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Hospitalisation at home for bariatric patients in Singapore: A safe and cost-effective postoperative care model

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Dear Editor,

Hospital-at-Home (HaH) provides acute, hospital-level care in patients' homes and is an emerging model of perioperative surgical care. Early applications, including ileostomy dysfunction and bariatric surgery,[1] have demonstrated improved patient satisfaction, reduced length of stay, and non-inferior safety profiles.[2] While HaH has shown effectiveness in non-surgical populations, its clinical outcomes and cost-effectiveness in surgical settings remain under-explored.

With obesity projected to affect over 1.5 billion adults by 2035, demand for bariatric surgery is rising particularly in Asia,[3] including Singapore.[4] Conventional postoperative care relies on inpatient admission, placing significant strain on physical bed capacity. Enhanced Recovery After Surgery (ERAS) has been shown in meta-analyses to reduce length of stay and healthcare costs, without increasing post-operative complications.[5] These protocols have enabled same-day discharge. However, eligibility criteria remain stringent as patients are typically under 60 years old, have a body mass index (BMI) of <45 kg/m², ≤2 comorbidities, reside close to hospital, and have no perioperative complications.[6]

Despite same-day discharge pathways, many programmes still require structured post-discharge support, including home visits by nurses for up to 5.7 days or continuous remote monitoring for up to 7 days.[6,7] While ERAS facilitates early discharge in low-risk patients, it does not eliminate the need for ongoing clinical oversight. HaH, enabled by technology-supported remote monitoring and multidisciplinary care, offers a scalable approach to extend perioperative care to higher-risk bariatric patients who would otherwise require prolonged hospitalisation in a brick-and-mortar model.

A retrospective observational study was conducted to compare clinical and cost outcomes between bariatric patients managed under the HaH service and eligible patients receiving usual inpatient care at the National University Health System in Singapore. Ethics approval was obtained from the National Healthcare Group Domain Specific Review Board (2023/00245).

The types of primary bariatric surgery included sleeve gastrectomy, Roux-en-Y gastric bypass, and one-anastomosis gastric bypass. With co-management between surgeons and physicians in HaH, patients were cared for by a multidisciplinary team of nurses and allied health professionals. They received teleconsultations and compulsory wound inspection during in-person physician home visits. Dieticians were also involved in the escalation of diets, and glucose levels were closely monitored in patients with a pre-operative history of diabetes mellitus. There were no complications of hyperglycaemia or hypoglycaemia. Patients could also participate in one-on-one rehabilitation by physiotherapists for functional decline. There was also a 24/7 medical service for patients to escalate their concerns to the HaH physicians with expedited investigations, home visits, or transfer to the hospital in the event of emergencies. All patients were required to remain in hospital for 1 night before being transferred to HaH the following day.

Continuous variables were summarised as mean ± standard deviation or median (interquartile range [IQR]), depending on distribution, and compared using independent-samples t-tests or Mann–Whitney U tests, respectively. Categorical variables were summarised as no. (%) and compared using chi-square or Fisher's exact tests, as appropriate. Exploratory adjusted linear regression analyses were performed for length of stay and gross hospitalisation bill, adjusting for age, sex, procedure type, pre-operative BMI, and comorbidity count.

Among the patients eligible for HaH who were under 60 years old with no immediate postoperative complications, 39 bariatric surgery patients were

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Table 1. Patient characteristics, clinical, and cost outcomes.

	HaH cohort (n=39)	Inpatient cohort (n=36)	*P* value
Patient characteristics			
Age in years, mean ± SD	38 ± 8.9	40 ± 11.5	0.27
Male sex, no. (%)	13 (33.3)	14 (38.9)	0.64
Ethnicity, no. (%)			0.07
Chinese	5 (12.8)	12 (33.3)	
Malay	24 (61.5)	14 (38.9)	
Indian	10 (25.6)	9 (25.0)	
Others	0	1 (2.8)	
Bariatric procedure, n(%)			1.00
Gastric bypass	27 (69.2)	25 (69.4)	
Sleeve gastrectomy	12 (30.8)	11 (30.6)	
Pre-operative comorbidity count, median [IQR]	1 [0–2]	1.5 [0–3]	0.21
Pre-operative comorbidities, no. (%)			
Type 2 diabetes	10 (25.6)	12 (33.3)	0.61
Hypertension	11 (28.2)	14 (38.9)	0.34
Hyperlipidaemia	10 (25.6)	15 (41.7)	0.15
Ischaemic heart disease	0 (0)	3 (8.3)	0.11
Chronic kidney disease	1 (2.6)	1 (2.8)	1.00
Pre-operative BMI, kg/m², median [IQR]	43.2 [37.7–46.5]	43.0 [37.0–46.8]	0.92
Clinical and cost outcomes			
Total length of stay,[a] days, median [IQR]	3 [3–4]	2 [2–3]	<.001
Mortality within episode of care, no. (%)	1 (2.6)	0 (0)	1.00
30-day readmission,[b] no. (%)	1 (2.6)	2 (5.6)	0.60
30-day emergency department attendance,[b] no. (%)	3 (7.7)	3 (8.3)	1.00
Gross hospitalisation bill,[a] SGD, median [IQR]	17,876 [16,551–20,183]	20,156 [17,562–21,275]	0.02

BMI: body mass index; HaH: Hospital at Home; IQR: interquartile range; SD: standard deviation; SGD: Singapore dollar

[a] For HaH cohort, defined as the sum of conventional inpatient stay and HaH stay

[b] Defined as 30-day post discharge from either HaH (HaH cohort) or inpatient ward (inpatient cohort)

enrolled in HaH while 36 patients opted for the usual inpatient care during the period from August 2023 to April 2025. The mean age of the HaH cohort was 38 years, 2 years younger than the inpatient cohort. There were more female patients than male patients in both cohorts. Over two-thirds of the patients in both cohorts underwent primary gastric bypass procedures. HaH patients had a lower 30-day readmission rate (2.6% versus 5.6%) than those receiving inpatient care. No major postoperative complications were recorded. There was 1 death in the HaH cohort after returning to hospital for a sleeve gastrectomy leak on postoperative day (POD) 3. However, a review of the case during a multidisciplinary mortality did not reveal any failure in care, as most sleeve gastrectomy patients were discharged on POD 2 and the outcome would not have been different in usual inpatient care. The escalation of care to the hospital for emergency

reoperation was expedient. Six-month postoperative BMI was also analysed among patients with available follow-up data (n=58), with a median [IQR] BMI of 30.7 [28.4–34.0] kg/m² in the HaH cohort and 32.4 [29.5–37.7] kg/m² in the inpatient cohort, with no statistically significant difference between groups (*P*=0.208). Overall, HaH saved 90 inpatient bed-days during the study period. The main reason for rejecting HaH was personal preference for conventional inpatient care.

In exploratory adjusted linear regression analyses accounting for age, sex, ethnicity, bariatric procedure type, pre-operative BMI, and comorbidity count, HaH was associated with a longer total length of stay compared with inpatient care (adjusted difference: 1.2 days; 95% confidence interval [CI] 0.90–1.56; *P*<0.001). HaH was associated with a lower gross hospitalisation bill, although the difference was not statistically significant (adjusted difference: –SGD853; 95% CI –2119 to 412; *P*=0.183). Additional baseline health indicators, including EQ-5D-5L and STOP-Bang scores, were available only for a subset of patients and were not included in the adjusted models to avoid substantial loss of sample size and unstable estimates.

To the authors' knowledge, this is the first Asian study evaluating HaH for post-bariatric surgery recovery. The findings on feasibility and safety are consistent with existing studies on HaH. A French study of patients undergoing sleeve gastrectomy or Roux-en-Y gastric bypass discharged to HaH after 1 postoperative night reported no significant differences in early complications or readmissions. Effective outcomes were supported by close coordination between surgical teams and HaH providers.[8] Similarly, a Spanish study demonstrated shorter total length of stay in the HaH cohort compared with inpatient care, with no mortality reported.[9]

This study is limited by its retrospective design, small sample from a single health system, and potential self-selection, as patients who chose HaH may have differed in motivation, health literacy, or perceived behavioural control. The eligibility criteria may also limit generalisability to older or clinically unstable patients.

The findings support HaH as a viable, psychologically acceptable alternative to inpatient recovery following bariatric surgery in younger, tech-savvy patients. Future work will evaluate early metabolic disease control. By maintaining safety while reducing costs and inpatient bed-days, HaH offers a solution to the rising demand for metabolic surgery. Wider implementation across Singapore, and its extension to other procedures, such as cholecystectomy, should be considered with agreed surgical–HaH protocols.

Ethics statement

This study was approved by the National Healthcare Group Domain Specific Review Board (2023/00245).

Declaration

The authors declare that they have no affiliations with or involvement in any organisation or entity with any financial interest in the subject matter or materials discussed in this manuscript. There is no conflict of interest to declare.

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