

Project Title

Efficacy of an Autonomous Commode to Improve Productivity, and Enhance Safety for Patients and Healthcare Providers in National Cancer Centre Singapore

Project Lead and Members

- Ho Lay Siong
- Guo Lifeng, Jane
- Tan May Leng, Mabel
- Daniel Tiang Chuanwen
- Oh Hong Choon
- Tan U Xuan
- Yuen Chau
- Franklin Tan Chee Ping
- Hsu Pon Poh

Organisation(s) Involved

Singapore Health Services, National Cancer Centre Singapore, Changi General Hospital, Singapore University of Technology & Design, Sengkang General Hospital

Healthcare Family Group(s) Involved in this Project

Healthcare Administration

Applicable Specialty or Discipline

Nursing

Aim(s)

- Achieve Fall Prevention. Enhancement of safety precaution for fall with in-built safety features to alert the patient and nurse when the patient tries to get out of the commode unassisted
- Enhance Staff's Safety. Minimise the occurrence of staff direct handling patient's excreta, that may be contaminated with the by-product of cytotoxic drugs

Background

See poster appended/ below

Methods

See poster appended/ below

Results

See poster appended/ below

Conclusion

See poster appended/ below

Additional Information

Singapore Healthcare Management (SHM) Congress 2022 – Merit Prize (Patient Experience category)

Project Category

Technology

Medtech, Robotics

Keywords

Autonomous Commode, Safety, Patients, Healthcare Providers

Name and Email of Project Contact Person(s)

Name: Ho Lay Siong

Email: singaporehealthcaremanagement@singhealth.com.sg



Background

Cancer is a major disease worldwide. The Singapore Cancer Registry Annual Report 2019 had reported near 80,000 new cancer cases over 2015-2019. There are many types of treatment for cancer, which includes chemotherapy. Depending on the protocol, drugs that are used during the chemotherapy regimen may cause patients to eliminate frequently. Hence, the commode chair is a common toilet aid found in a number of places including hospitals and nursing hospices. While the commode chair is convenient, its usage is not without cons.

Possible side effects from the treatment drugs administered may increase the risk of fall of the patient while using these commode chair. Cytotoxins contained within the chemotherapy patient's excreted fluids and waste may also cause nurses to be vulnerable to occupational exposure via aerosols or contact while handling the waste. Such exposure could cause a variety of side effects ranging from acute effects such as skin irritations, to suppressed immunity and cancer risks.

Aim

Through the deployment of the autonomous commode system at the outpatient Ambulatory Treatment Unit (ATU) of the National Cancer Centre Singapore (NCCS), the project aims to:

1. Achieve Fall Prevention

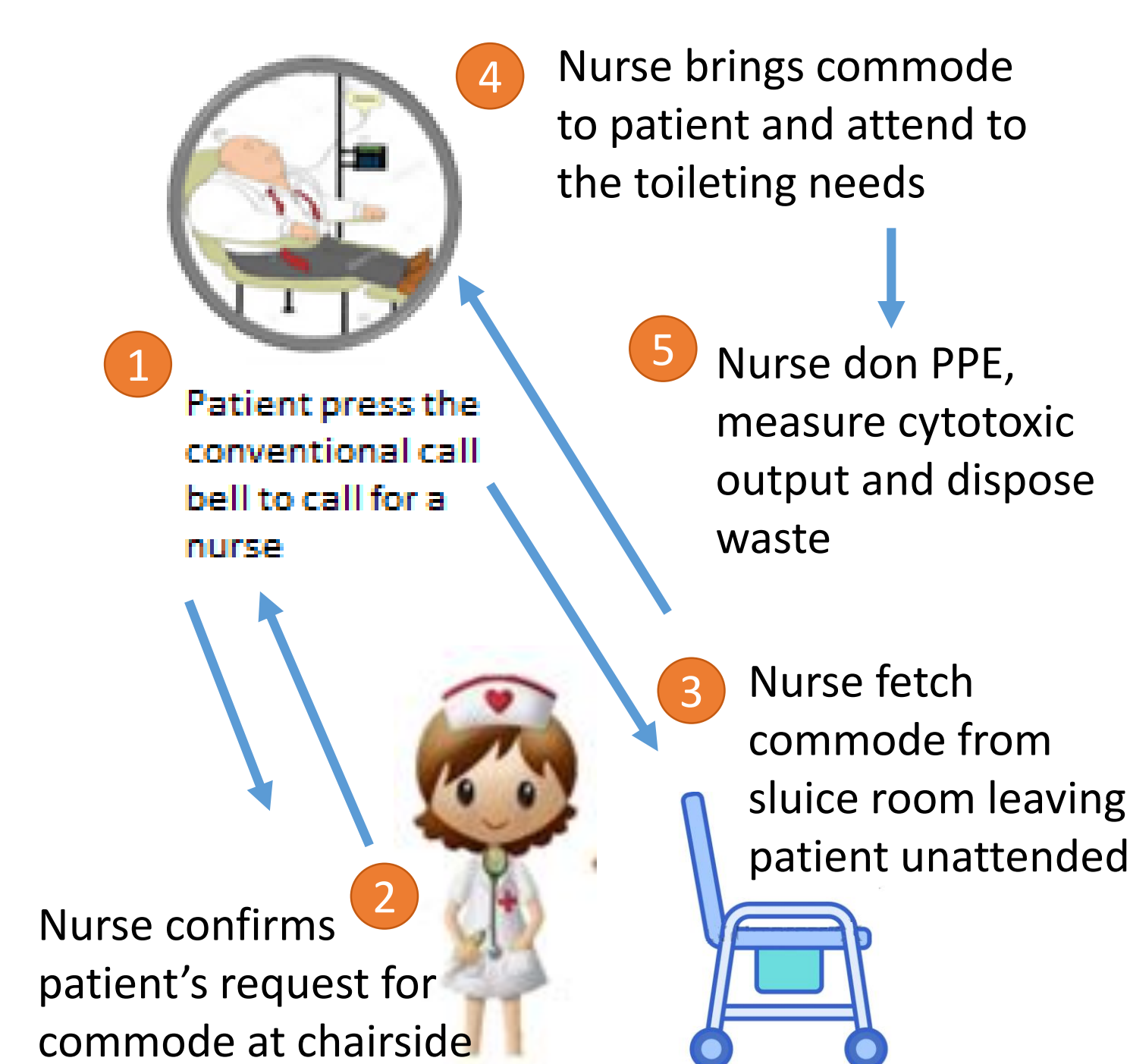
- enhancement of safety precaution for fall with in-built safety features to alert the patient and nurse when the patient tries to get out of the commode unassisted

2. Enhance Staff's Safety

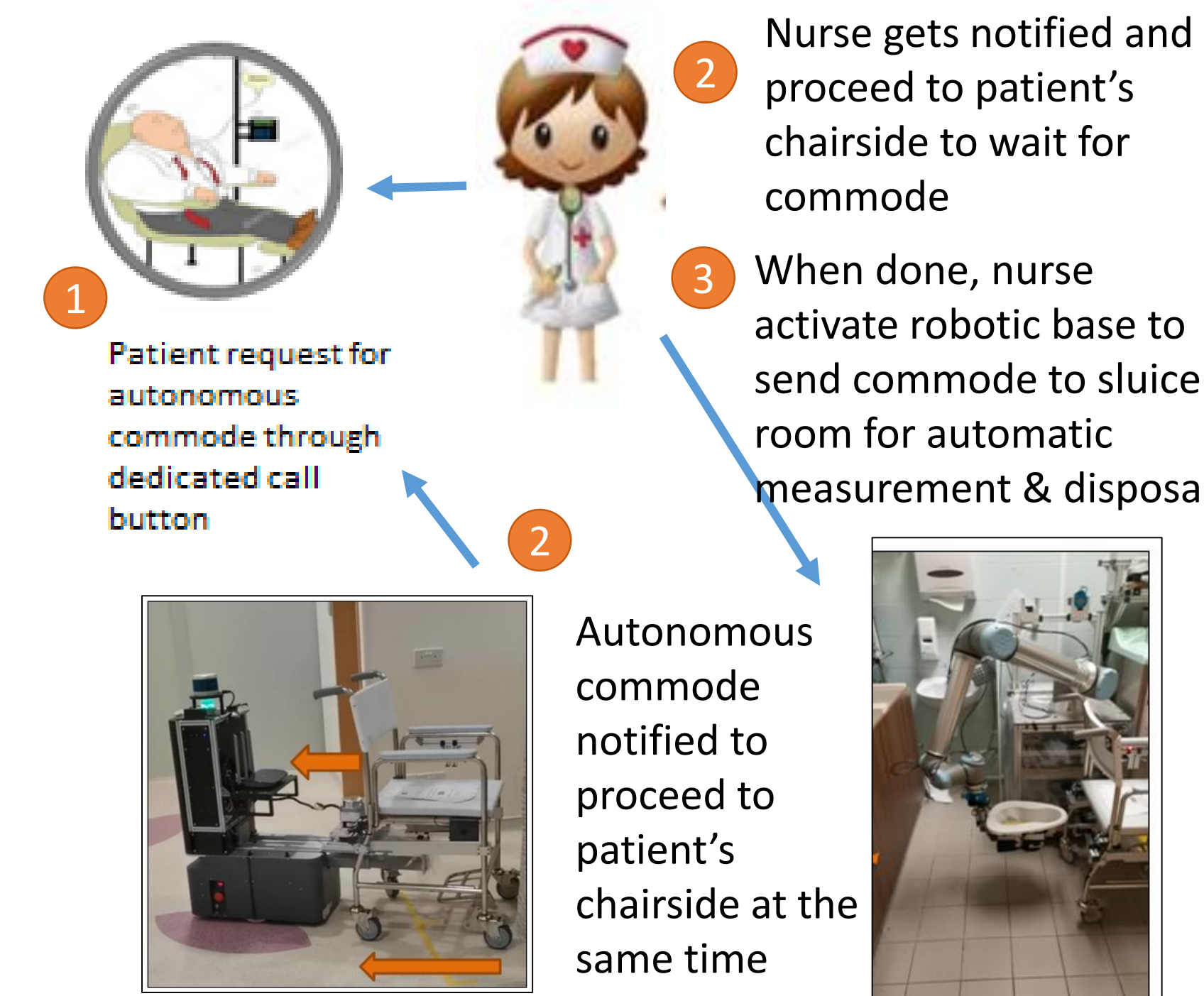
- minimise the occurrence of staff direct handling patient's excreta, that may be contaminated with the by-product of cytotoxic drugs

Workflow

Manual Commode



Autonomous Commode



Methodology

- A pre-post-test design was deployed via 4 sets of questionnaires to evaluate the satisfaction levels of staff, and patients who had used the commode.
 - Response from users on their experience of using the manual and autonomous commode were compared.
 - Response from staff on their perception of the deployment of manual and autonomous commode were also analysed.
- All questions were answered on a 4-point Likert scale ranging from Strongly Agree to Strongly Disagree.
- Questionnaire was administered either through a face-to-face interview or handled to the patients to be filled on the spot.
- Descriptive statistics were used to report the demographic information of the patients and staff.
- Independent T-Test was used for age comparison.
- Pearson's chi-square test was used to compare the satisfaction level of the use of manual commode chair versus the autonomous ones for both patient and staff divisions.

Results

Patient Satisfaction

Table 1: Patient satisfaction questions on autonomous commode and manual commode.

	Manual (N=56)		Autonomous (N=30)		P-Value
	Frequency	Percentage (%)	Frequency	Percentage (%)	
Question 1: Commode came in a timely manner					<0.001
Agree/Strongly Agree	56	100	21	70	
Disagree/Strongly Disagree	0	0	9	30	
Question 2: Commode is clean when using					1
Agree/Strongly Agree	56	100	30	100	
Question 3: Commode is safe to use					0.95
Agree/Strongly agree	54	96	29	97	
Disagree/Strongly Disagree	2	4	1	3	
Question 4: Commode is comfortable to use					0.06
Agree/Strongly agree	50	90	30	100	
Disagree/Strongly Disagree	6	10	0	0	
Question 5: Commode is easy to use					0.46
Agree/Strongly agree	55	98	30	100	
Disagree/Strongly Disagree	1	2	0	0	

Significant level at P < 0.05

P-value corresponds to the Pearson chi-square test

Staff Satisfaction

Table 2: Staff satisfaction questions on autonomous commode and manual commode.

	Manual		Autonomous		P-Value
	Frequency	Percentage (%)	Frequency	Percentage (%)	
Question 1: Commode is clean when using					1
Agree/Strongly Agree	23	100	23	100	
Question 2: Patient was safe when using the commode					1
Agree/Strongly Agree	23	100	23	100	
Question 3: If staff worry about cytotoxic waste exposure when handling patient's body excretions using the					<0.001
Agree/Strongly Agree	16	69	4	17	
Disagree/Strongly Disagree	7	31	19	83	

Significant level at P < 0.05

P-value corresponds to the Pearson chi-square test

- ✓ 97% of the autonomous commode user agreed that the commode is clean, comfortable, easy and safe to use.
- ✓ 70% of the user also agreed that the commode came timely.
- ✓ Overall satisfaction almost comparable to that of the manual commode.

- ✓ 100% of the staff finds the autonomous commode was clean and safe for patient usage.
- ✓ 83% indicated that they felt less worried of cytotoxic exposures

Conclusion

The pilot deployment of the autonomous commode system definitely free up time from the nurses in fetching and delivering the commode, which in exchange allowed the nursing team to attend to the patient almost immediately, providing timely and quality patient care. This new workflow also minimise the occurrence of injurious falls which might happen in the past while the nurses are fetching the commode. By minimising human intervention/handling of the cytotoxic waste in the whole process, nurses' risks to harmful exposures were significantly reduced. Hence, promoting greater job satisfaction and safety. The elimination of the need to don PPE in the whole process also resulted in some cost savings and minimise waste generation, which indirectly promote environmental sustainability.