

Structured Training Increased Self-Perceived Competence Among Health Professionals to Become Return-to-work Coordinators in Public Hospitals in Singapore

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Return-to-Work Coordinators

Occupational Therapy Department, TTSH

A National Return-to-Work (RTW) programme was launched in Singapore in Nov 2017. This led to the impetus of a training programme for health professionals to become RTW coordinators.

Ten competency domains of RTW, defined based on literature^{1,2} and a local randomised controlled trial³ were incorporated into the training programme. The objective of this study is to explore if a structured training programme increases self-perceived rating of competence among health professionals as RTW coordinators.

Methods

- ▶ 42 participants from public hospitals in Singapore attended
- ▶ The training programme consisted of two pre-workshop online modules; a two-day workshop; and a post-workshop assignment.
- ▶ Participants rated their level of competence on a scale from 1 (limited competence) to 9 (proficient competence) in ten domains pre- and post-workshop.

Competency domains	Mean scores	
	Pre-workshop	Post-workshop
Knowledge of medical conditions	5.60	6.48
Communication skills	5.12	6.31
Interpersonal skills	5.10	6.40
Conflict resolution skills	4.93	6.00
Organisation and administration skills	4.83	5.93
Problem-solving skills	4.29	6.02
Assessment skills	4.21	6.26
Return-to-work focus	3.88	6.07
Return-to-work facilitation skills	3.60	5.83
Knowledge of legal aspects	3.33	5.67
Overall confidence level	4.76	6.60

Fig. 1: Mean scores of ten competency domains pre- and post-workshop

Percentage Change of 10 Competency Domains

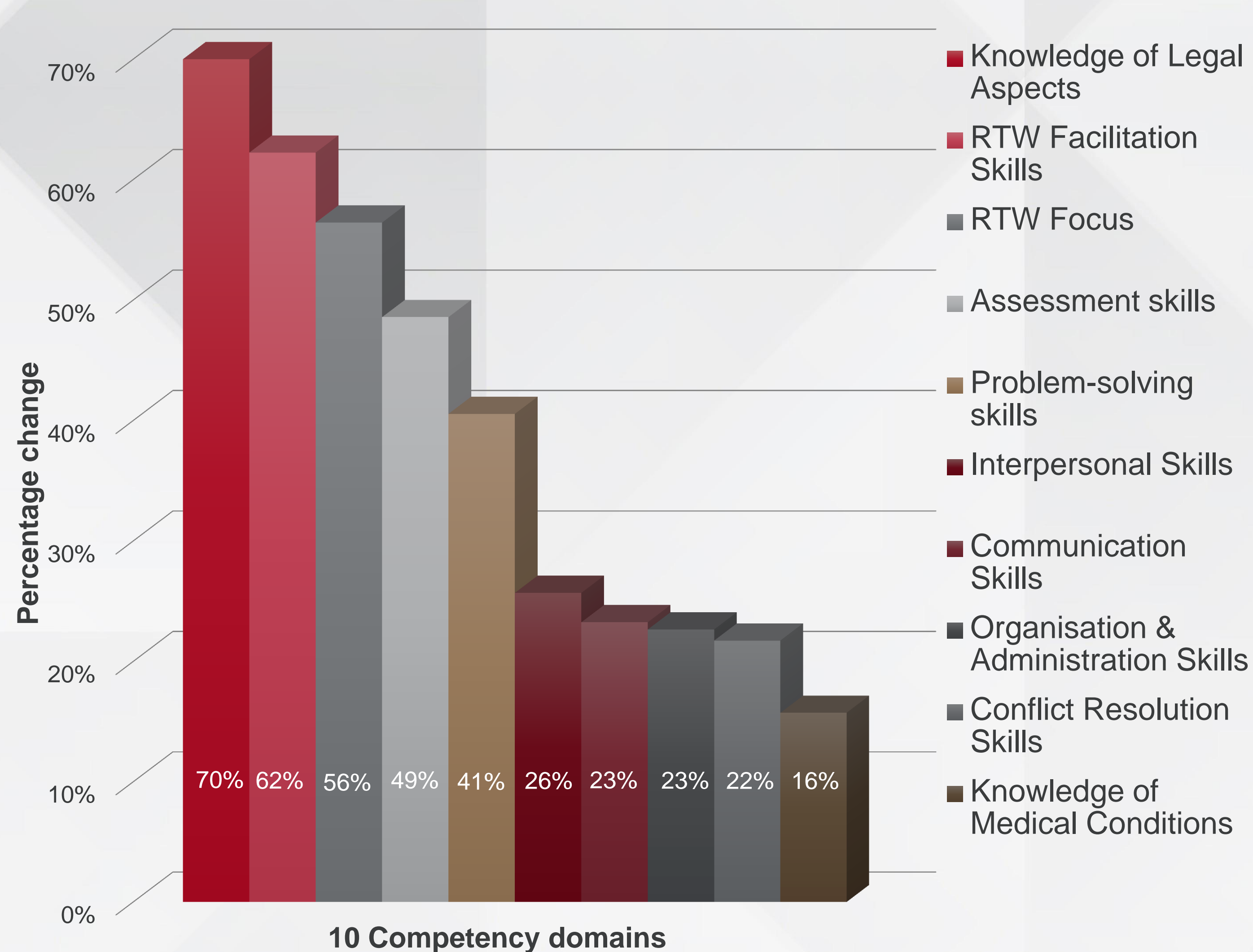


Fig. 2: Percentage change of self-perceived competency in ten domains

Conclusion

- ▶ Continuous learning through community of practice for these RTW coordinators would be beneficial to enhance their self-perceived competencies in managing the diversity of RTW cases.
- ▶ This study serves as a stepping stone in establishing competency domains for future RTWC trainings among different health professionals and building capabilities at the workplace.

References

- ¹Gardner B, Pransky G, Shaw W, Nha Hong Q. & Loisel P. Researcher perspectives on competencies of return-to-work coordinators. *Disability And Rehabilitation*. 2009; 32(1): 72-78.
- ²Shaw W, Hong Q, Pransky G & Loisel P. A literature review describing the role of return-to-work coordinators in trial programs and interventions designed to prevent workplace disability. *Journal of Occupational Rehabilitation*, 2008; 18(1): 2-15.
- ³Tan HSK, Yeo DSC, Giam JYT, Cheong FWF & Chan, KF. A randomised controlled trial of a Return-to-Work Coordinator model of care in a general hospital to facilitate return to work of injured workers. *Work*. 2016;(54): 209-222.

Discussion

- ▶ The structured training enabled participants to gain more confidence in all of the ten competency domains (refer to Fig. 2). Key highlights of the workshop include
 - Knowledge of Work Injury Compensation Act
 - Engagement session of key stakeholders
 - Role plays on RTW scenarios
 - Development of RTW plan
 - Conflict resolution with stakeholders
- ▶ Future training can be tailored based on participants' pre-workshop self-efficacy ratings.
- ▶ A six-month post-training review of the self-perceived competency may be conducted to determine transference of skills to the workplace, especially in the lowest rated domains post-workshop.



Background

Patients with Amyotrophic Lateral Sclerosis (ALS) gradually lose their functions to walk, talk, and eat. However, their brain functions remain mostly intact. These patients often require high level of care as they are mostly bed-bound, on tracheostomy tube and/or ventilator support with limited communication abilities. Such high dependency on their carers without the means to communicate most of the time, is debilitating.

Challenges

- Patients: home-bound; poor social connection; frustrated with inability to make their needs/wishes known; high cost to attend hospital appointments; need to coordinate timings to minimise fatigue/stress
- Services: Communication services/intervention not a priority, value of it undermined; poor awareness of technology for alternative communication means; devices are expensive and inaccessible to these patients; unknown efficacy/outcomes

Drive for change

With increasing awareness of the multidisciplinary team through collaborations of a few cases, there has been a need for change in providing value-added care and the "Help Me Speak" program was born. With the support and collaboration between Home Ventilation & Respiratory Support Service (HVRSS) and Speech Therapy Department, funds were gathered to purchase high technology eye gaze devices (Tobii eye gaze devices) to support the needs of this special group of patients in the community.

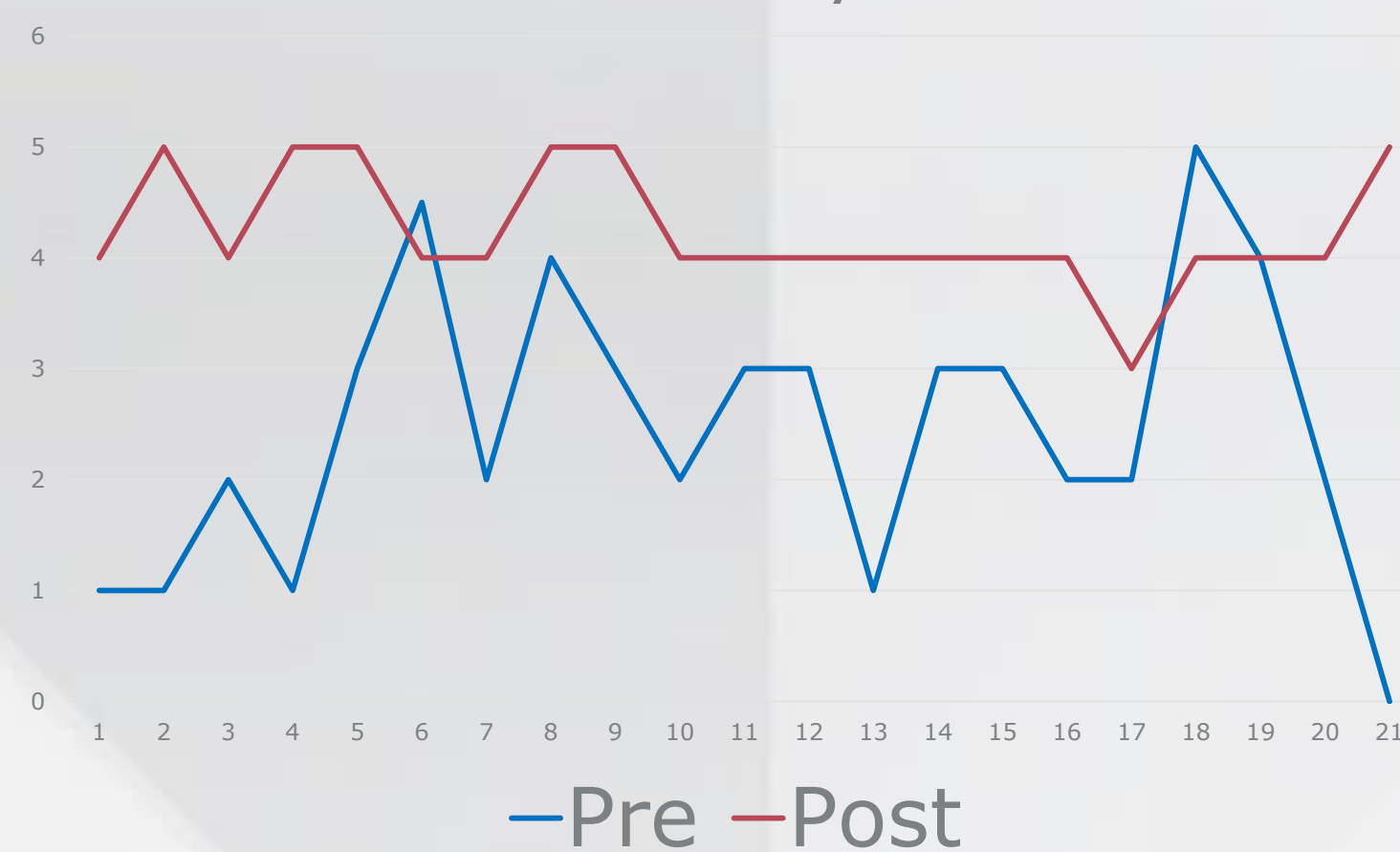
Objectives/Aims of program

- To redesign the care model & provide access to expensive high-technology eye-gaze devices for communication in the community
- To set up a loan system and provide opportunity to loan for free to trial devices up to months before deciding on purchase
- To empower caregivers to assist in device set up & to empower patients to communicate their needs & wishes.
- Increasing the well-being of patients and potentially carers

Results

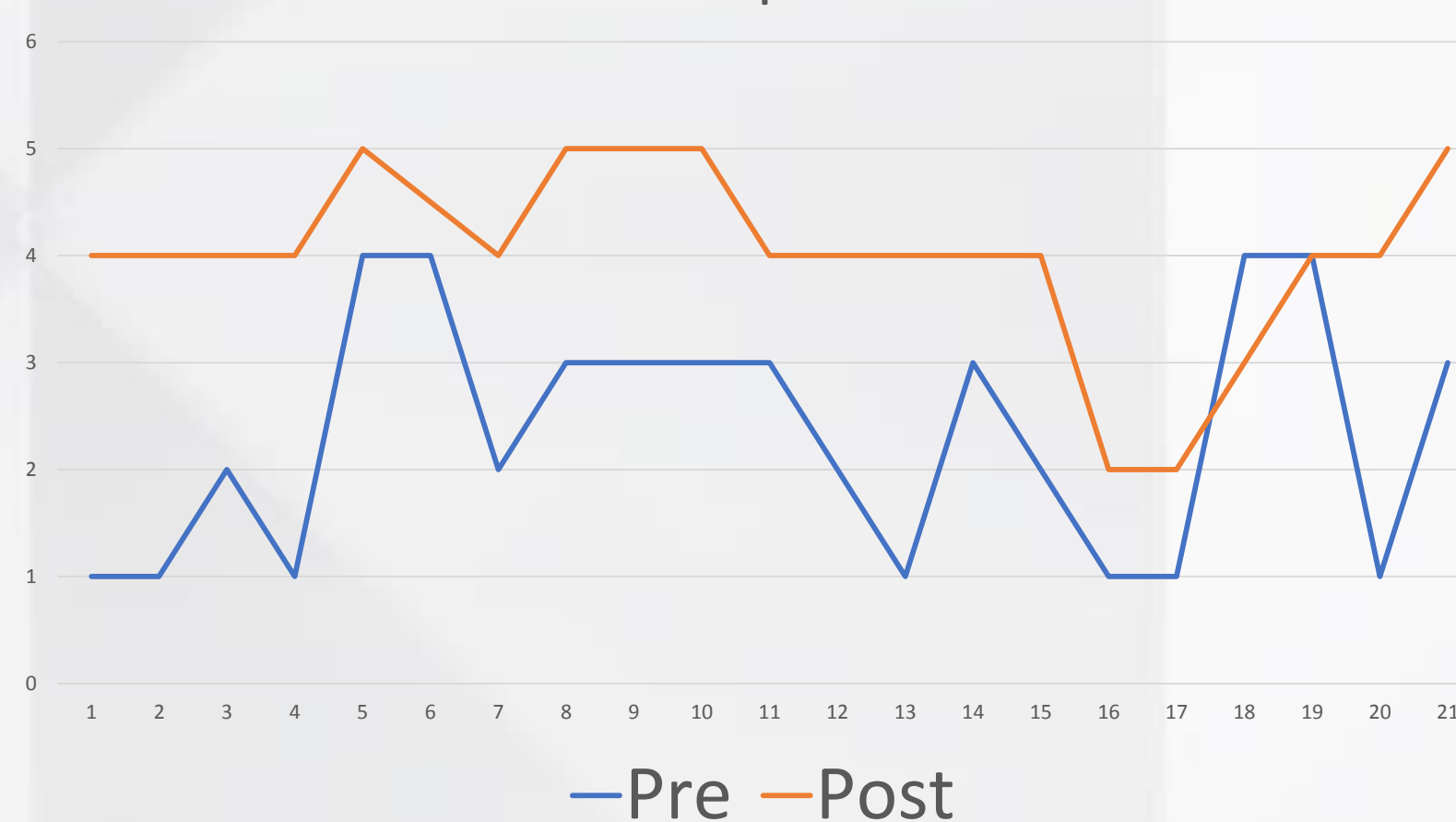
A total of 21 patients were recruited thus far. The Therapy Outcome Measure (TOM), adapted for AAC services (Murphy, Boa, & Enderby, 2015) was used. It contained 5 major components - impairment, communication impairment, activity, participation, and wellbeing. Given the degenerative nature of motor neuron disease, many patients had worsening scores in their physical and communication impairment components. The scores were noted prior to the introduction of the eye gaze devices and also post trial or loan of the devices.

Activity



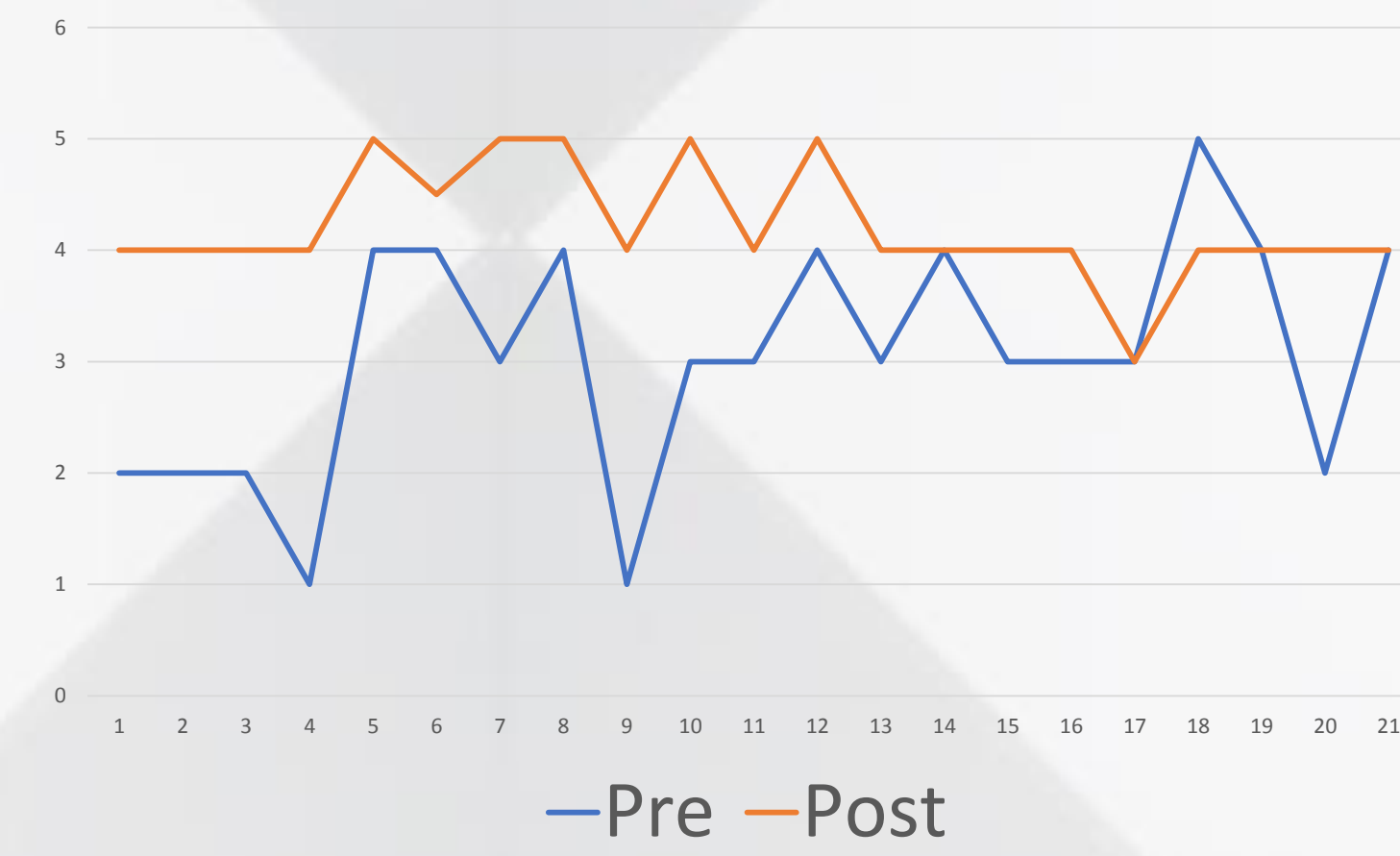
Majority of the patients (86%) had increased in their activity scores by at least 1 point – indicating a significant improvement in their ability to communicate with others.

Participation



Similarly, majority of patients (90%) had increased in their participation scores – indicating a significant improvement in their ability to show autonomy and control over life, and at times fulfilling their social/family role.

Well-being



Last but not least, 76% of the patients achieve an improvement in their well-being. This possibly indicated that with the ability to communicate with this eye gaze device, patients generally had reduction in frustration or fear.

Speech Therapy, TTSH



TTSH Speech Therapist Tan Xuet Ying shows Ms Sharon Teo how to use an eye-gaze device that allows her to communicate via a computer. Ms Teo has a progressive neurodegenerative disease known as Amyotrophic Lateral Sclerosis.
PHOTO: GIN TAY FOR THE STRAITS TIMES
PUBLISHED AUG 22, 2017, 5:00 AM SGT

Conclusion

This loan system has changed the care model by shifting the care from outpatient setting to the community setting. It has increased the accessibility and affordability of patients to these expensive high technology devices and set the new benchmark of AAC care in Singapore. Moreover, both caregivers and patients are empowered to optimise their communication and patients remain connected to the external world.

Some patients went on to purchase their own devices under the Assistive Technology Fund after realising the value of having such a device. Unfortunately, there were a few who passed on due to their medical conditions, however the increase in their quality of life during the shortened lifespan made an impact on the wider community. It increased awareness and receptivity towards this alternative form of communication and provided hope for a more enabling life despite their physical limitations.

Impact of Volunteerism in the Acute Setting: Guiding Rehabilitative Exercises in Patients after Total Knee Replacement

Kelvin Tan, Jaclyn Tan, Ashton Neoh, Joshua Tan, Caroline Chung

CHAMPS TKR Programme

Orthopaedic
Surgery,
Physiotherapy &
Nursing Depts,
TTSH

Rehabilitation is strongly recommended after Total Knee Replacement (TKR). In TTSH, all TKR patients receive daily physiotherapy and are taught rehabilitative exercises to improve their knee flexibility, muscle strength & functional mobility. All of them are instructed to perform the exercises at least twice a day as studies show that higher exercise dose translates to better clinical outcomes. However, because of post-operative pain and fatigue, patients often find it difficult to do the exercises themselves.

Under Temasek Foundation Cares - CHAMPS (Centre for Health Activation Mobilises Para-Clinical Seniors) TKR Programme, volunteers are trained to guide the TKR patients with rehabilitative bed exercises during hospital stay. Training includes classroom session and practical sessions in the ward. This transforms the current clinical practice where exercises were conventionally taught by physiotherapists.

From Oct-Dec 2018

- ▶ 16 Competent Volunteers
- ▶ Benefited 69 TKR patients
- ▶ Conducted 104 Exercise sessions

TKR Patient Satisfaction Survey

- ▶ 95% rated the session good/excellent.
- ▶ 86% found the session useful/ very useful
- ▶ 93% found that the session beneficial (E.g. Perform the exercises with more confidence, Remember the exercises)

Clinical Outcomes

Outcomes	Volunteer involvement		p value
	Yes (n = 69)	No (n= 71)	
Length of stay, Mean (SD)	5.68 (1.75)	6.28 (3.16)	0.166
Pain Score, Mean (SD)	3.43 (1.60)	3.89 (2.16)	0.155
Extension PROM, Mean (rank)	64.14 (0 - 15)	75.77 (0 - 35)	0.022*
Flexion PROM, Mean (SD)	89.25 (16.24)	88.37 (17.53)	0.760
Ambulatory distance, Mean (SD)	20.35 (14.23)	17.83 (12.17)	0.264

- ▶ The Extension Passive Range-Of-Motion (straightening passive range-of-motion of the operated knee) was **statistically significantly better** upon discharge.



ARTiculate!

Care & Counselling, TTSB

Background of project

ARTiculate! is an acrylic painting programme initiated by the Department of Care & Counselling in 2013 to provide an alternative way of self-expression. The name *ARTiculate!* was coined as the programme aims to encourage voices and stories to be heard through the use of art. ARTiculate! hopes to create a better healing environment in the hospital setting.

➤ Engaging patients through ARTiculate!

ARTiculate! is envisioned to serve as a platform to engage patients to express themselves when they find it difficult to share their thoughts and feelings verbally or in words. It also hopes to enhance the psychosocial well-being of patients.

Patients who have participated in ARTiculate! shared that they felt a sense of achievement and their moods were uplifted upon completion of their artworks. It was also found that ARTiculate! has also promoted confidence and self-discovery during the process.¹



Above paintings were done by Mr. T sharing his journey with cancer¹. From left to right: Green bamboo to symbolise strength and to remind him to stay strong when he first received his diagnosis. His world became “black and white” as he lost vision of his left eye; through the artworks, he reminded himself to continue to stay strong like the bamboo. Mr. T felt that “spring has arrived” and was hopeful when he was told that he could go for a bone marrow transplant.

➤ Promoting self-reflection through ARTiculate!

ARTiculate! is also conducted with healthcare professionals and students to promote reflective practice. It provides them a space to slow down in the fast-paced acute hospital, to connect with themselves while they paint their thoughts and emotions. It was used for student medical social workers to reflect on the relationships between healthcare professionals and patients (see below)²:

	<p>Plus</p> <p>"Red cross is a symbol of the healthcare profession. The relationship between the healthcare professionals and patients is not only about the medical. Such relationships add value to healthcare professionals' and patients' lives in myriad ways (depicted by the multi-coloured crosses). We have to look beyond the illness and see that there are other aspects of patients to value."</p>		<p>Revive the heart</p> <p>"As healthcare professionals, it is essential not just to ensure that patient is well physically, but also emotionally and mentally. This painting illustrates the concept that healthcare professionals should have the 'human touch'- heart in patient's recovery journey."</p>		<p>The Boat</p> <p>"In our work, we are constantly navigating relationships. It isn't always smooth sailing and we have to work hard to row towards therapeutic relationships with our patients and their family members. However, there is always a sunrise on the horizon waiting to greet us. It's a reminder that despite murky waters, every effort is worth it."</p>
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➤ Spreading awareness and encouragements

In 2018, the first book “ARTiculate: my painting, my life, our stories” was published. It consisted of 50 art pieces by patients and their carers at Tan Tock Seng Hospital, with each art piece accompanied by a poem or prose that encapsulated the story behind the painting³.

Part of the editorial team and publisher at the book launch at Singapore Patients' Conference 2018.



1. Tan Tock Seng Hospital. (2018). *ARTiculate!: my painting, my life, our stories*. Singapore: Writes Publishing.

2. Tan, K.L.Y., Wong, H.M., Poh, K.S.Y. (2016, June). *ARTiculate! enhances psychosocial well-being of patients*. Poster presented at The 8th International Conference on Social Work In Health And Mental Health, Singapore.

3. Wong, H.M., Tan, K.L.Y., Poh, K.S.Y. (2017, May). *Exploring the use of ARTiculate! as a medium for student medical social workers to reflect on relationships between healthcare professionals and patients*. Poster presented at 4th International Conference on Practice Research, Hong Kong.

Nurse-Led Function Focused Care (FFC) Model: Engaging Nurses In Maximizing Patient's Mobility To Achieve Therapy Goals in Ward 82 at Tan Tock Seng Hospital

Liew SP, Iqbal SR, Quek LQ, Eng XW, Roslan AS, Chia SM, Myint KA, Macalald JMR

Inter-professional Approach to Mobilization

Physiotherapy & Nursing Department, TTSH

A Function Focused Care (FFC) Model was developed through a quality improvement project using the Functional Resonance Analysis methodology (FRAM). This model counteracts the functional deconditioning which results from prolonged bed rest.

Literature widely supports increasing out of bed mobilization time & dosage in enhancing functional recovery. In FFC, nurses were involved in engaging patients in physiotherapy-recommended activities throughout the day resulting in increased mobilization episodes. The functional scores showed significant improvement in both sub-acute & acute setting.

FFC model improved inter-disciplinary communication & empowered nurses in delivering enhanced collaborative care with positive patient outcomes. This model has the potential to spread across other wards and better engage the available resources in optimising patients functional mobility to improve outcomes with no additional cost.

Tangible Outcomes

- ▶ **Inter-professional collaboration:** Clear communication of common goals between nurses & PT's to achieve better patient outcomes
- ▶ **Functional outcomes:** Improved Modified Barthel Index (MBI) scores in most patients (Figure 1)
- ▶ **Culture change:** Nursing ownership in increasing patient mobilization & functional recovery (Figure 2)
- ▶ **Job redesign:** Nursing workforce role transformation - Better value delivered to patients
- ▶ **Safety:** No adverse events during mobilization

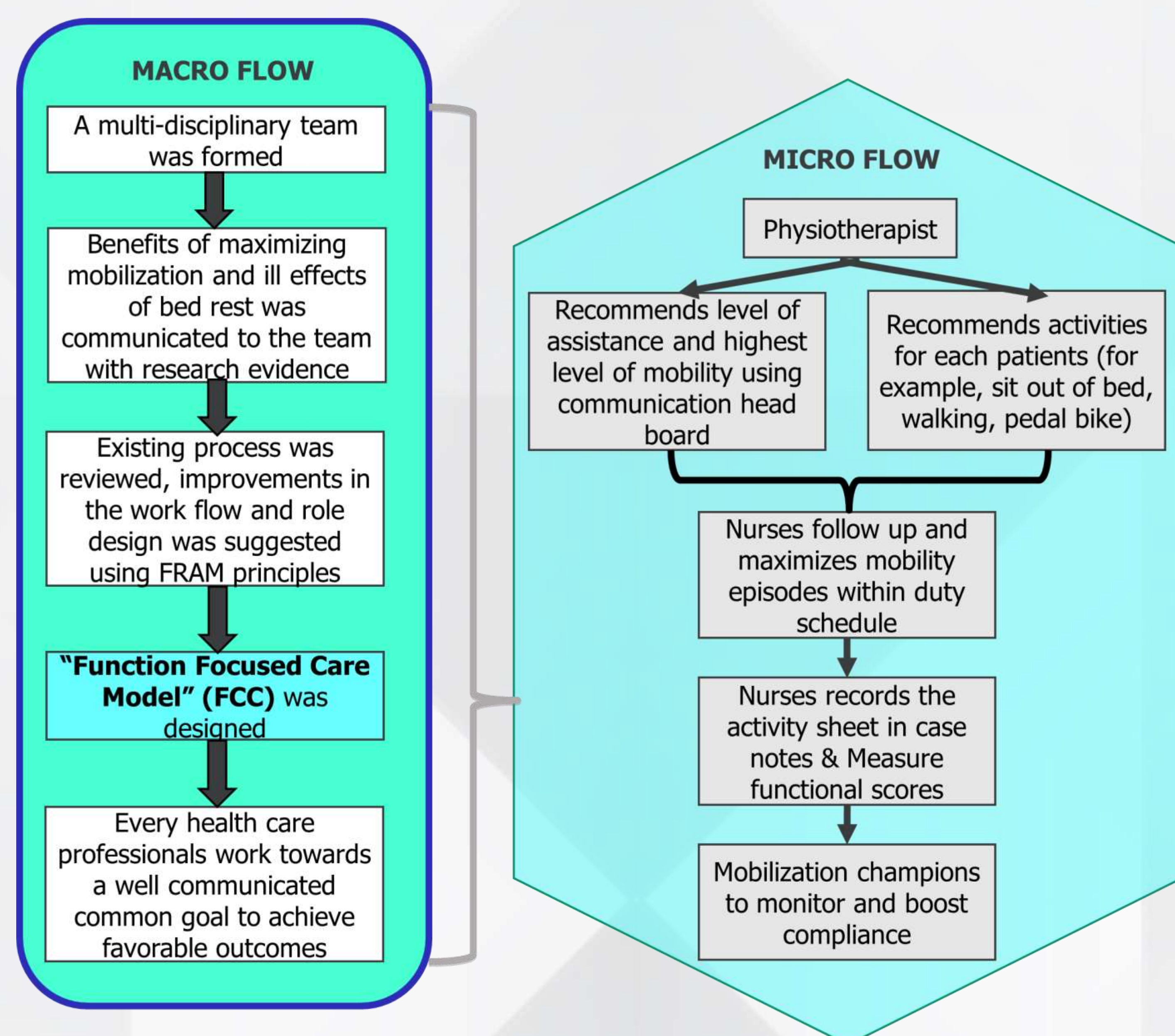


Figure 1: Functional outcome

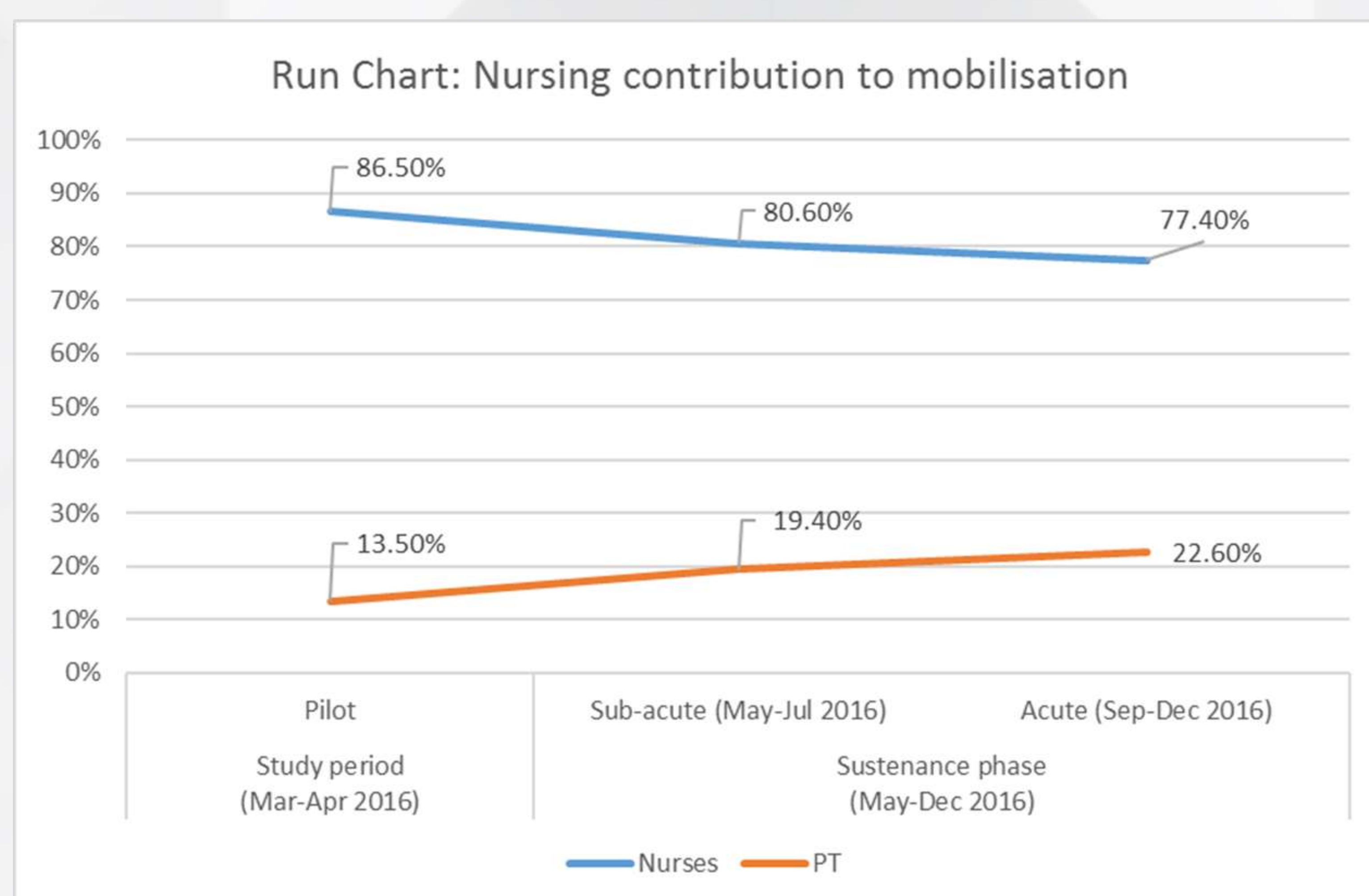


Both sub-acute and acute patient populations in Ward 82 demonstrated significant functional improvement.

Mean difference of *MBI scores* were 7.37 and 10.11 respectively in both population.

Note: Due to a change of the discipline of the ward from sub-acute to acute setting, there is a break of data collected from December 2016 to March 2017.

Figure 2: Mobilization episodes



Nurses & PTs percentage contribution for mobilization of patients in this project.

Through FFC model: Increase in mobilization episodes sustained with nursing engagement despite increasing acuity of patients.

During 9 months (n=88): PT-led mobilization episodes = 325
Nurse-led mobilization episodes = 1620

Patient Centric Goal Setting

Introduction

Healthcare coordination has become more challenging in our local context as the focus of care is being passed to the community. At times, there are more than one service providers receiving patients in the community, forming a network of support to provide care for patients. However, patients often feedback about feeling confused with regards to who is caring for them due to the multiple parties involved. Patient centric goal setting is being piloted in this project and it aims to provide a common language between patients and stakeholders. The project hopes to achieve 2 objectives: a) to increase healthcare staff awareness of patients' goals, and b) to improve patients' satisfaction on their transitional care experience.

In collaboration with Singapore General Hospital and Filos Community Services, focus groups with patients from the acute setting who have transited back home, were conducted to explore their experiences of the transitional care.

The project has highlighted 3 key areas of patient's needs (Imberan, Tan, Yeo, Hng & Woon, 2019) as follows:

- ▶ Need to understand the benefits of the therapy session
- ▶ Need to be prepared for home and be educated on post discharge activities
- ▶ Need to be respected as an individual with personal goals and strengths

Methodology

The project utilized Esther methodology originated from Sweden, which aims to improve healthcare coordination and delivery (Vackerberg, 2016). Esther is a patient persona and the focus of the methodology is always to ask "What is best for Esther? Coupled with quality improvement tools, the aim of Esther projects is to improve care delivery so to support patients living in the community. (Vackerberg et al, 2017)



Team Members:

1. Tess Hng, TTSH
2. Clarice Woon, TTSH
3. Raihana Bte Imberan, SGH
4. Joy Tan, SGH
5. Yeo Chee Keong, Filos Community Services

Outcomes and learning points

At baseline, we took feedback from 8 patients, out of whom only 1 patient reported that healthcare staff were aware of his goals. Another patient reported that healthcare staff were unaware of his goals while the rest of the 6 were unsure if their goals are known. We trialed the Patient Centric Goal setting form with 7 current inpatients and followed up with them until they are discharged and transited to a community service provider. Post intervention, all 7 of the reported that staff were aware of their goals.

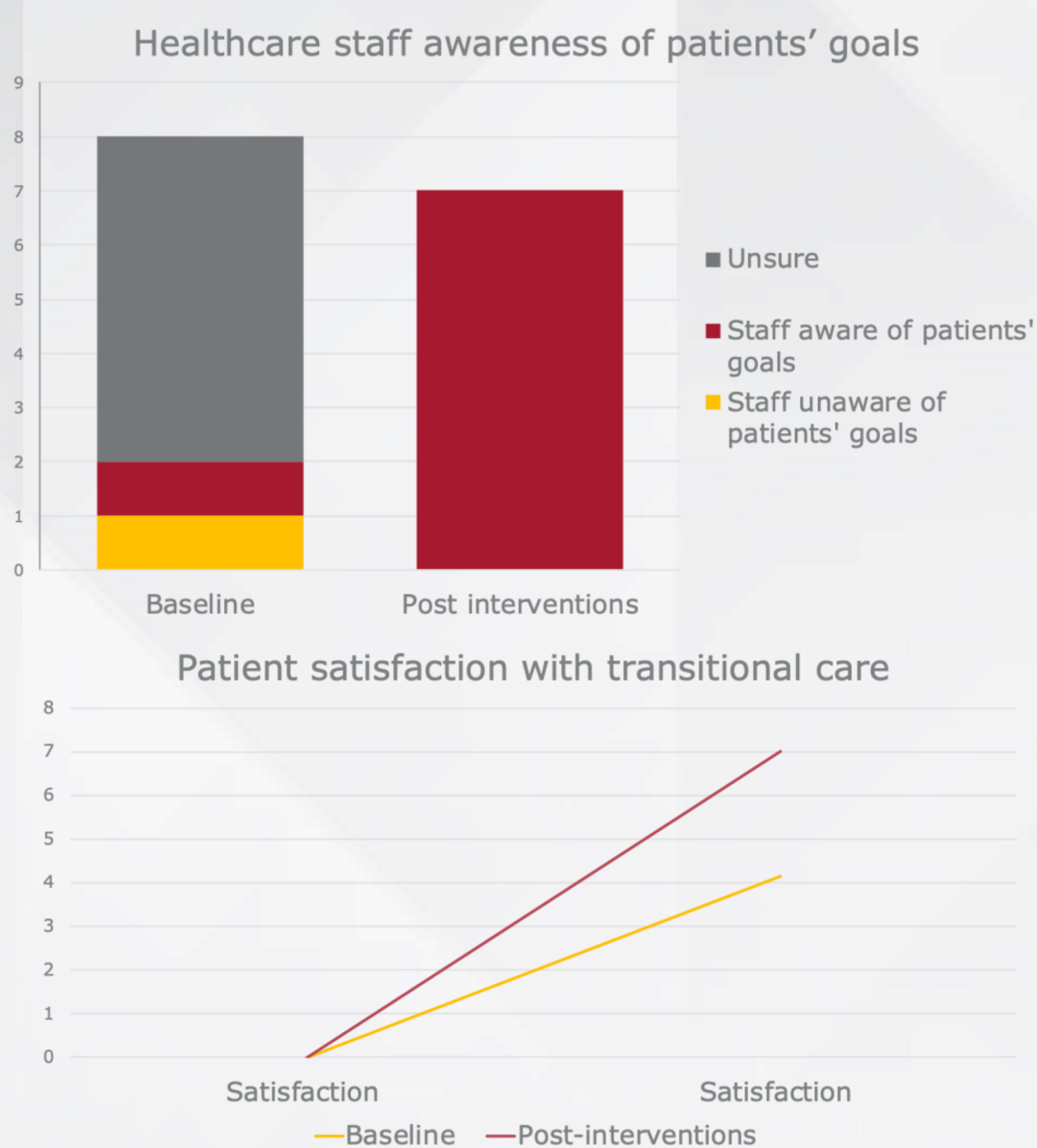


Image on right: Patient centric goal setting form, page 1. Image on far right: Patient centric goal setting form, page 2.

Reference:

1. Hng, T., Woon, C., Tan, J., Imberan, R., & Yeo, C. K., (2019, March). To enhance ESTHERS' transitional care experience through patient-centric goal setting. Poster session presented at ESTHER Network for Health & Social Care Singapore, Singapore.
2. Vackerberg, N., Levander, M. S., Thor, J. (2016) What is best for Esther? Building improvement coaching capacity with and for users in health and social care- a case study. *Wolter Kluwer Health, Inc.*, 25(1), 53-60.
3. Vackerberg, N., Bardoni, R., Lim, E., Tan, J. B., Sim, A., Carlborn, A., Mills, A., Mueller, 2017, *Esther- The Esther Coaches Workbook*, Singapore, Esther Network, Jonkoping, Sweden, Esther Network, Singapore, Esther Network, United Kingdom.

Feedback from both staff and patients shows that there are value in understanding patient centric goals. For the staff, understanding patient's goals and values help them to be more purposeful in their interventions. For the patients, having someone to talk to them about their goals helps them to feel respected as an individual. In terms of patients' satisfaction with their transitional care experience, there were overall improvements too. At baseline, the average score is 4.13, while the average score post intervention is 7. The reflection of having to ensure patient's information flow to community partner is that the community partners often value the inputs about patients' goals and values. The additional feedback loop with the community partners, on top of the IT system adds a human touch to the referral process. When we check in with patients, they also appreciated the follow through to ensure that they are not lost in transition.

Name: _____
 NRIC: _____
 Information obtained from: Self/ Others: _____

At admission

Goal setting form 1- Understanding patient

1. What is important to you?
 (The first row states the global goals areas that patients are likely to mention. Prioritize them from 1-6 in order of importance. The following rows are suggested questions for your use to explore more with patients. Focus on No. 1 and 2 to explore further with patients)

Family	Financial	Health	Social interaction	Interest/hobbies	Work
What do you think your family need?	When did you last work? What were you doing?	What about health you value?	Who do you enjoy spending time with?	How often do you do XXX? Who do you do it with?	What is important to you about being able to do work? (Financial? Social? Sense of usefulness?)
What will you want to do for your family?	What will be your top most concern with regards to financial difficulty?	If you had better health, what would you want to do/be doing?	What do you do during those times?	What is it about XXX that you enjoy the most?	
	Have you thought of how you can expand your financial options?	If you have poor health, which aspect of your life will suffer the most?			

2. What do you enjoy doing? (Optional)

Sports	Socializing	Cook/food	Reading	Others
How often do you do this sport?	Who do you socialize with?	What type of cooking/ food do you enjoy the most?	What do you enjoy reading?	
Why do you like this sport?	How often do you meet up with friends/ family to socialize?			

Name: _____
 NRIC: _____
 Information obtained from: Self/ Others: _____

3. What is most important to focus on/ what can we start working on right now that can help you progress in your goal?
 a) _____
 b) _____

4. Where do patient think he/she right now?
 1 2 3 4 5 6 7 8 9 10

Post discharge (1months to 4 months)

Patient Reported Transitional Care Experience Survey

These questions relate to your recent transition to _____ (state care site).

1	Are the care staffs aware of your goals?	1= Yes 2= No 3= Not sure (do not read out this option)
2	On a scale of 1-10, how will you rate your satisfaction of the transition from SGH/ TTSH to _____ (state care site).	
3	On a scale of 1-10, how far do you think you have achieved your goal?	
4	Other comments?	(Free text)

Design and Development of a Novel 3D-printed Non-Metallic Self-Locking Prosthetic Arm for Forequarter Amputation

Trevor Binedell, Subburaj Karuppasamy

3D-Printed Prosthetic Arm

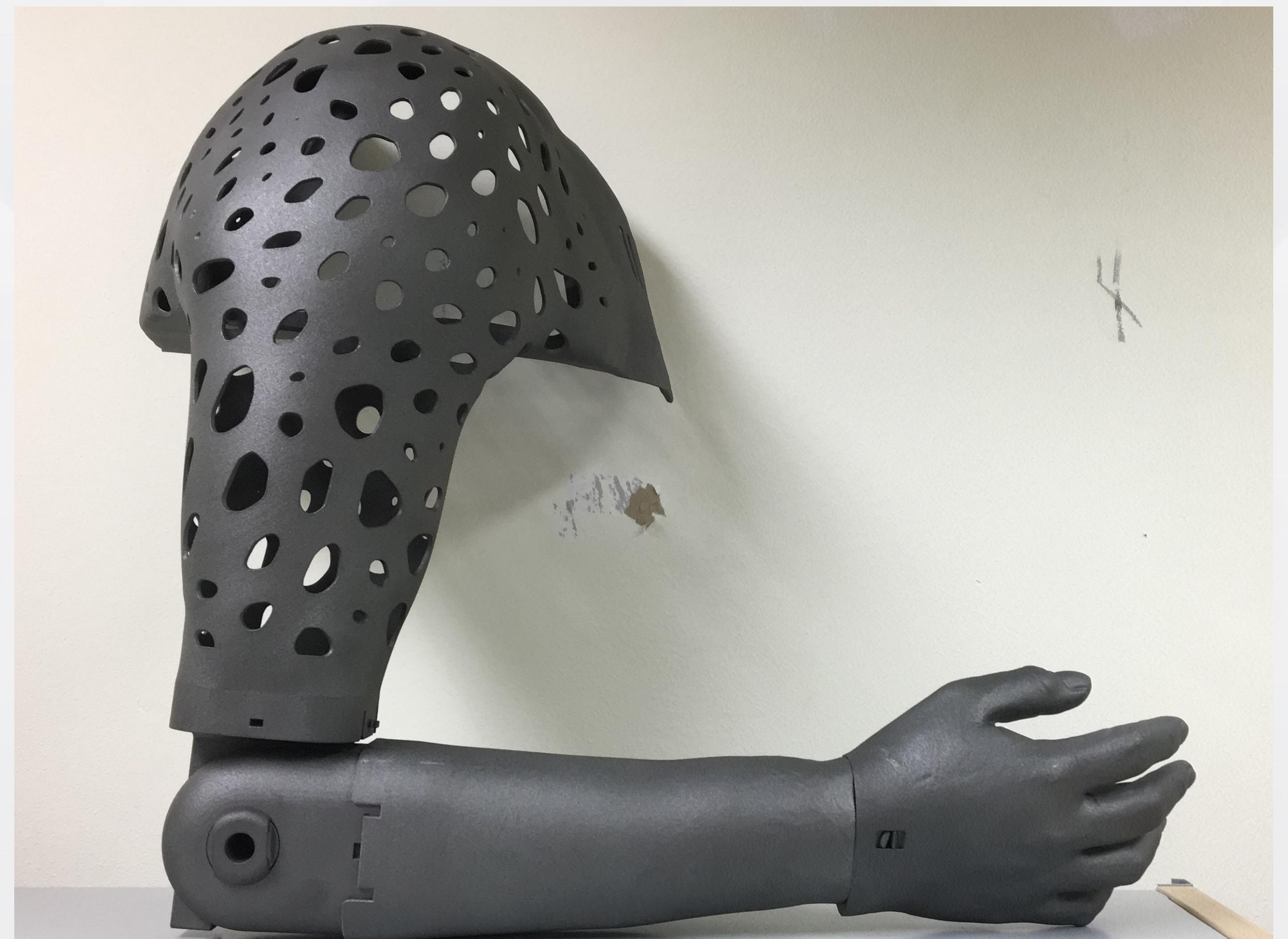
Foot Care
& Limb
Design
Centre
NAMIC
SUTD

Armed with a set of specific requirements from a patient, who had undergone a forequarter amputation, losing his entire shoulder joint & arm, we embarked on a journey to design & develop a unique cosmetic design for a new prosthetic arm.

Working in collaboration with experts from SUTD, a 3D-scan of the missing limb as well as the contralateral arm were taken to facilitate computer modelling and 3D-printing of the prosthetic arm & its individual components. A protocol for capturing geometrical characteristics of the contralateral limb anatomy, designing a patient-specific prosthesis and optimizing the geometry of the prosthesis for specific 3D printing technology for the fabricating to the final prosthesis, has been developed.

Design Features

- ▶ Completely non metallic arm to pass through airport security without user having to remove arm
- ▶ Lockable elbow position for business meetings and driving position
- ▶ Cooler with specifically designed windows to facilitate breathability and useful for gripping arm when wearing
- ▶ Aesthetically more pleasing due to exact copy of left arm
- ▶ Lightweight <600grams



Outpatient and Home Advanced Rehabilitation Therapeutics Using Jintronix Virtual Reality Telerehabilitation System

This study was funded by Ng Teng Fong Innovation Program Grant NTF_NOV2016_IN_C1_A1

Christopher WK Kuah, Suharti Hussain ChweeYin Ng, SengKwee Wee, YongJoo Loh, Karen SG Chua

Centre for Advanced Rehabilitation Therapeutics

INTRODUCTION

This study serves to evaluate the application of a telerehabilitation system to complement outpatient rehabilitation services and enhance home support. An online virtual reality platform called Jintronix (www.jintronix.com) was used to deliver a clinic-to-home, caregiver-supervised, and individualized exercise programs for stroke outpatients.

METHODS

Study design: Prospective open-label study

Inclusion criteria: 21-75 years old ; ≥3 months post-stroke medically stable ; require ≤minimal assistance; have a primary caregiver; able to participate in a 15 minutes screening trial

Exclusion criteria: seizure history; severe cognitive or perceptual deficits, or emotional or behavioral issues; pain (Visual Analogue Scale >5); pregnant/breastfeeding; known poor cardiac function (EF<30%); non-weight bearing status in either lower extremities; caregiver unable to meet competency requirements

Jintronix:

- Consists of activities and exercises targeting the upper limb, lower limb, trunk, balance and gait
- Uses Kinect camera for motion tracking
- Prescribed by clinicians

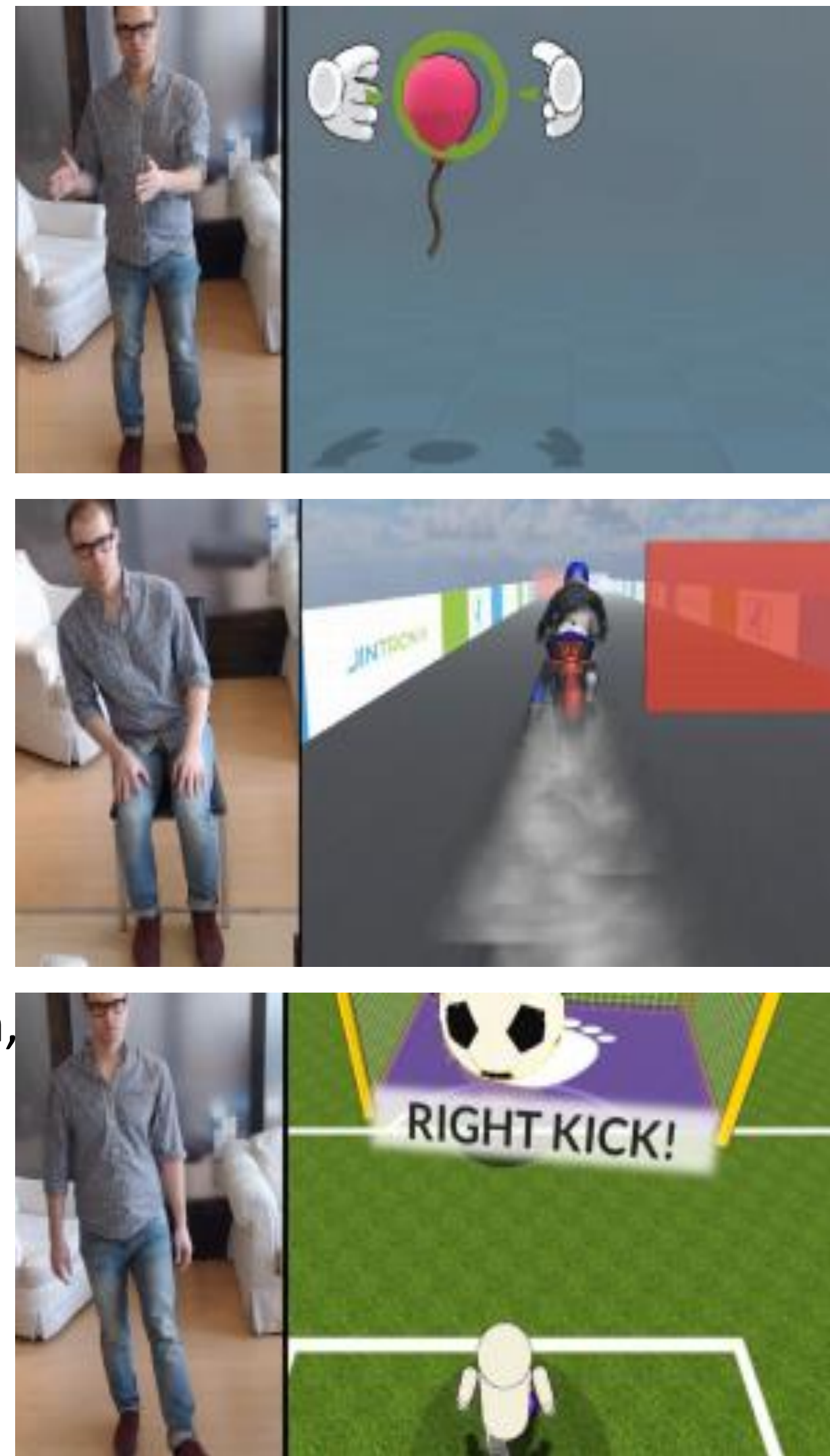
Protocol:

Phase 1: Clinic-based training: 9 sessions (3x/week) over 3 weeks, 45mins/session; Caregiver training

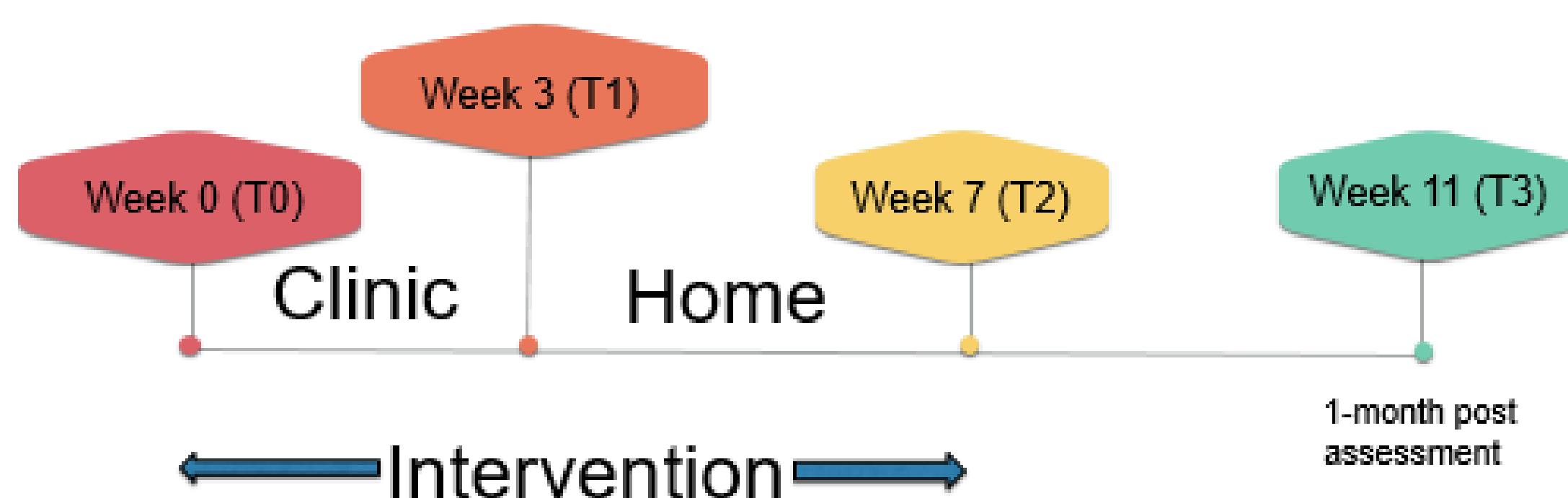
Phase 2: Home-based training: 20 sessions (5x/week) over 4 weeks, 45 mins/session;

Caregiver-supervised; Daily remote monitoring ; Exercise modification as needed

Daily remote monitoring: The therapist will log in to Jintronix daily at the end of the day to review each scheduled home-based training on its duration, and quality and consistency of performance. Each review may include adding or removing activities, or modifying game parameters to adjust level of challenge, in consideration of safety to both participants and caregivers.



ASSESSMENT TIME POINTS

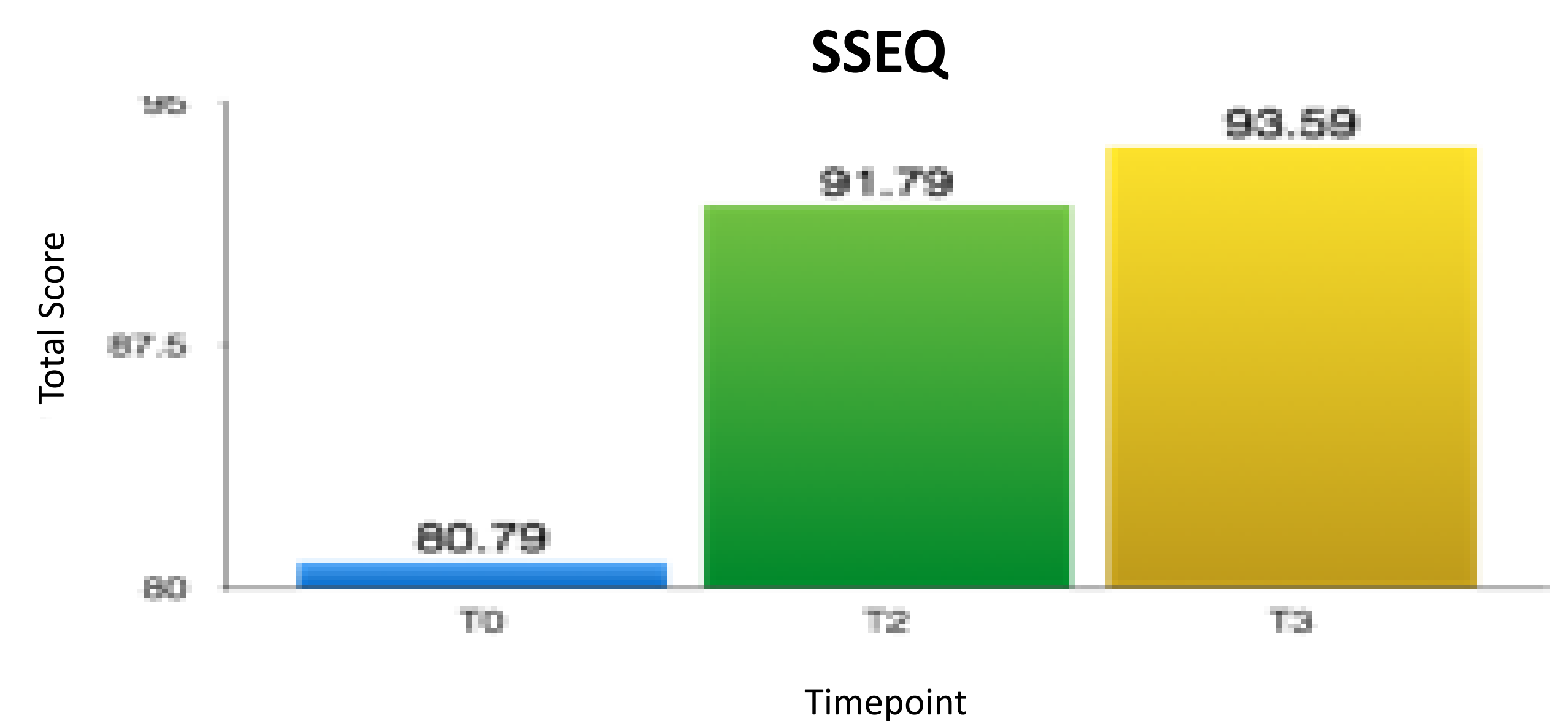
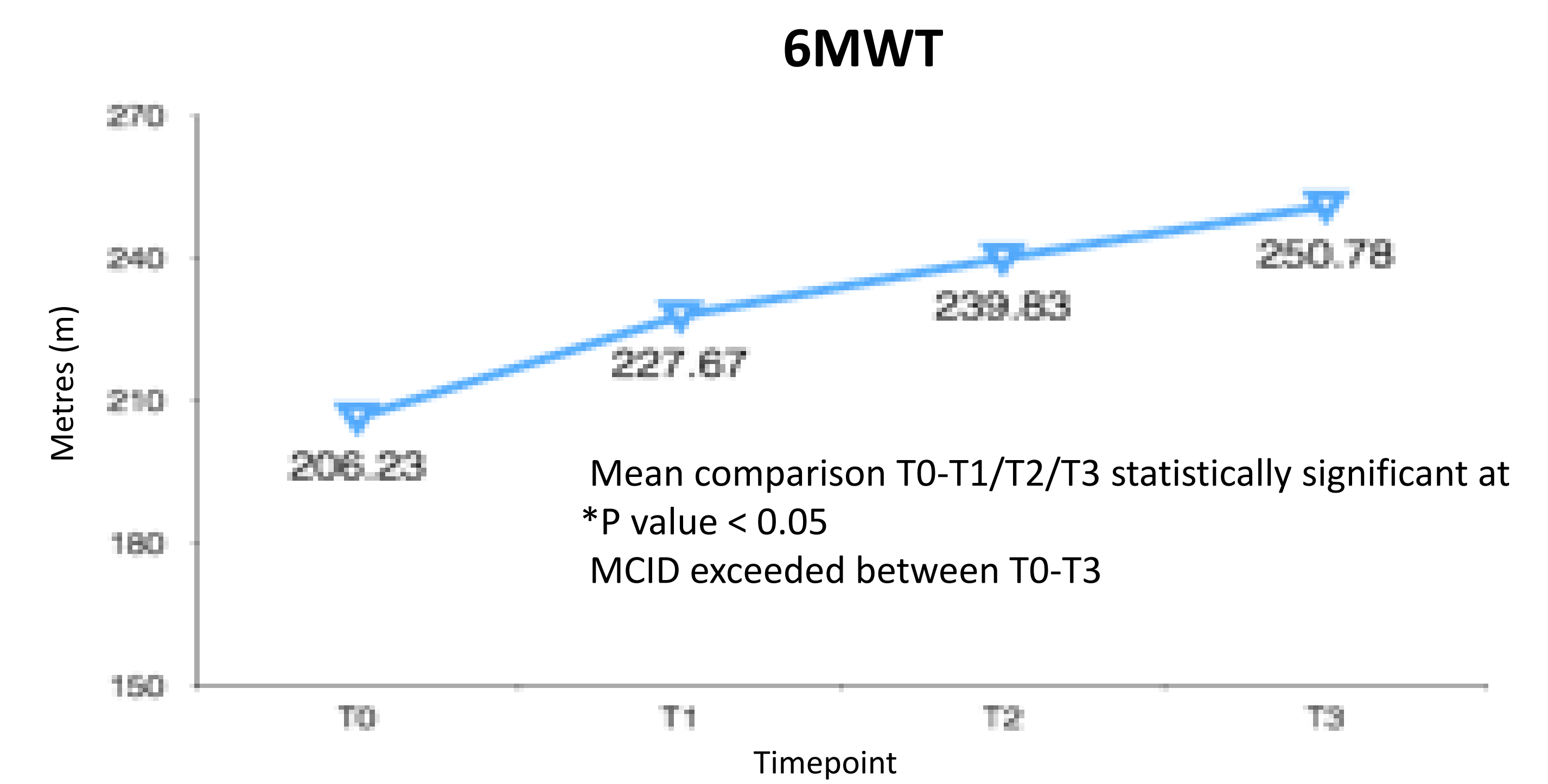
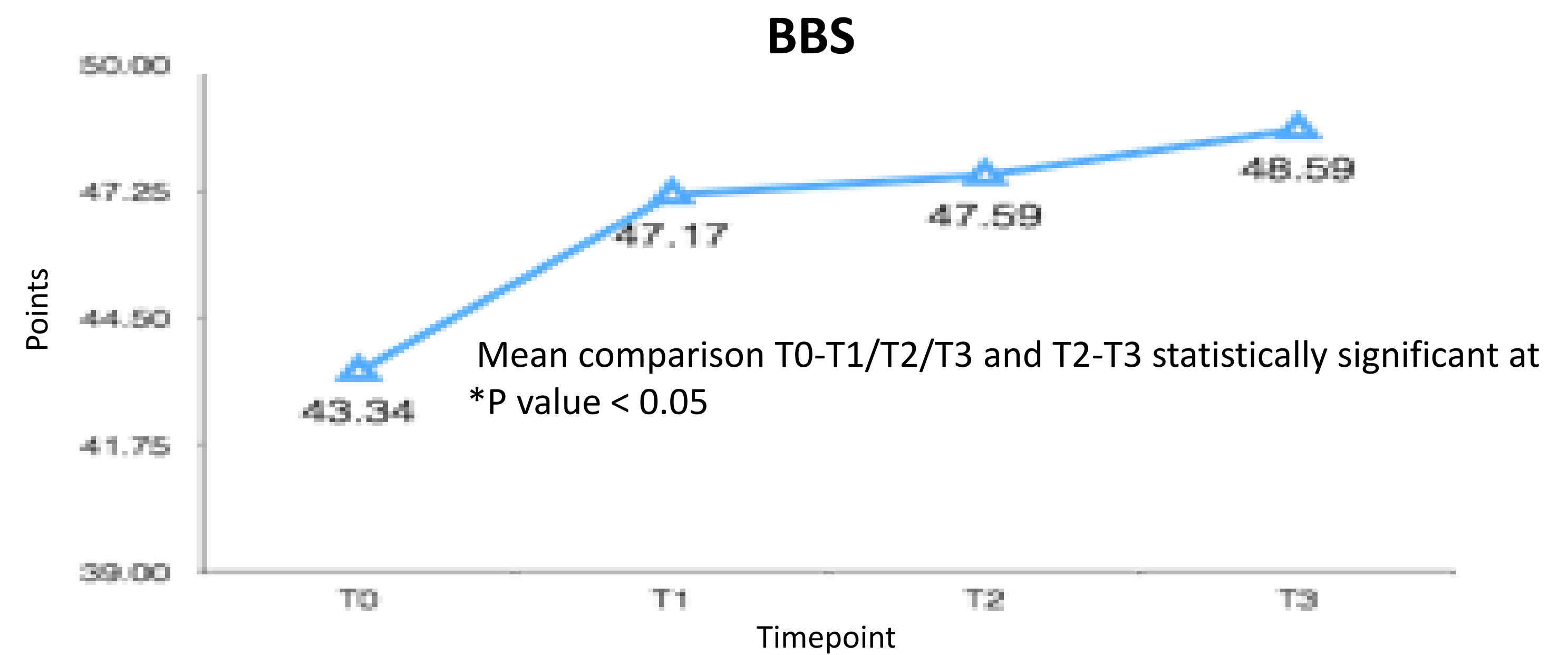
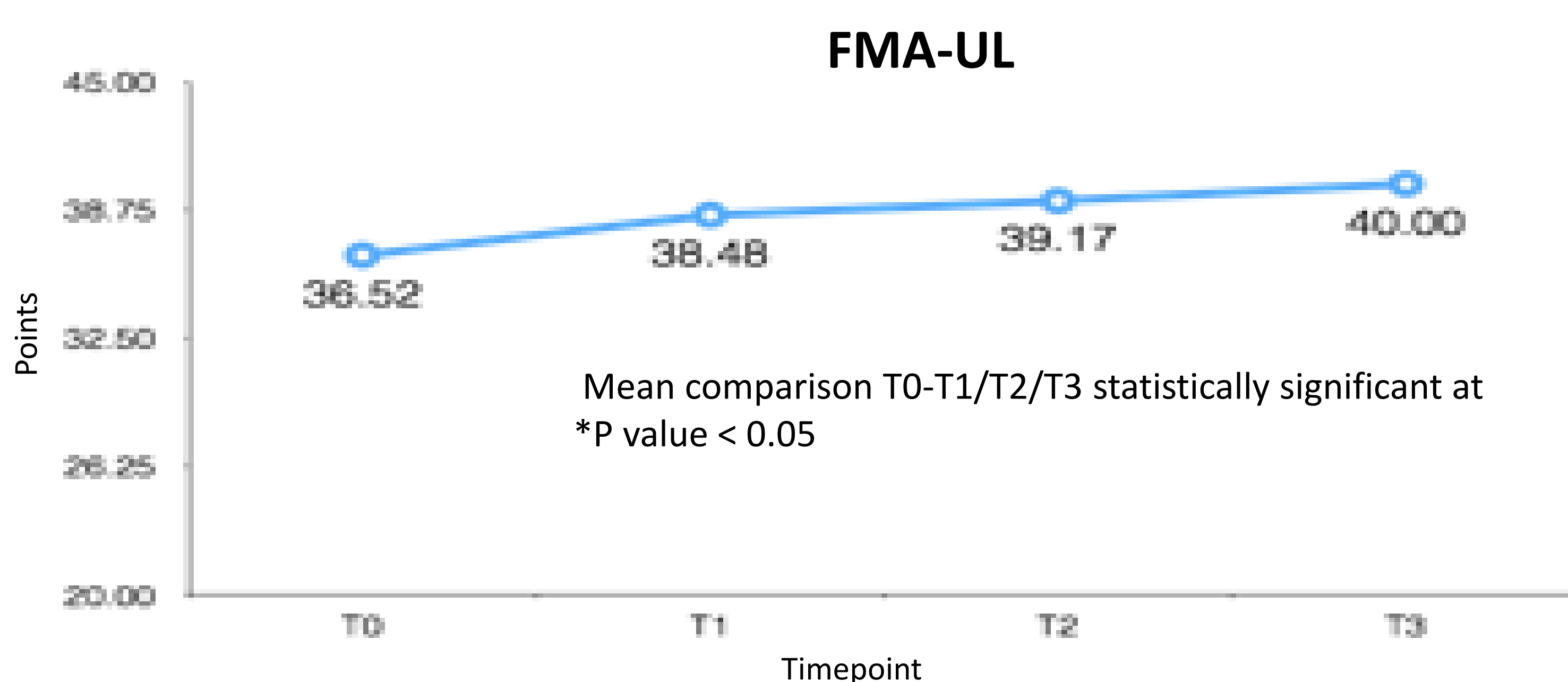


Outcome measures:

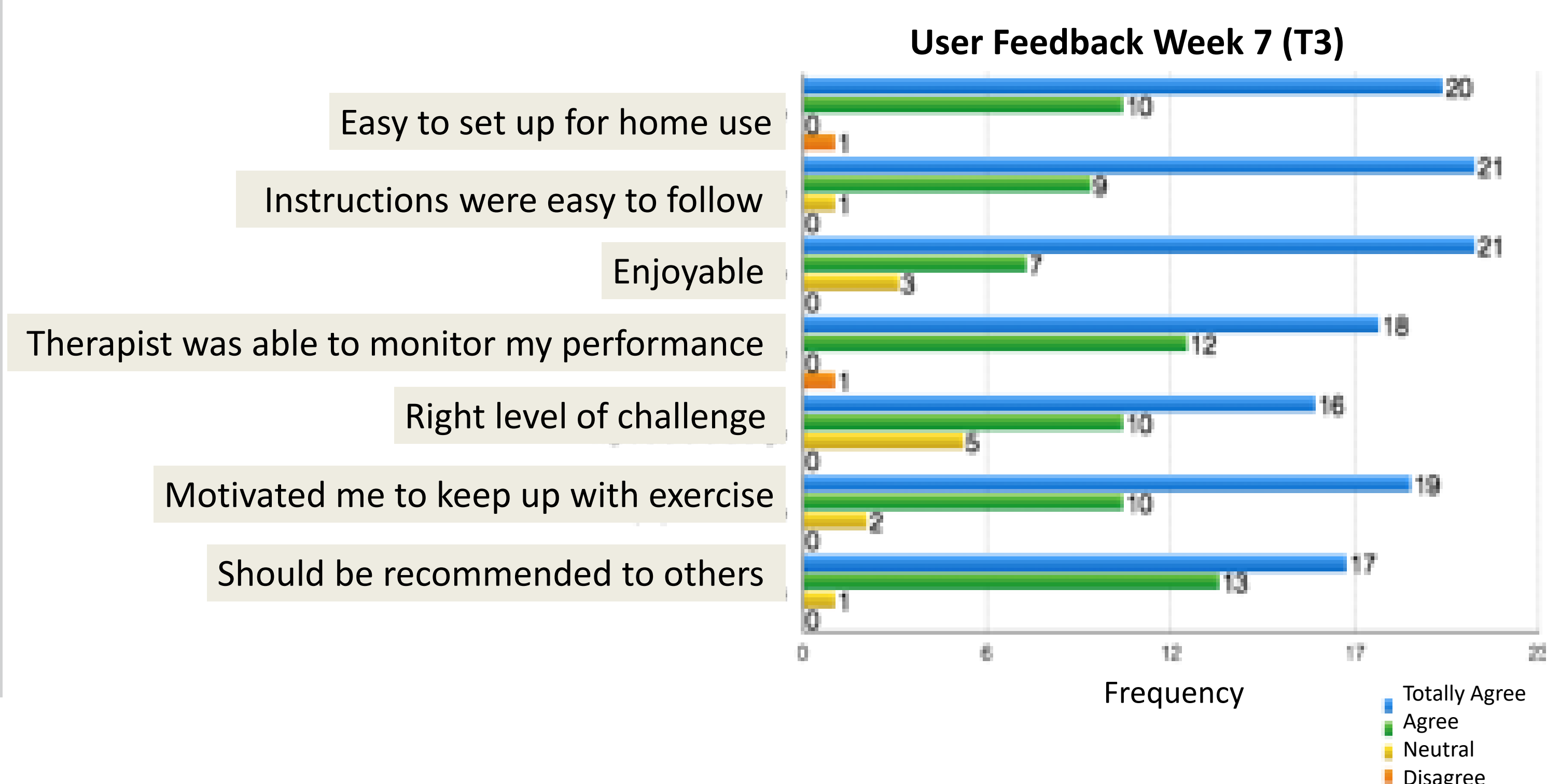
- Fugl-Meyer Upper Limb Motor Assessment (FMA-UL)
- Berg Balance Scale (BBS)
- 6 minutes Walk Test (6MWT)
- 10 metres Walk Test (10mWT)
- Pain Score
- Stroke Self-Efficacy Questionnaire (SSEQ)
- User Feedback

RESULTS

Total recruited	n=35
Drop-out	3 (due to non-related medical issue, personal interest)
Age, mean(SD)	55.91 (11.36) years
Gender, n(%)	Male: 24 (68.6); Female:11 (31.4)
Ethnicity, n(%)	Chinese: 30 (85.7); Malay: 2 (5.7); Indian: 1 (2.9); Others: 2 (5.7)
Education, n(%)	Primary: 5 (14.3); Secondary: 3 (8.6); ITE: 3 (8.6); Polytechnic: 5 (14.3); Tertiary: 19 (54.3)
Post-stroke duration, median (IQR)	311.00 (633.00) days
Infarct, n(%)	14 (40.0)
Haemorrhage, n(%)	61 (60.00)
Gaming experience, n(%)	No: 13 (37.1); Yes: 22 (62.9)



Mean comparison T0-T2/T3 statistically significant at *P value < 0.05
No significant difference between T2-T3



DISCUSSION AND CONCLUSION

Virtual reality-based training system with remote home monitoring was well received. Based on 60mins duration of a clinic session, 573hours were saved during the home phase training based on reduced clinical time spent. 6MWT met Minimally Clinically Important Difference (MCID) of 34.4m; whilst no significant difference for 10mWT. Effects of intervention maintained post 1-month. Resources are required for Jintronix setup at home and managing technical issues.

Complementary VR telerehabilitation at home with Jintronix, with a trained caregiver and remote therapist monitoring, is a feasible and acceptable approach for post-stroke physical rehabilitation.

This approach can potentially lead to cost-savings for both patients and the healthcare institution.

Medication Supply Verification in the Clinics by our Patient Service Associates

Medication Supply Verification

Pharmacy Department, TTSH

Background

Traditionally, medication supply ordering was performed only when patients arrived at pharmacy by either pharmacists or pharmacy technicians. However, this has caused needless wait for patients and high medication rework rate at the pharmacy.

Intervention

As part of the TTSH Outpatient Journey Transformation, the Medication Supply Verification (MSV) process was shifted upstream into the clinics. Now, the process is performed post-consult, at the MSV counters located within the Specialist Outpatient Clinics (SOCs). In addition, the MSV process, traditionally performed by Pharmacy Technicians, can now also be performed by Patient Service Associates (PSA) who have been upskilled and certified competent in MSV via a structured training framework.



Results/Outcomes

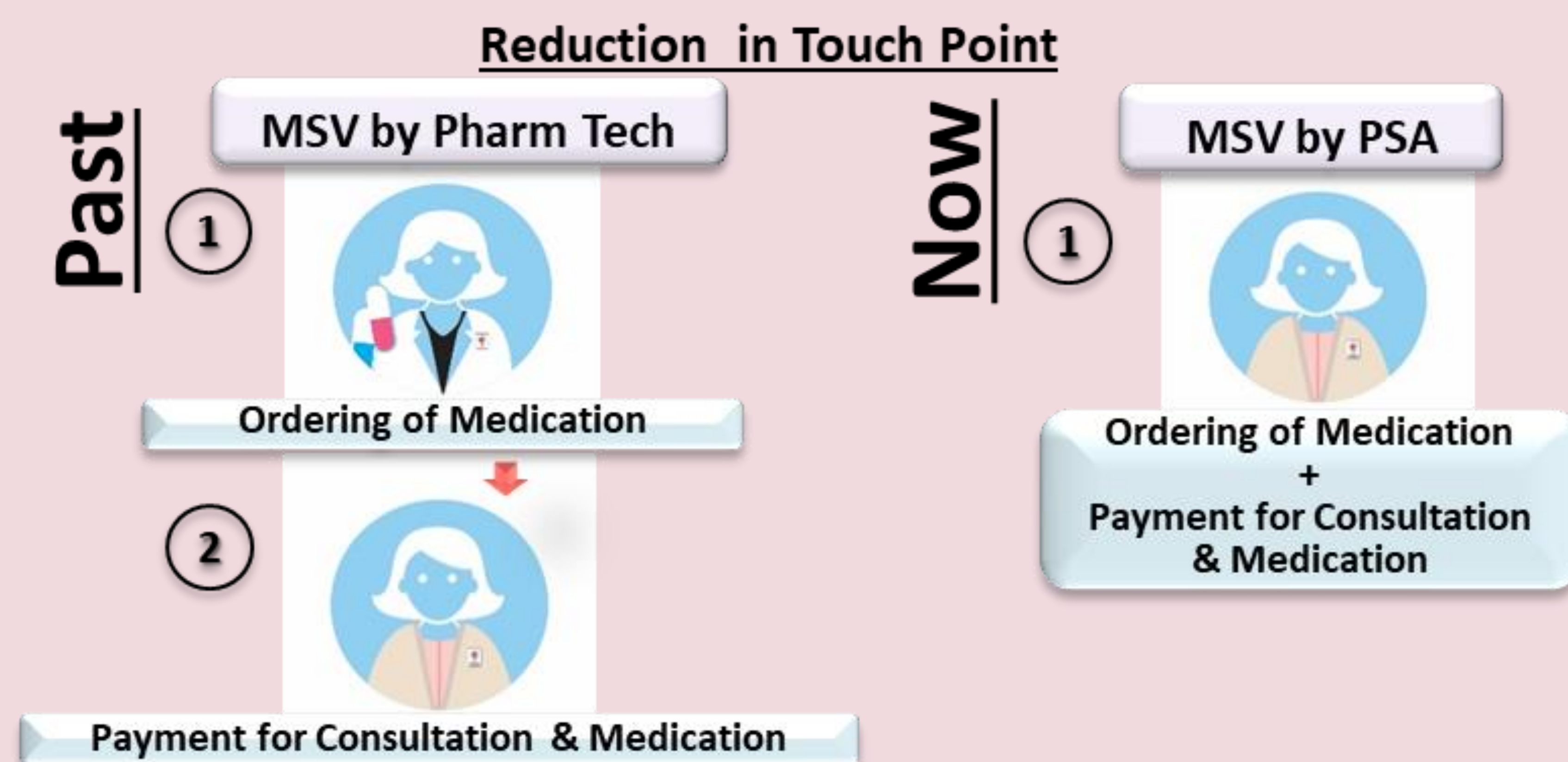
In line with TTSH's Better Care strategic focus, this initiative improves patient experience through the following:

1.Reduction in wait time at the Pharmacy – 88% of patients experience wait time of less than 15 minutes, up from previous 47%, due to:

- Commencement of medication packing process while patients are still at the SOC
- Initiation of prescription interventions with the prescribers earlier at the SOC, if any

2.Reduction in touchpoints as the PSAs can perform both MSV and billing (consultation and medications) at the MSV counter in the SOC, also facilitating One-Bill process for patients

3.“First time right” quality in fulfilling prescriptions by obtaining the supply quantity patients prefer before packing commences, thus reducing reworks at Pharmacy



At the same time, **upskilling the PSAs** to carry out basic clinical responsibilities such as MSV empowers them and value adds to their work. Such job redesigning efforts improve staff morale and contribute strongly to TTSH's Better People strategic focus.

Directly-Observed Therapy for Antiretroviral Therapy in Non-adherent HIV Patients

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Drug Adherence Programme (DAP)

Pharmacy Department, NCID, TTSH

Background

The advent of highly-active antiretroviral therapy (HAART) has revolutionised HIV treatment with significant decrease in AIDS-associated mortality. Adherence to HAART is essential to optimizing HIV control, but remains a major challenge, even in the local setting. Poor adherence is associated with increased viral load, development of drug-resistant HIV-strains & disease progression. Barriers to adherence with HAART are complex and include a myriad of patient-, regimen-, & system-related factors. Many behavioural interventions have been developed to support adherence such as adherence case management, counselling, pharmacist-based education, telephone support, reminder devices, & home visits by nurses.

Pharmacist-led Drug Adherence Programme (DAP) at NCID advocates patients' adherence to HAART through education and counselling, monitoring of side effects, as well as implementing various interventions such as provision of pillboxes, regular pill count, promote use of phone alarm reminders or smart phone applications. Despite its best efforts and interventions, a fraction of our patients are not able to achieve good adherence and virologic suppression.

Building on the success of directly observed therapy (DOT) for the treatment of tuberculosis, DOT was proposed and implemented in this challenging group of patients.

Intervention

The DOT programme is targeted at patients who are not able to achieve viral load suppression despite multiple interventions by DAP pharmacists, doctors, nurses and medical social workers. If the patient is unable to make it for the session, the patient will be contacted and consumption of HAARTs will be confirmed over telecommunication (text or call). For patients who default DOT sessions, pharmacist will follow up by actively contacting patients and engaging them to return.



Eligible patients are identified by their infectious disease physician, DAP pharmacist or medical social worker to enrol into the DOT programme for HAART.

Enrolled patients attend DOT session with DAP pharmacist daily. Medications are either pre-packed by pharmacist or brought by patient in daily pillboxes

The pharmacist will review the physical medications and then supervise the administration of the medications, ensuring that the patient swallowed the medications

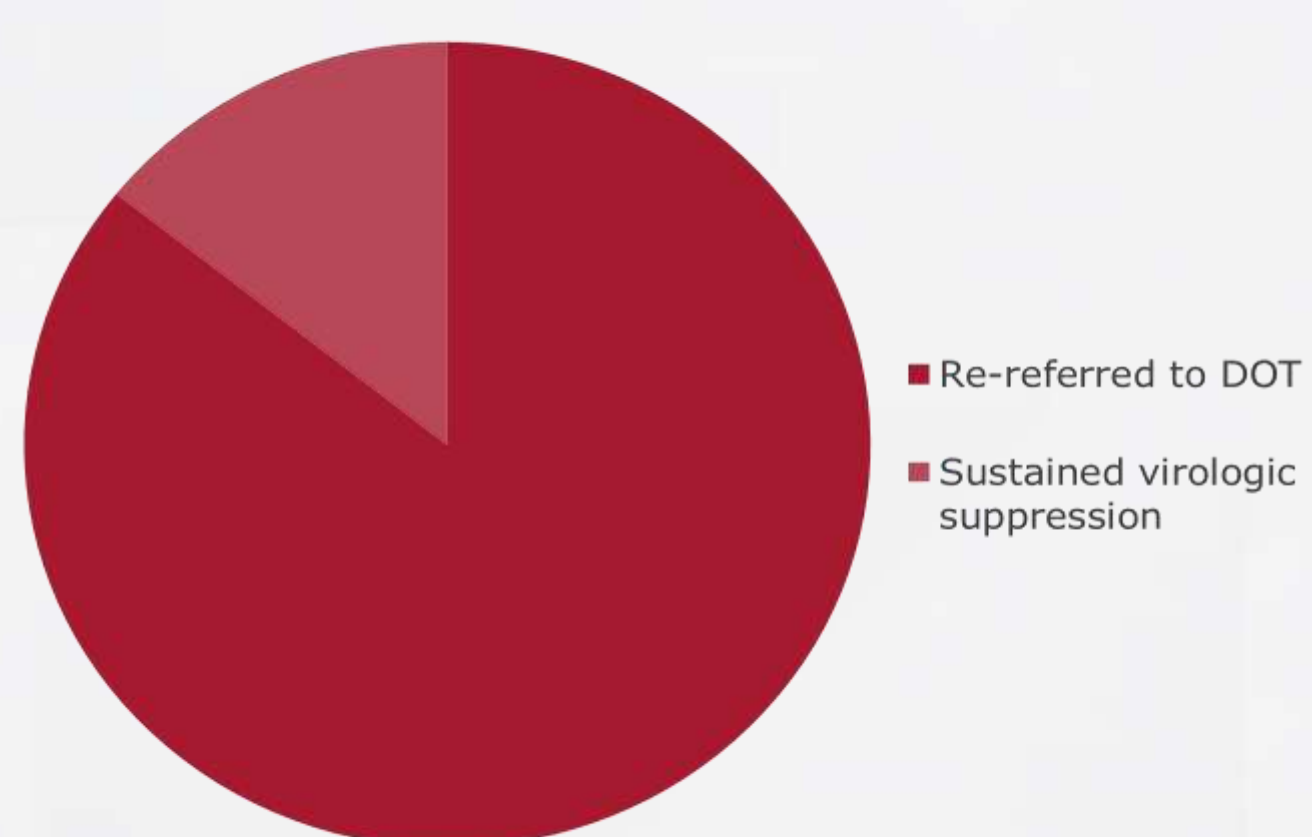
Results

Since its initiation on February 2016, the programme has received 25 unique patient referrals (total of 27 referrals) for on-site HAART DOT. A summary of referrals and discharges are as followed.

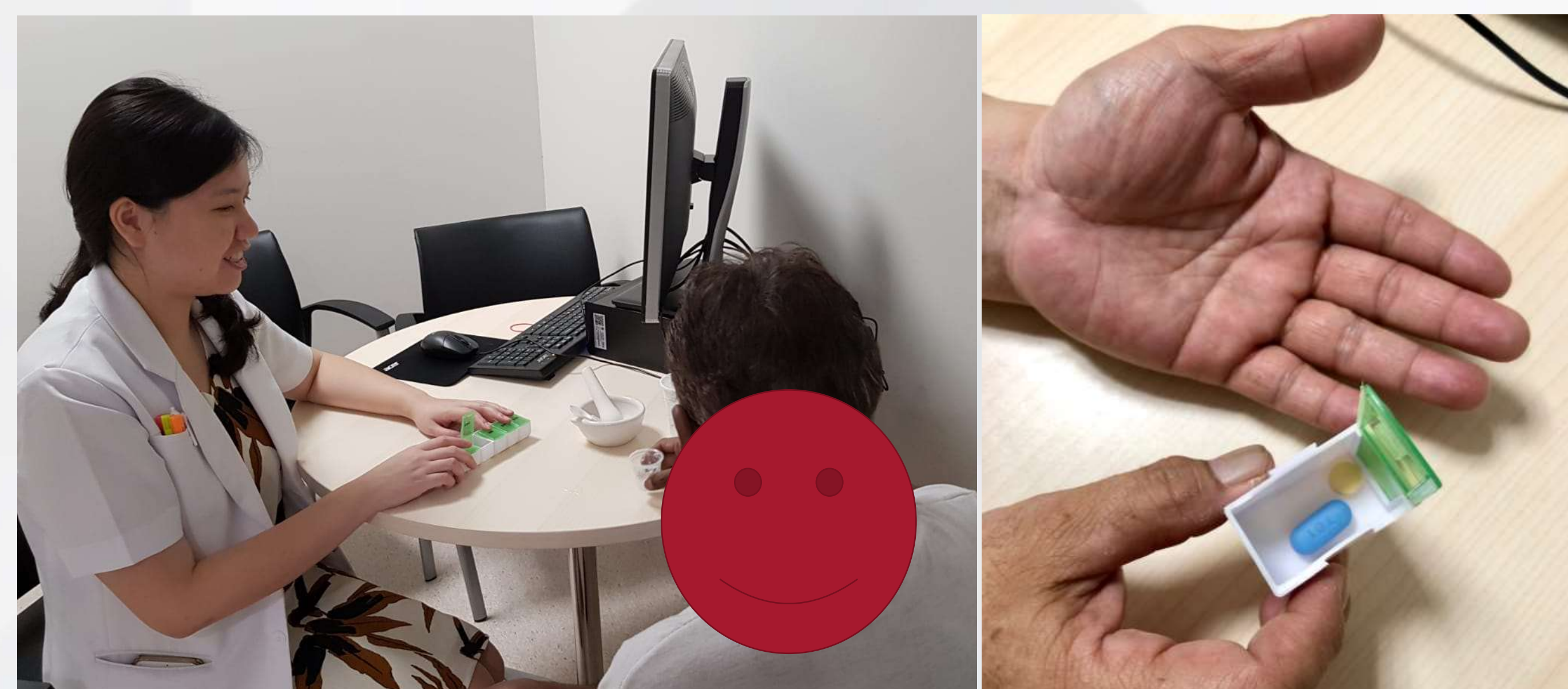
	2016	2017	2018
Number of referrals	12	6	9
Number of discharges	3	2	1
Number of patients who dropped out due to poor attendance	3	5	5

6 patients were discharged from the programme since its initiation. In the group of successfully discharged patients, only 1 (16.7%) patient was re-referred to DOT due to viral rebound and non-compliance. The remaining 5 patients achieved sustained virologic suppression post discharge.

Patients discharged from DOT



As of 31/12/2018, there are a total of 8 patients who are actively attending the HAART DOT programme. 6 out of 8 patients (75%) achieved suppressed viral load and are currently maintaining good attendance with HAART DOT.



Even though the drop-out rate of the programme is high at 52%, for the 48% who remained in the programme, sustained virologic suppression were observed in these challenging group of patients who had inability to achieve viral load suppression before.

High drop-out rates were also investigated. Inability to attend DOT on-site due to work and social commitments was stated as main reason for non-attendance. In light of these challenges faced, a new branch of DOT, tele-DOT, was then initiated to conduct DOT over a video conferencing device such as smartphones.

Conclusion

The successful implementation of HAART DOT at NCID has managed to reach out to a population of recalcitrant defaulters who are non-adherent to HIV treatment. In spite of the favourable results, more can be done to improve and reinvent the service.

Moving forward, the team will be working on examining the root causes of high drop-out rates and designing measures to improve DOT attendance.

Improving Medication Error Rates and Efficiency of Drug Top-up & Return Processes at Tan Tock Seng Hospital Outpatient Pharmacy

Improving Medication Error Rates

Pharmacy Department, TTSH

Background

In a busy pharmacy like TTSH's Outpatient Pharmacy which handles more than 2400 prescriptions a day, drug top-ups and returns to drug bins are common. Traditionally, these manual processes are manpower-intensive and error-prone despite best verification efforts in the forms of 2-staff verifications and Weekly Shelf Checklist where shelf In-charges check drug bins on a regular basis for potential error in bins. Even so, 3.4 near misses have been recorded monthly on average, with 2 leading to dispensing errors between August 2016 and July 2017. There is hence an urgent need for an intervention to improve the medication error rates and efficiency of such processes to ensure better care.

Intervention

Having previously done a process redesign to the manual sorting process which reduced sorting time from 2 hours to 30 minutes, the TTSH Outpatient Pharmacy adopted technology as an intervention, a crucial next-step in accordance with the TTSH Innovation Cycle.

The team developed an in-house electronic system which tapped on QR codes and commercial barcodes to improve the drug top-up process. Scanning a bin's QR code reveals image of the matching drug on screen, while at the same time, allows for drug verification by cross-checking against the commercial barcodes scanned.

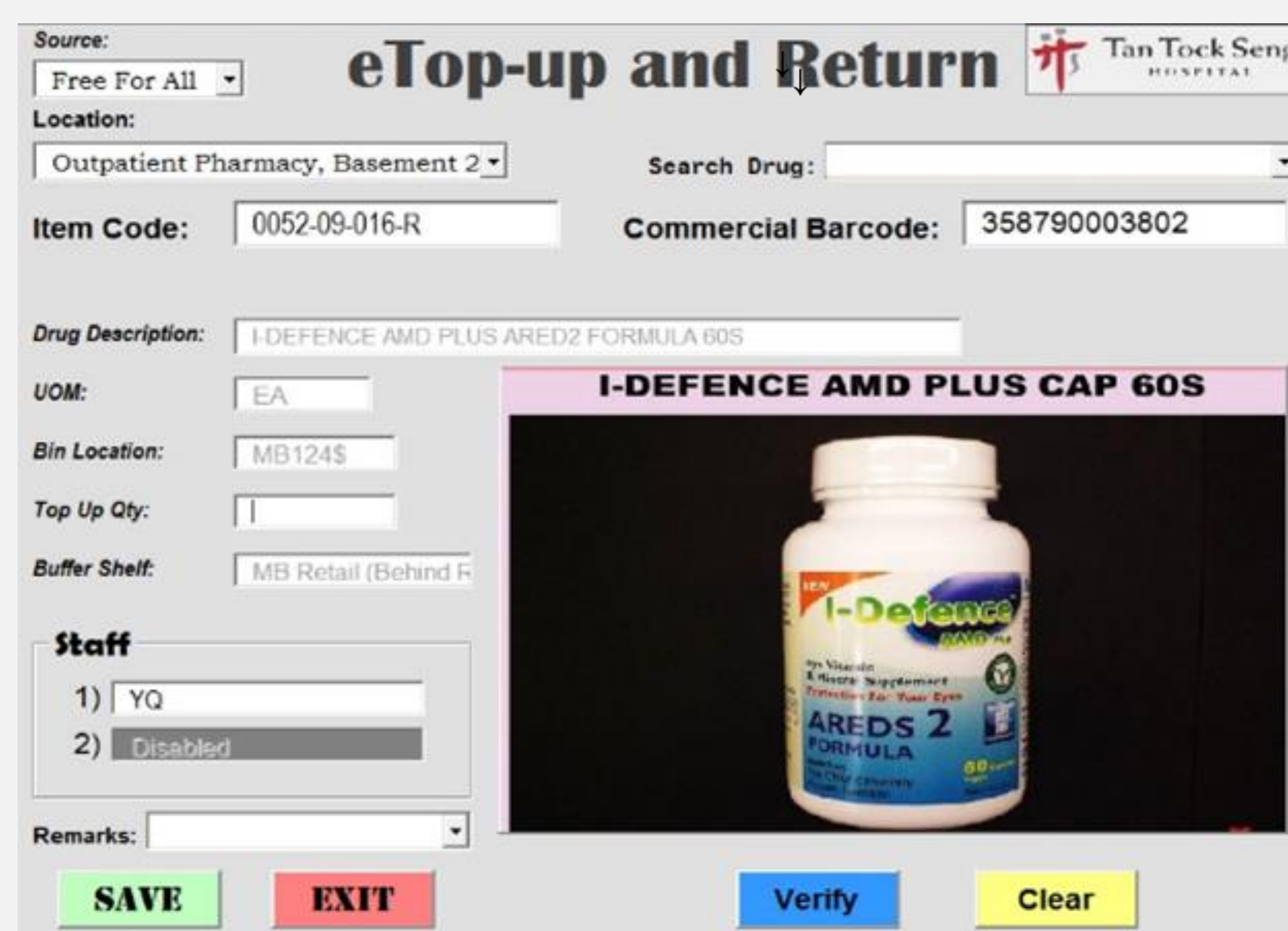


Figure 1. Screenshot of software with drug image after scanning a drug bin's QR code

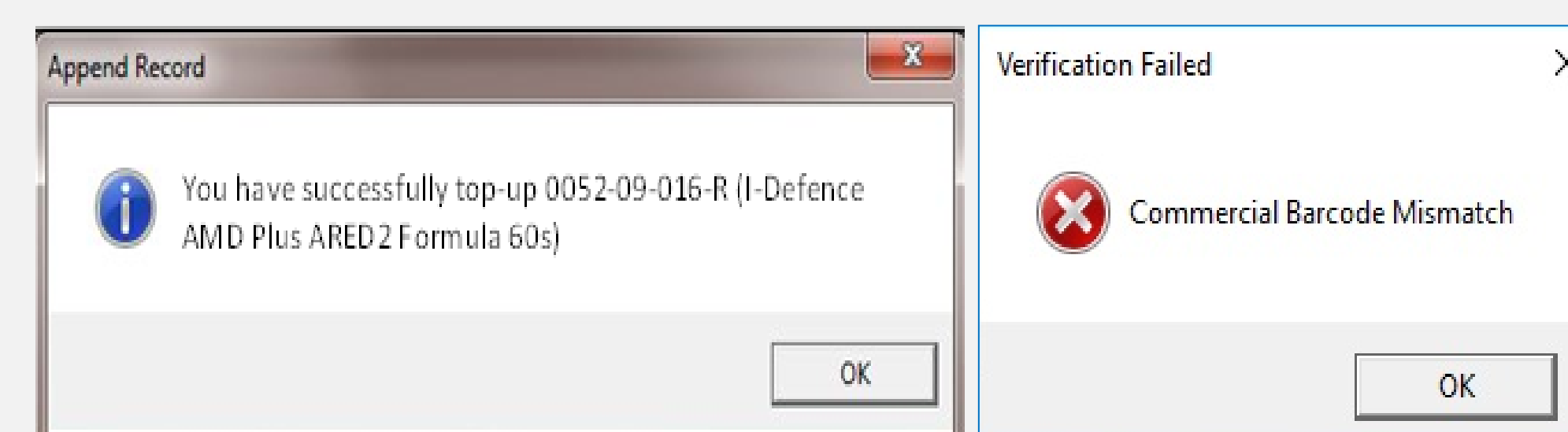


Figure 2. Notifications of Successful and Unsuccessful Drug Verifications

For drug returns, the drug image verification mode supported by the in-house electronic system has been useful in improving both accuracy and efficiency of the process as well.

Results / Outcomes

Drug top-up process

Dual e-verifications via drug images and commercial barcode for drug top-ups removes the need for a second staff as the counter-checking witness, who can be redeployed to better support the team in serving patients.

Following system implementation,

•Average top-up time per drug: 3.74 minutes → 2.09 minutes (**44% reduction**)

Drug return process

•Return time per drug: 2.25 minutes → 1.735 minutes (**23% reduction**)

Near misses

•Near misses per month: 3.4 → 1 instances (**70% reduction**)

Conclusion

In all, the electronic system developed in-house has contributed greatly to better care for patients by:

1.Reducing instances of near misses which may lead to dispensing errors and compromising patient safety

2.Reducing drug top-up and return time as well as freeing up 1 drug top-up manpower for other value-added work

Fun Knee™: Novel Total Knee Replacement Rehabilitation using “Gamification” and Motion Sensor Technology

Ashton Neoh, Li Kun Man, Khaw Xin Yue, Joshua Tan

Fun Knee™

Physiotherapy Department, TTSH

Total Knee Replacement (TKR) is one of the most common elective surgeries performed globally. In TTSH, over 600 TKRs are performed annually. Rehabilitation exercises are crucial for optimising recovery of knee movement and function post-operatively.

Our data showed that 65% of patients had reduced knee straightening range, and 25% of patients had reduced knee bending range between discharge and outpatient physiotherapy review. Poor knee range can perpetuate pain, cause activity limitations, and delay independence. Root cause analysis showed reduced exercise effectiveness and compliance as key problems patients face.

In collaboration with NTU-LILY engineers, we developed a mobile game application that is synchronized to a self-designed, motion-sensing knee sleeve. Fun Knee™ guides patients to perform four key rehabilitation exercises more accurately post-discharge. Mid-term analyses of our pilot, clinical study suggest favourable objective and subjective outcomes. Preliminary data suggests that Fun Knee™ facilitated pain reduction and knee range improvement that are comparable to usual care.

Clinical Study Preliminary Outcomes

Fun Knee™ intervention initiated in post-op TKR patients during admission

- 32 patients, aged 65 ± 6.4 years old
- Clinical outcomes on first outpatient physiotherapy review:

	Fun Knee™ (n=15)	Usual Care (n=17)
Pain (NRS)	4 / 10	5 / 10
Knee Extension (°)	-7	-8
Knee Flexion (°)	102	99
Function (PSFS)	7 / 10	6 / 10

NRS: numerical rating scale, PSFS: patient-specific functional scale

- Rehabilitation experience survey in patients who used Fun Knee™:
 - Majority found hardware and software comfortable and easy to use
 - 69.2% found 2 sessions of learning to use Fun Knee™ adequate
 - 61.5% were confident to independently use Fun Knee™ at home
 - 77% felt moderately to very supported in their rehabilitation post-discharge

