiative

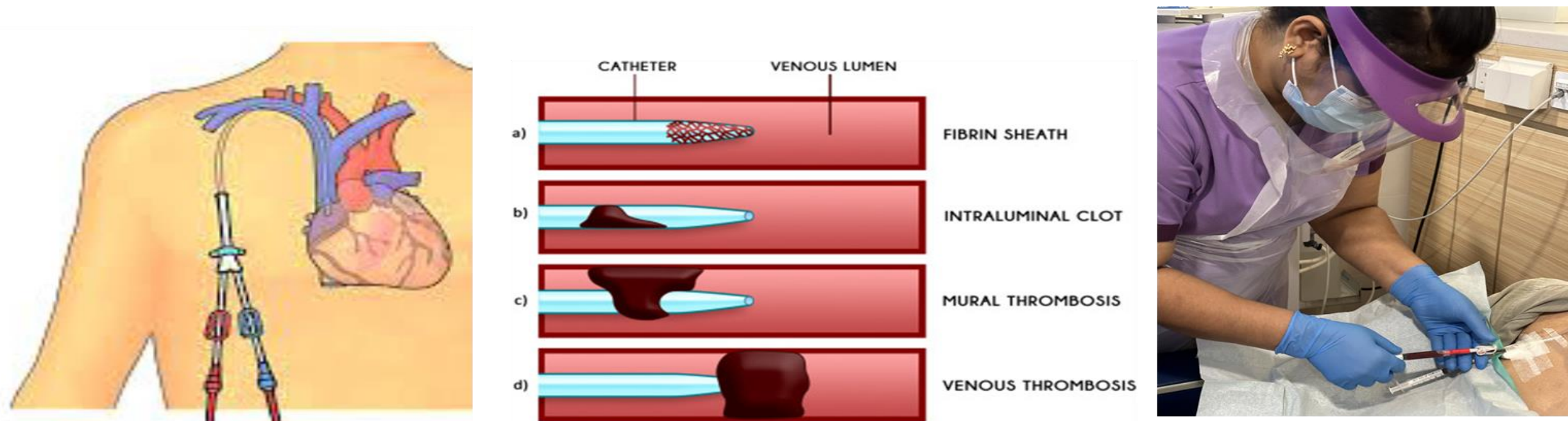
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INTRODUCTION

The National Kidney Foundation (NKF) provides haemodialysis (HD) to over 5,399 patients across 45 community-based dialysis centres (DC) in Singapore by June 2025.

Among 911 patients using tunnelled haemodialysis catheters (THC), catheter dysfunction led to a median of 48 hospital referrals monthly. This initiative aimed to reduce hospital referrals by implementing a standardised community-based lytic dwell protocol.



PROBLEM ANALYSIS

The approach of referring patients to acute hospitals for management of THC dysfunctional has several implications:

1. **Patient safety risks** – Delayed HD increases the risk of fluid overload, uraemia, and electrolyte imbalance.
2. **Disruption and inconvenience** – Unplanned hospital visits disrupt patients' routines and burden families.
3. **Financial burden** – Hospital-based care results in higher out-of-pocket and hospitalisation costs.
4. **Healthcare system strain** – Frequent referrals contribute to ED overcrowding and increased resource utilisation.

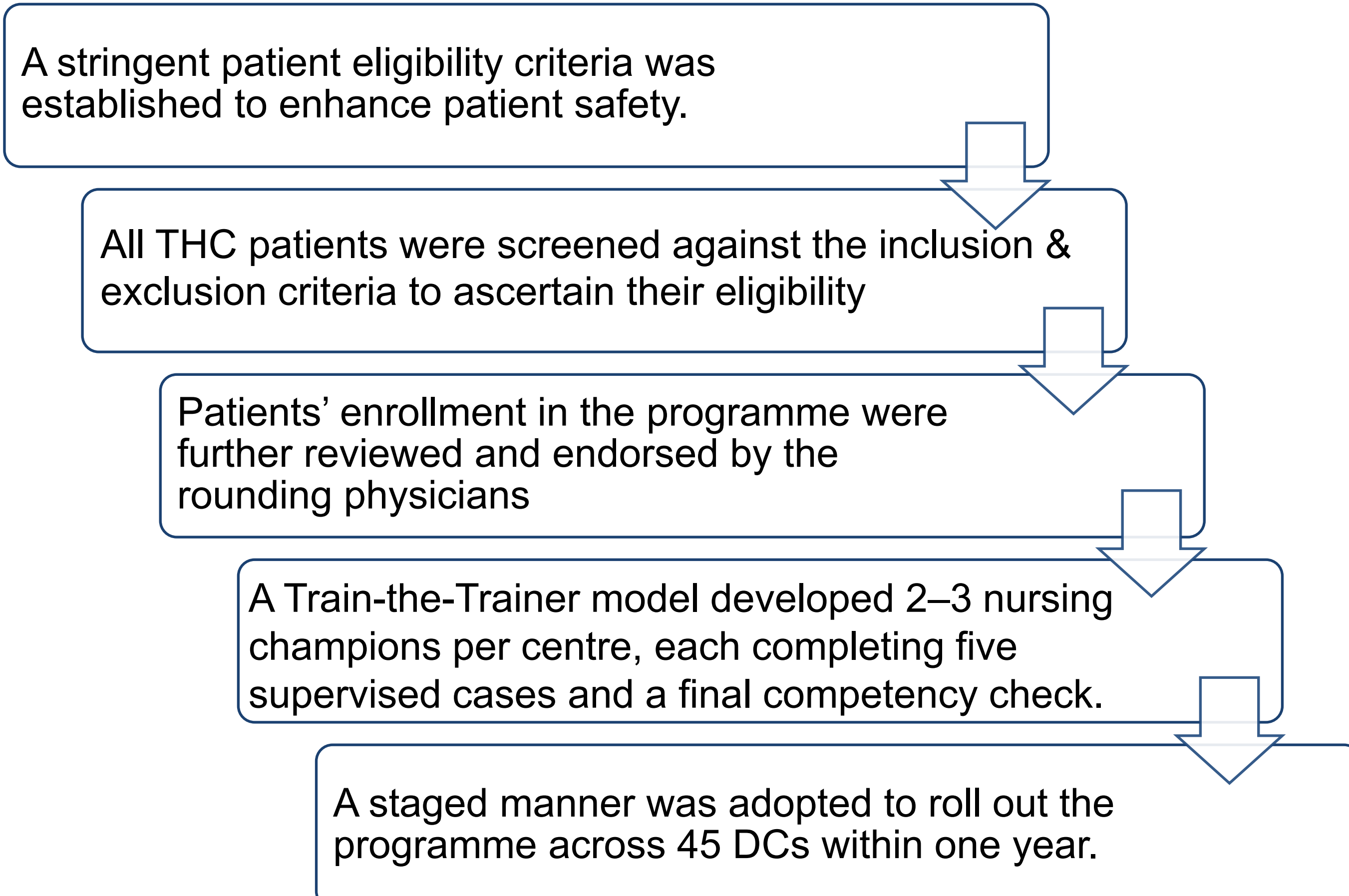
METHODS

A phased quality improvement initiative was implemented across NKF DCs in collaboration with eight Singapore public hospitals and the National Improvement Unit.

The project involved implementing a bundle of interventions in stages:

- Empowering Community dialysis nurses to perform Catheter flow restoration with Lytic dwEll at Community diAlysis centRe (CLEAR) (Figure 1)

Figure 1: CLEAR Process Design



METHODS (cont'd)

- Optimising Blood flow, Locking solution, Anticoagulant & Standardising Technique (BLAST)

The following clinical practices were implemented:

- Keep blood flow rate =>300ml/min as possible.
- Lock THC with 4% Sodium Citrate or escalate to Heparin lock when required.
- Optimise systemic anticoagulation dose for HD.
- Flush the THC with Normal Saline upon HD conclusion and apply Positive Pressure locking technique.



RESULTS

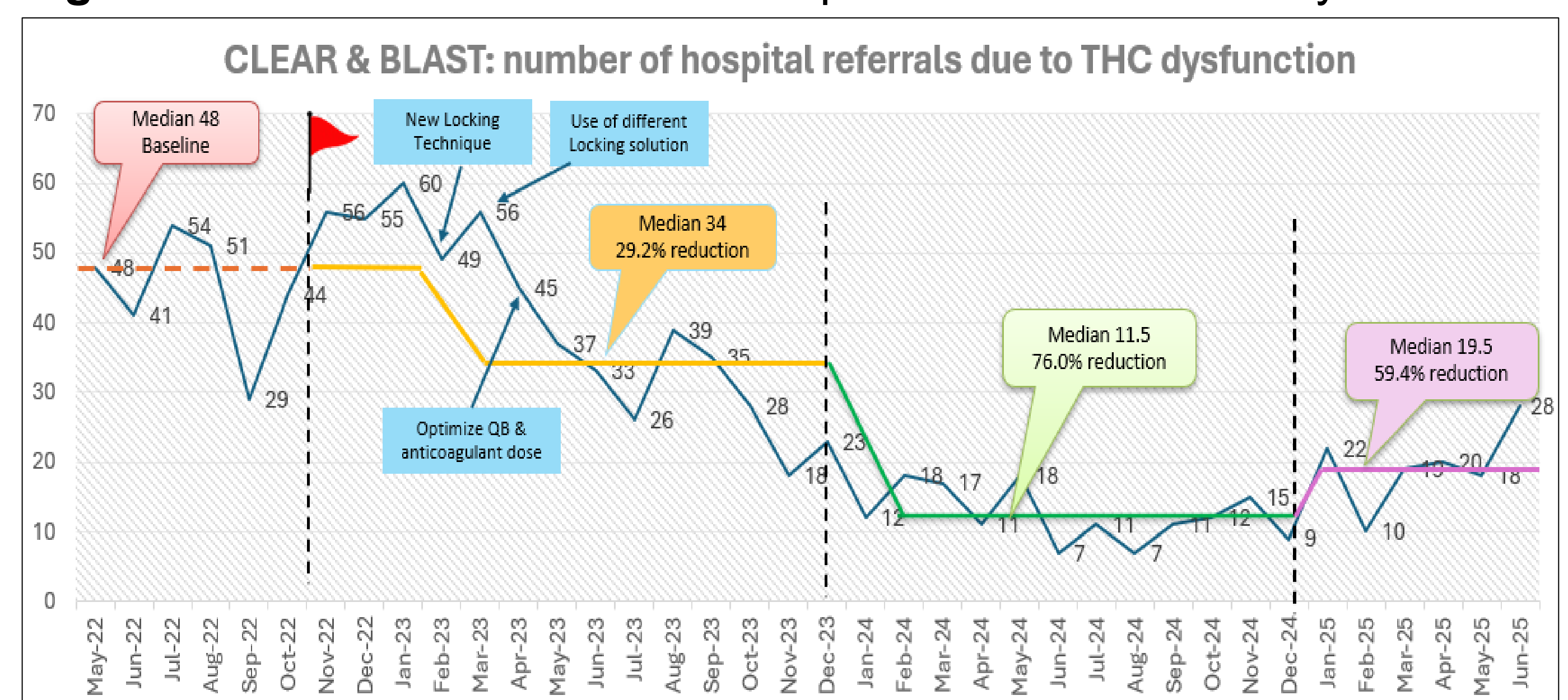
Outcome Measure:

- Over 2.5 years, 402 hospital admissions were avoided, with an overall procedural success rate of 86.8%.
- Hospital referrals for THC dysfunction were reduced by 29.2% (Year 1), 76.0% (Year 2), and 59.4% (Year 2.5) from baseline. (Figure 2)

Process Measure:

- 116 nurses were successfully trained in lytic agent administration.
- No infective complications were reported within 72 hours following the procedures.
- Overall patient satisfaction exceeded 97%.
- Over 95% of nurses reported feeling empowered to deliver value-added care.
- The initiative achieved healthcare cost savings of SGD 1.2 million through reduced hospital admissions.

Figure 2: Reduction in number of hospital referrals for THC dysfunction



CONCLUSION

This initiative demonstrates that upskilling community dialysis nurses to perform lytic dwell for THC occlusion significantly reduced hospital referrals without compromising patient safety, enabled a scalable community-based care model, and achieved substantial healthcare cost savings, supporting the feasibility of task-shifting with appropriate protocols.

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2. Lok, C. E., Huber, T. S., Lee, T., Shenoy, S., Yevzlin, A. S., Abreo, K., ... & Foundation, N. K. (2020). KDOQI clinical practice guideline for vascular access: 2019 update. American Journal of Kidney Diseases, 75(4), S1-S164.

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