

## **Project Title**

A Multimodal and Multisensory Library for Patients In Critical Care

## **Project Lead and Members**

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## **Organisation(s) Involved**

National University Hospital

## **Healthcare Family Group(s) Involved in this Project**

Allied Health

## **Applicable Specialty or Discipline**

Occupational Therapy

## **Project Period**

Start date: August 2021

Completed date: September 2022

## **Aim(s)**

1. Introduction of a novel multimodal and multisensory library with portable equipment available for loan to suitable patients to create a conducive sensory experience and provide individualized psychosocial rehabilitation within the confines of the CCU.
2. Overcome OT manpower limitations through harnessing the strengths of collaborative practice (using existing staff members in ward and caregivers), thereby increasing patient engagement time with the equipment.

## **Background**

See poster appended/ below

## **Methods**

See poster appended/ below

## **Results**

See poster appended/ below

## **Conclusion**

See poster appended/ below

## **Project Category**

Care & Process Redesign

Value Based Care, Functional Outcome

## **Keywords**

Critical Care, Occupational Therapy, Multimodal, Multisensory

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# A multimodal and multisensory library for patients in critical care

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## Problem and background

While patients in critical care units (CCUs) have their physical needs taken care of, the psychosocial and emotional needs of patients in critical care units are often overlooked. During the COVID pandemic, further visitation restrictions limited social engagement for these patients. As such, the stay in critical care units may be a primary traumatic experience, increasing the risk of developing long-term psychosocial and emotional problems, and prolonged hospitalization.<sup>1</sup>

Comparing literature to our current practice, we noticed 2 gaps:

### Underoptimized Non-Pharmacological Approaches

The current open ward concept in the CCU is not fully conducive for individualized non-pharmacological approaches for psychosocial rehabilitation (e.g. sensory stimulation and leisure engagement).

### Underoptimized Occupational Therapy (OT) Services

While OT psychosocial interventions in CCU are beneficial as part of a multidisciplinary approach, there is lack of service provision due to a lack of required equipment and manpower, with the traditional concentration of physical rehabilitation in the post-CCU phase.

## Solutions

A two-pronged solution was proposed:

- 1) Introduction of a novel multimodal and multisensory library with portable equipment available for loan to suitable patients to create a conducive sensory experience and provide individualized psychosocial rehabilitation within the confines of the CCU.
- 2) Overcome OT manpower limitations through harnessing the strengths of collaborative practice (using existing staff members in ward and caregivers), thereby increasing patient engagement time with the equipment.

The library comprises:

### • Snoezelen® Multi-Sensory Environment

Snoezelen® sensory equipment has been proven to reduce agitation and anxiety, engage the user, stimulate reactions and encourage communication.<sup>2</sup> This is feasible to calm patients, divert their attention from physical pain, manage their stress and promote sleep hygiene.<sup>3</sup>

### • Oculus Virtual Reality (VR)

VR is effective for relaxation and stress reduction (Pizzoli, et al., 2019). The VR feature of the Oculus enables patients in critical care to experience nature, undergo guided relaxation and participate in games of interests within the confines of the setting.

### • Tobii Dynavox:

The Tobii Dynavox, an augmentative and alternative communication (AAC) device is proposed to facilitate effective communication between patients (i.e. with difficulties verbalizing or writing) and healthcare professionals and/or family members. It has an eye gaze feature to assist patients in expressing themselves, encouraging early social engagement.



Figure 1. Multisensory library (left to right): Snoezelen Sensory equipment, Oculus Virtual Reality, Tobii Dynavox

## Implementation

**Pilot duration:** August 2021 to September 2022

### Phase 1

**Staff Training:** A smaller group of OT champions who worked in CCUs were trained. Instructions for use are provided for ease of reference.

**Assessing success:** Equipment was piloted in smaller number of wards and processes refined with ongoing feedback from stakeholders

### Phase 2

**Pilot extended:** Equipment piloted in more wards and staff training extended to more healthcare professionals.

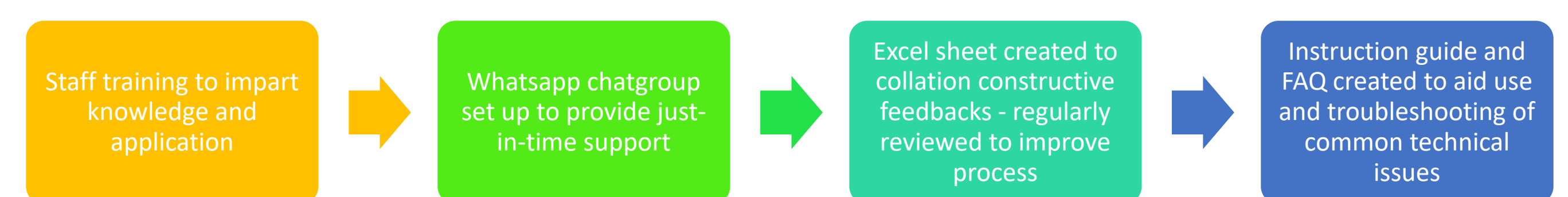


Figure 2. Ongoing process improvement from stakeholder feedback

- ✓ 11 OT, 3 physiotherapists, 1 therapy assistant and 2 caregivers were trained

### Patient population (N=11 patients)

- 7 patients from CCU; 4 from general wards
- Inclusion criteria: Able to express themselves and had  $\geq 1$  or more of the following:
  - ✓ Delirious or disoriented
  - ✓ Appears to have low motivation, low mood or anxious thoughts

## Outcomes and projections

Table 1. Psychosocial factors addressed with use of library equipment (N= No. of sessions)	Pre-implementation n(%)	Post-implementation n(%)
No. of OT sessions conducted	15	32
No. of OT sessions addressing psychosocial factors	nil	32 (100%)
Negative affect/ low motivation E.g., Agitation, low motivation, low mood, low arousal	14 (73.7%)	4 (12.5%)
Positive affect/mood E.g., Calm, smiling, giggling, expressing thanks and requesting for more sessions	2 (10.5%)	28 (87.5%)

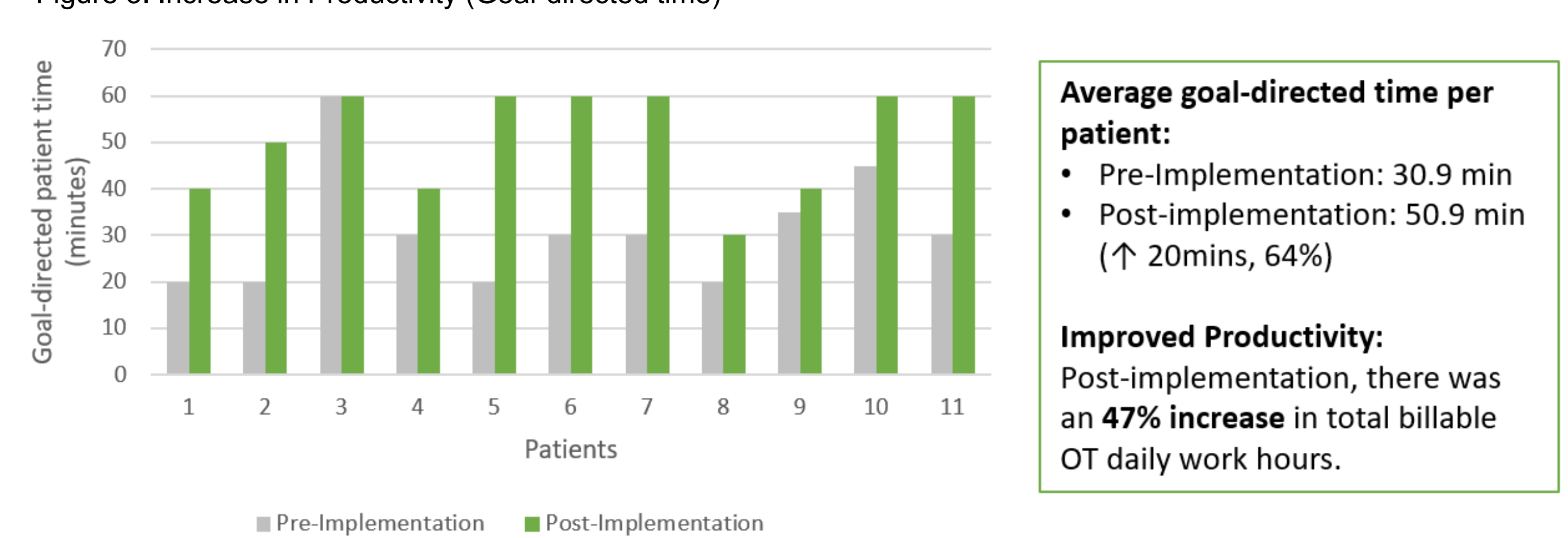
### Improved Psychosocial Factors:

- Sessions with negative affect or low mood:  $\uparrow$  61.1%
- Sessions with positive affect/mood:  $\uparrow$  77%

### Productivity and Cost Savings

- 15.2% reduction rate of declined sessions  $\rightarrow$  reducing the non-billable patient-related time by **20 minutes, or 5% of OT daily work hours saved.**
- The reduction of negative emotions  $\rightarrow$  reducing the non-billable patient-related time and non-goal directed time by **100-150 minutes, or 23.8 – 35.7% OT daily work hours saved.**

Figure 3. Increase in Productivity (Goal-directed time)



### Reference

1. Myers, E.A., Smith, D.A., Allen S.R., & Kaplan, L.J. (2016). Post-ICU syndrome: Rescuing the undiagnosed. *JAAPA*, 29 (4), 34-38.
2. Snoezelen Multi-Sensory Environments (2023). Sensory rooms and therapy explained. Retrieved from: <https://www.snoezelen.info>.
3. Christensen, G.L. (2015). Early Activities in ICU Occupational Therapy. Minnesota Occupational Therapy Association 2015 Annual Conference, USA.
4. Pizzoli, et al. (2019). User-centered virtual reality for promoting relaxation: an innovative approach. *Frontiers in Psychology*, 10, Article 479.