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VALUE-BASED HEALTHCARE CONFERENCE 2024

22-23 AUGUST 2024

NUHS@HOME
National University Health System

A value-driven approach to substituting traditional ward-based hospitalisation with Hospital-at-Home.

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BACKGROUND

Ward-based hospitalisation has traditionally been offered to patients requiring treatment for acute care needs. However, healthcare systems worldwide are facing constraints in hospital bed capacity due to the increased demand caused by the COVID-19 pandemic and ageing populations[1]. HaH is a care model that has recently gained traction in Singapore[2], allowing the same level of care to be provided to patients in their own homes instead of in the hospital. While HaH has been shown to have comparable or better clinical and cost outcomes than ward-based care in Australia, Europe, and United States[3-6], whether such outcomes are replicated in Singapore is unknown.

AIM

This study aimed to describe the clinical and cost-effectiveness of the HaH care model in comparison to traditional ward-based hospitalization in the Singapore context.

METHOD

A prospective quasi-experimental study was conducted comparing patients admitted between January 2021 and May 2023 to NUHS@Home, a HaH programme run by the National University Health System, with equivalent patients admitted to National University Hospital or Alexandra Hospital receiving equivalent ward-based care. The key clinical outcomes of interest were 30-day readmission, 30-day ED reattendance, in-treatment mortality and 30-day mortality. The key utilisation outcomes were total length of stay (LOS) and hospital LOS. Patient reported outcomes included change in EQ-5D-5L utility values and EQ-VAS values at day 14 from baseline, and patient satisfaction scores. Cost outcomes examined were total cost and cost per bed day.

KEY FINDINGS

151 patients recruited for both HaH and in-ward care. HaH patients were older and more likely to be female. 67% of patients were admitted to HaH from the ward setting. Compared to ward-based patients, there was no significant difference in 30-day readmissions among HaH patients (RR 1.2, 95% CI 0.6 – 2.4). Unanticipated 30-day mortality rate was at 0% for both groups of patients (Table 2). HaH patients had longer total overall length of stay (5 vs 4 days, median difference 1.0, 95% CI 0.4 – 1.6), but shorter hospital length of stay (1 vs 4 days, median difference -3.0, 95% CI -3.4 – -2.6). Improvements in EQ-5D and EQ-VAS two weeks post-discharge were also similar for both HaH and ward-based patients (Table 2).

Median total costs calculated per patient was lower for HaH at $5,105.09 (IQR $3,303.36, $6,919.92) compared to ward-based patients at $6,133.70 (IQR $4,388.81, $7,853.26). Similarly, median total cost per bed day was also lower for HaH at $775.96 (IQR $622.09, $928.43) compared to ward-based patients at $1,166.10 (IQR $1,105.71, $1,257.07) (Table 2).

Table 1. Demographic

	Hospital-at-home (n=151)	Ward Care (n=151)
Mean Age (SD)	58.0 (20.9)	51.4 (21.2)
Male, n(%)	76 (50.3)	83 (55.0)
Race, n(%)		
Chinese	103 (68.2)	106 (70.2)
Malay	33 (21.9)	24 (15.9)
Others	15 (9.9)	21 (13.9)
Cohabitants, n(%)		
Lives with family	138 (91.4)	133 (88.1)
Lives alone	8 (5.3)	12 (7.9)
Lives with unrelated persons	6 (3.9)	6 (3.9)
Admission type to HaH, n(%)		
Direct Admission	50 (33.1)	-
Emergency Department	42 (27.8)	-
From Home	8 (5.3)	-
Ward Transfer	101 (66.9)	-
Diagnosis at enrolment, n(%)		
Cellulitis/ skin and soft tissue infection	65 (43.0)	55 (36.4)
Urinary tract infection	27 (17.9)	24 (15.9)
Rhabdomyolysis	24 (15.9)	36 (23.8)
Others*	35 (22.9)	36 (23.6)
Admission in the last 12 months, n(%)		
1	31 (20.5)	23 (15.2)
≥ 2	29 (19.2)	25 (16.6)

*Others: Bacteremia, dehydration, dengue fever, fall with head injury, fluid overload, gastroenteritis, hepatobiliary sepsis, hyperglycemia, hypertensive urgency, infected hematoma, intra-abdominal infections, Heart failure exacerbation, peumonia

Table 2. Clinical, Utilization and Costing Outcomes

Clinical Outcomes, n(%)	Hospital-at-home (n=151)	Ward Care (n=151)	Relative Risk (95% CI)	p-value
30-day readmission	-	-	1.2 (0.58, 2.45)	0.62
30-day ED reattendance	-	-	1.9 (0.54, 6.44)	0.33
Utilization Outcomes, Median (95% CI)			**Median Differences (95% CI)**	**p-value**
Total length of stay (days)	5.0 (4.4, 5.6)	4.0 (3.7, 4.3)	1.0 (0.4, 1,6)	0.002
Hospital length of stay (days)	1.0 (0.7, 1.3)	4.0 (3.7, 4.3)	-3.0 (-3.4, -2.6)	<0.001
HaH length of stay (days)	4.0 (3.5, 4.5)	-	-	-
Patient Reported Outcomes, Mean (95% CI)			**Mean Differences (95% CI)**	**p-value**
Change in EQ-5D utility value from baseline	0.23 (0.18, 0.29)	0.21 (0.15, 0.26)	0.03 (-0.05, 0.11)	0.50
Change in EQ-VAS from baseline	14.9 (12.0, 17.7)	13.9 (11.1, 16.7)	1.0 (-3.1, 5.0)	0.64
Cost Outcomes, Median (95% CI)			**Median Differences (95% CI)**	**p-value**
Total cost (S$)	5,105.09 (3,303.36, 6,919.92)	6,133.70 (4,388.81, 7,853.26)	-112,5.69 (-1,773.47, -172.56)	-
Cost per bed day (S$)	775.96 (622.09, 928.43)	1,166.10 (1,105.71, 1,257.07)	-377.95 (-420.44, -338.90)	-

CONCLUSION

The HaH model represents a viable and value-driven alternative to traditional inpatient hospitalisation, offering cost savings, comparable clinical outcomes, and enhanced patient reported outcomes. Expansion of HaH programmes across Asian populations has great potential to flexibly increase hospital capacity.

To our knowledge, this study is the first comparative analysis of a HaH service in Asia However, further studies are needed to determine how to effectively scale up these models of care.

REFERENCES

[1]Tan CC, Lam CSP, Matchar DB, Zee YK, Wong JEL. Singapore's health-care system: key features, challenges, and shifts. The Lancet. 2021 Sep;398(10305):1091–104.
[2]Ong Ye Kung. Healthier SG – A Movement for Singapore [Internet]. 2024 Jun 3; Singapore. Available from: https://www.moh.gov.sg/news-highlights/details/speech-by-mr-ong-ye-kung-minister-for-health-at-the-ministry-of-health-committee-of-supply-debate-2024-on-wednesday-6-march-2024
[3]Cryer L, Shannon SB, Van Amsterdam M, Leff B. Costs For 'Hospital At Home' Patients Were 19 Percent Lower, With Equal Or Better Outcomes Compared To Similar Inpatients. Health Affairs. 2012 Jun;31(6):1237–43.
[4]Leff B, Burton L, Guido S, Greenough WB, Steinwachs D, Burton JR. Home Hospital Program: A Pilot Study. J American Geriatrics Society. 1999 Jun;47(6):697–702.
[5]Edgar K, Iliffe S, Doll HA, Clarke MJ, Gonçalves-Bradley DC, Wong E, et al. Admission avoidance hospital at home. Cochrane Effective Practice and Organisation of Care Group, editor. Cochrane Database of Systematic Reviews [Internet]. 2024 Mar 5 [cited 2024 Apr 4];2024(3). Available from: http://doi.wiley.com/10.1002/14651858.CD007491.pub3
[6]Gonçalves-Bradley DC, Iliffe S, Doll HA, Broad J, Gladman J, Langhorne P, et al. Early discharge hospital at home. Cochrane Effective Practice and Organisation of Care Group, editor. Cochrane Database of Systematic Reviews [Internet]. 2017 Jun 26 [cited 2024 Apr 19];2021(7). Available from: http://doi.wiley.com/10.1002/14651858.CD000356.pub4

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