Project Title

Robot Therapy-An Innovative Interaction to Engage Dementia Patient

Project Lead and Members

Project lead: Tan Xiuzhuang Phyllis

Project members:

- Ms Ummu Kharr Unais Binte Abdul Rahman, Senior Staff Nurse
- Ms Tan Yi Xue, Senior Staff Nurse
- Ms Yeoh Poh Ling, Senior Staff Nurse
- Ms Nan Phoo Thandar Aung, Senior Staff Nurse
- Ms Joan Chung, Staff Nurse
- Ms Carillo Kristine Angelie Salvador, Staff Nurse
- Ms Sajor Caroline Gabatino, Assistant Nurse
- Ms Simplicio Fe Amor Dinglasan, Assistant Nurse
- Ms Hnin Su Aung, Healthcare Assistant
- Ms Tiblani Aisa Hassan, Healthcare Assistant
- Ms Lynn Shi Huiling, Assistant Manager, Admin Office / Inpatient
- Mr Adon Chan Hock Kiong, Deputy Head, Rehab Services
- Ms Chua Gek Choo (Advisor), Director of Nursing

Organisation(s) Involved

Yishun Community Hospital

Aims

To introduce NAO Robot to engage dementia patients in activities

Background

See attached

Methods

See attached

Results

See attached

Lessons Learnt

Collaboration with Innovative Partners

Multiple discussions and constructive feedback from care staff, physiotherapist, caregiver with the programmer, are imperative for the best outcome of the Robot performances.

In the planning phase, the team should consider including a design of a multi-purpose trolley on wheels (TOW) with charging facility to house 5kg NAO robot. This would enhance the ease of movement from one location to next,

Care Coordination

It is important to coordinate patient care activities among the care team to enhance patient outcome with shared observational information for this group of dementia patients.

Conclusion

See attached

Additional Information

Continuous reviewing and improving our processes are important to create a learning opportunity for all staff. The team also needs to listen attentively to the care staff and welcome any feedback constructively. Leadership support is empirical, being there to inspire and encourage the team's effort. "It does not matter how slowly you go, as long as the motivation do not stop."

Currently, one in 10 people aged above 60 in Singapore has dementia. The number is expected to go beyond 100,000 by 2020 (ST, Apr 30, 2019). Hence healthcare system could prepare during this period to apply AI solutions to increase productivity and safe care. Dementia patients require staff attention, at times one to one, hence adopting

AI solution would engage this group of patients in shorter time with lesser staffing. "It is not about Perfect, it's about effort."

Project Category

Automation, IT & Robotics, Workforce Transformation

Keywords

Automation, IT & Robotics, Workforce Transformation, Productivity, Safe Care, Dementia Patients, Patients Engagement, Time Savings, Manhours Savings, Improvement Tools, Community Care, Yishun Community Hospital, Humanoid Robotics, Distraction Therapy, Observed Emotional Rating Scale, Driver Diagram

Name and Email of Project Contact Person(s)

Name: Tan Xiuzhuang Phyllis

Email: tan.phyllis.xz@yishunhospital.com.sg

Robot Therapy:
An Innovative Interaction to Engage Dementia Patient

Tan X.Z.P.[1], Tan Y.X.[1], Unais U.K.[1], Yeoh P.L.[1], Aung N.P.T.[1], Chung J.[1], Salvador C.K.A.[1], Gabatino S.C.[1], Dinglasan S.F.A.[1], Shi, L.A.[2], Chan H.K.A.[3], Chua G.C.[3].
[1]Nursing Inpatient Ward, [2]Admin Office/Inpatient, [3]Rehabilitation Services, [4]Nursing Admin
Yishun Community Hospital

Background / AIM

Humanoid robotics was introduced and widely used in Japan Nursing Homes and Day Care Centres to engage the seniors. In Singapore, some of the nursing homes have started using Paro, a social robot with the appearance, movement and sounds of a baby seal. It is often used as a form of distraction therapy to calm persons with mood disturbance and/ or behavioural issues such as agitation. The quality of social interaction was also observed to have attributed positive impact with these robots. NAO, an autonomous, programmable humanoid robot was introduced to Yishun Community Hospital (YCH) with the capability to perform more functions as compared to Paro Seal.

- The Optic, audio and impact sensors and motors are able to detect surroundings, interpret detection and activate programmed responses.
- Able to express emotions like laughter or sadness during interactions.
- Interact and communicate to engage patients in different languages

Hello! I am Sunny

The aim of this NAO Robot project was to engage dementia patients in activities. Thus will free nursing time for other care tasks.

Methodology

There were 2 to 4 patients required one to one staff commitment to engage them. The recommended 'Paro Seal' is able to calm patient however could not engage patient with activities. Hence the team brainstormed for innovative solutions using AI to focus on targeted group of patients, review staff ratio to patients and an outcome measurement tool. The driver diagram tool mapped out the relationship between the aims, the key drivers helped to achieve and the specific interventions as shown in diagram1 and a developed a time line for plan tasks (refer table 1).
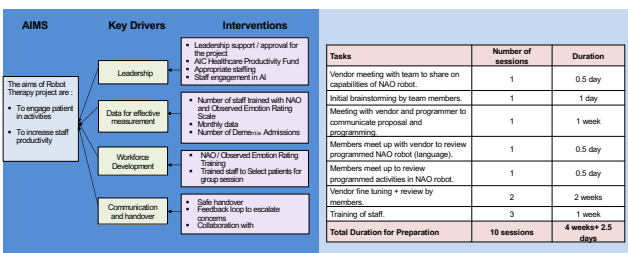
Chart 1: Key Drivers

Tasks	Number of sessions	Duration
Vendor meeting with team to share on capabilities of NAO robot.	1	0.5 day
Initial brainstorming by team members.	1	1 day
Meeting with vendor and programmer to communicate proposal and programming.	1	1 week
Members meet up with vendor to review programmed NAO robot (language).	1	0.5 day
Members meet up to review programmed activities in NAO robot.	1	0.5 day
Safe handover + review by members.	2	2 weeks
Vendor fine tuning + review.	1	2 weeks
Training of staff.	3	1 week
Total Duration for Preparation	**10 sessions**	**4 weeks+ 2.5 days**

Table 1: Timeline of planned tasks

Implementation Phase

1. Staff Training
- Steps to operate, charge and maintain NAO Robot.

2. Group session
- Pilot sessions conducted within the ward cubicle for 15 minutes.

3. Observed Emotion Rating Scale
- Staff training to use the scale.

Results

1. Observed Emotional Rating Scale

The ratings consisted of 1= Never, 2=Rarely, 3=Some of the time, 4=Much of the time and 5=Almost Always. There were improvement shown on the pleasure (↑25%) and general alertness (↑46%) scale as indicated in Chart 2. There were reduction score in both anger (↓4.2%) and anxiety/fear (↓6.3%). There was no difference to the sadness scale, refer to Chart 3.
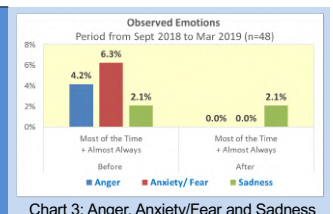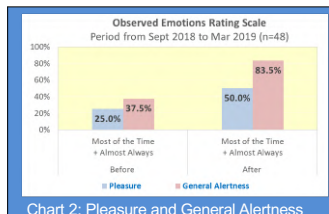
Chart 2: Pleasure and General Alertness

Chart 3: Anger, Anxiety/Fear and Sadness

2. Overall Engagement

The staff observed each patient during the NAO Robot activities and score as Yes or No. The patients with dementia were shown to engaged quickly during NAO robot activities. The Overall Engagement showed 76.3% (refer to Chart 4).

Chart 4: Overall Engagement

NAO Robot Group session in the ward cubicle

3. Feedback

Patients caregiver expressed that they enjoyed NAO Robot therapy sessions. 100% agreed that the patient was engaged during NAO Robot session.

Project Impact

The implementation of NAO Robot activities had benefitted on cost savings as indicated in Table 2.
1) Total Time saved per month = **11 hours per month**
2) Total Man-hours saved = **$4,775 per month**

Measurement	Pre-Implementation Conventional Activities	Implementation NAO Robot (Group)	Results Total Savings
Number of Patients	4 Patients	4 Patients	4 Patients
Number of RN per session	4 RNs	1 RN	3 RN per session
Minutes per session	180 Minutes per session (Individual)	15 Minutes per session (Group)	165 minutes (2.75 hour) per session
Average sessions per month	4 sessions per month	4 sessions per month	4 sessions per month
Minutes for 4 sessions per month	720 minutes (12 hours)	60 minutes (1 hour)	660 minutes (11 hours) per month
Manpower per month	16 RNs	4 RNs	12 RNs
Man-hours cost per month	$4,800	$25	$4,775 per month

Table 2: Time and Man-hours Savings

Conclusion

The number of persons with dementia is expected to go beyond 100,000 by 2020 (ST, Apr 30, 2019). Hence healthcare system should search for AI solutions to increase productivity and safe care. Applying AI solutions to engage the patients in shorter time could increase staff productivity. It is important to collaborate with innovative partners and to coordinate patient care activities to enhance patient outcome "It is not about Perfect, it's about Effort."