


Experiences of Patients and Their Caregivers Admitted to a Hospital-at-Home Program in Singapore: a Descriptive Qualitative Study



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BACKGROUND: Hospital at Home (HaH) programs have been shown to improve clinical outcomes, quality of care, and patient satisfaction. However, how Asian patients experience HaH remained underexplored.

OBJECTIVE: To explore the perceptions and experiences of patients and caregivers admitted to a hospital-at-home program in Singapore.

DESIGN: Descriptive qualitative study design.

PARTICIPANTS: Purposive sampling was used to conduct 36 interviews with 13 patients, nine Legally Acceptable Representatives (LARs), and 14 caregivers until data saturation was achieved.

INTERVENTIONS: NUHS@Home is a HaH program providing care through a multi-disciplinary team, enabled by remote vital signs monitoring through a tablet and wireless blood pressure and oxygen meters.

APPROACH: This study used in-depth semi-structured individual interviews. Interviews were transcribed and thematically analyzed using Braun and Clark's six-step inductive approach.

KEY RESULTS: The overarching theme identified was "Enablers, difficulties, and improvements to the HaH experiences" which was supported by three key themes: (1) Perceived better care at home, (2) Importance of social support, and (3) Organizational structures required to support HaH. Participants described overall HaH experiences around factors contributing to their impeding engagement, overall satisfaction, and quality of care.

CONCLUSIONS: Although HaH is unfamiliar to the Singapore population, most of the participants in this study had an overall positive experience. The key challenges found in this paper were the stress and inconvenience caused to caregivers. The enablers for positive HaH experiences were (1) consideration of patient's family members as key participants in the patients' therapeutic alliance; (2) the HaH care team must be accessible, approachable, and reassuring, and communicate frequently and timely with patients and their families; and (3) financing

strategies to ensure HaH out-of-pockets costs remain affordable which are critical to keeping HaH as an option for patients and families.

KEY WORDS: hospital-at-home; Hospital at Home; telehealth; qualitative; interviews.

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INTRODUCTION

The Hospital at Home (HaH) care model delivers acute hospital-level care in the comfort of the patient's home as a substitute for traditional hospital care.¹ Such care models are well established in the USA, Europe, and Australia, and have been deployed to address the healthcare demand in the coronavirus disease 2019 (COVID-19) pandemic.²⁻⁴ HaH in these countries has been reported as safe by patients and caregivers^{1,5} and shown to improve patient satisfaction.⁶ However, patients' experiences of care for acute illnesses at home may vary between cultures and social support structures.⁷ Asian communities may have different attitudes towards hospitalization and home-based care, with hospitalization often treated as a standard and preferred site of care.⁸ Previous research suggested that Asian patients were more likely to rely on their healthcare providers for their recovery.⁹ A qualitative study of patients in Singapore reported similar findings, where participants "see(saw) the hospital like a hotel" and "expect(ed) everything to be done by the nurses".¹⁰

Family dynamics are uniquely different in Asian societies, where high proportions of older adults are found to be living with younger children or grandchildren. For example, most of those aged 65 years lived with children and extended families in Southeast and South Asia, and figures were more than 90% in Pakistan.¹¹ In contrast, high proportions of older adults living alone were reported in Europe, Northern America, Australia, and New Zealand.¹¹ Furthermore, the presence of

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domestic helpers also differed in Asian communities compared to the Western context. Asia is one of the regions with the largest number of domestic workers, with Singapore having almost 50% of caregivers employing live-in domestic helpers to assist with caregiving duties,¹² who are generally privately funded by patients or their families. Additionally, working versus unemployed or retired caregivers in Asian societies may also have different acceptance of HaH.¹³ Therefore, understanding attitudes towards HaH from Asian contexts like Singapore may help to inform the development of HaH in other Asian countries, the USA, and European urban centers with large Asian communities.¹⁴ As such, this study aimed to explore the experiences and perceptions of patients and their caregivers admitted to a HaH program in Singapore. To our knowledge, this study is the first in such efforts.

METHODS

Study Design and Setting

This study is part of an ongoing prospective quasi-experimental cohort study examining the effectiveness of a HaH program in Singapore, NUHS@Home.¹⁵ This program served patients in Western Singapore, admitting patients from two tertiary public hospitals — a 1200-bed academic health institution and a 300-bed general hospital. Hospital-based clinicians collaborate with private on-demand medical house-call services that provided supplementary and after-hour home visits. Patients were monitored through a biosensor adhesive vital patch for continuous heart rate and respiratory rate readings and Bluetooth-connected blood pressure and oxygen devices. Patients were able to view these readings via a home-placed tablet, synchronized to a clinical dashboard accessible by the care team. Patients who deteriorated were escalated to acute hospitals. As this was a pilot program during the study period, patients who opted for HaH care had their bills completely subsidized by the hospital. Those who declined HaH would be provided standard care in the hospital, via usual hospital payment.

Participants

All patients and their direct caregivers who were ≥ 21 years old and enrolled in the NUHS@Home program were invited to this study. Direct caregivers were those who contributed any one of the following: provided care for patients at home, assisted in patients' daily living, or influenced patient care (e.g., make decisions on patients' medical treatment). When the patients could not consent, their Legally Acceptable Representatives (LARs) were approached instead. In Singapore, the LARs are often either family members who are also direct caregivers for patients or organize care for them. Only one caregiver per patient was invited for an interview. When several directed caregivers were involved, either the first who was available or designated by the patients was sought

to consent for this interview. Due to logistical difficulties, paid lay caregivers (e.g., domestic helpers) were excluded from this study. The interview was conducted after the patient had been discharged from HaH. Participant recruitment continued until data saturation.

Data Collection and Analysis

A female research assistant (C.C.) with a nursing bachelor's degree (honors) was trained by a qualitative research expert (S.S.) to conduct the one-to-one, semi-structured interviews. The interviewer (C.C.) had no prior relationship with the participants and was uninvolved in any HaH care. Due to the COVID-19 pandemic restrictions, interviews were conducted via phone calls using secured audio platforms as per the ethics board's recommendations (National Health Group Domain Specific Review Board: reference number: 2020/00345). Participants were de-identified through pseudonyms, and interview data were coded by using identification numbers. They were briefed thoroughly on the study's purpose, including their rights to withdraw under any circumstances, and that their participation was voluntary and confidential, and would not affect the care they received from the team.

The interview guide was developed based on literature^{2,16} and the clinical expertise of the co-authors (S.Q.K. and Y.W.L.), which was subsequently piloted. Interview data were coded by using identification numbers. Participation was strictly voluntary and written informed consents were obtained. Audio recorded and transcribed verbatim interviews were thematically analyzed using Braun and Clark's six-step inductive approach.¹⁷

Interviews that were conducted in Mandarin were manually translated and transcribed to English and confirmed for accuracy by the researcher who was fluent in both languages. Triangulation¹⁸ was adopted by gathering multiple sources of data (e.g., interviewing patients, caregivers, and LARs) and by comparing our findings with two prior studies that collected the public's perception of HaH in the Singapore context.^{8,19}

RESULTS

Findings were reported with references to the Consolidated Criteria for Reporting Qualitative Research Checklist (COREQ).²⁰ From February to August 2021, 49 potential participants were approached through purposive sampling, and 13 declined due to busy schedules. Overall, 36 interviews representing 30 HaH patient episodes were conducted, with 13 patients, nine LARs, and 14 caregivers, with an average duration of 35 minutes (Table 1). Six patient episodes were represented by both patient and caregiver. The remaining participants were interviewed without other members of their families participating in this study.

The mean age was 49.8 (SD 12.39) amongst patients, 81.7 (SD 6.38) amongst LARs, and 49.9 (SD 13.99) amongst

Table 1 Number of Interviewed Participants

	Approached for interview (n)	Accepted interview (n)	Declined interview (n)
Total number of participants	49	36	13
Patients	20	13	7
LARs	10	9 (in which none was related to the patients who accepted or were approached for interview)	1
Caregivers	19	14 (in which 6 were related to the patients who accepted the interview)	5

caregivers. Approximately half of patients and caregivers and two-thirds of LARs were female. Participants were either Chinese ($n = 27$), Malays ($n = 8$), or Indian ($n = 1$). The most common diagnoses for patients in this study were cellulitis and urinary tract infection. Participants' full characteristics are shown in Table 2. The majority of caregivers and LARs in this study were family members of the HaH patients.

The overarching theme: "Enablers, difficulties, and improvements to the HaH experience" highlights the overall experience and opportunities for enhancing HaH. This is supported by three key themes: (1) Perceived better care at home, (2) Importance of social support, and (3) Organizational structures required to support HaH. The themes and sub-themes are presented in Figure 1.

Theme 1: Perceived better care at home

Participants shared positive HaH experiences, which included comfort, convenience, increased involvement in patient care, engagement with the care team, and perceived improved patient outcomes.

Comfort and Convenience. Most of the patients, caregivers, and LARs felt that HaH provided comfort and convenience.

"...comfort, it is intangible right. You can't put dollars and cents into it...ability to sleep better right, you are close to the things that you are used to...watch TV...go onto the computer. Where else in the hospital, you can't do all these." [Patient, female, 55 years old (yo)]

Caregivers and LARs did not have to travel to visit their loved ones in the hospitals. This was especially appreciated by those with work commitments, or with limited mobility. Also, caregivers and LARs who opted for HaH were motivated by a sense of duty, by enabling their loved ones to recover comfortably at home.

"He [patient] has a schedule...to be out of bed...and then go for his morning's stroll...we have a great forest [nearby], so the air is fresh...better than being stuck in the hospital bed." [Caregiver, female, 62 yo]

Active Participation and Engagement in Patient Care. Patients felt that being in a familiar environment at home allowed them to relinquish the "sick role" associated with hospital care, and to actively participate in their recovery.

Table 2 Characteristics of study participants

Characteristics	Patients (n = 13)	LARs (n = 9)	Caregivers (n = 14)
Age (mean, SD)	49.8 (12.39)	81.7 (6.38)	49.9 (13.99)
Sex (% , n)			
Male	53.8 (7)	33.3 (3)	50.0 (7)
Female	46.2 (6)	66.7 (6)	50.0 (7)
Race/ethnicity (% , n)			
Chinese	61.5 (8)	88.9 (8)	78.6 (11)
Malay	30.8 (4)	11.1 (1)	21.4 (3)
Indian	7.7 (1)	0	0
Living arrangements (% , n)			
With spouse/parents/children/others	92.3 (12)	100 (9)	100 (14)
Alone	7.7 (1)	0	0
Employment (% , n)			
Employed	84.6 (11)	0	85.7 (12)
Unemployed/retired	15.4 (2)	100 (9)	14.3 (2)
Patient's primary diagnosis (% , n)			
Cellulitis	69.2 (9)	22.2 (2)	50.0 (7)
Urinary tract infection	15.4 (2)	33.3 (3)	28.6 (4)
Rhabdomyolysis	15.4 (2)	0	7.1 (1)
Aspiration pneumonia	0	11.1 (1)	7.1 (1)
Gout	0	11.1 (1)	0
Fluid overload	0	22.2 (2)	0
Gastroenteritis	0	0	7.1 (1)
Number of participants with paid domestic helpers (% , n)	15.4 (2)	55.5 (5)	42.9 (6)
Patient length of stay in Hospital-at-Home in days (mean, SD)	4.54 (3.95)	4.67 (3.27)	4.36 (2.87)

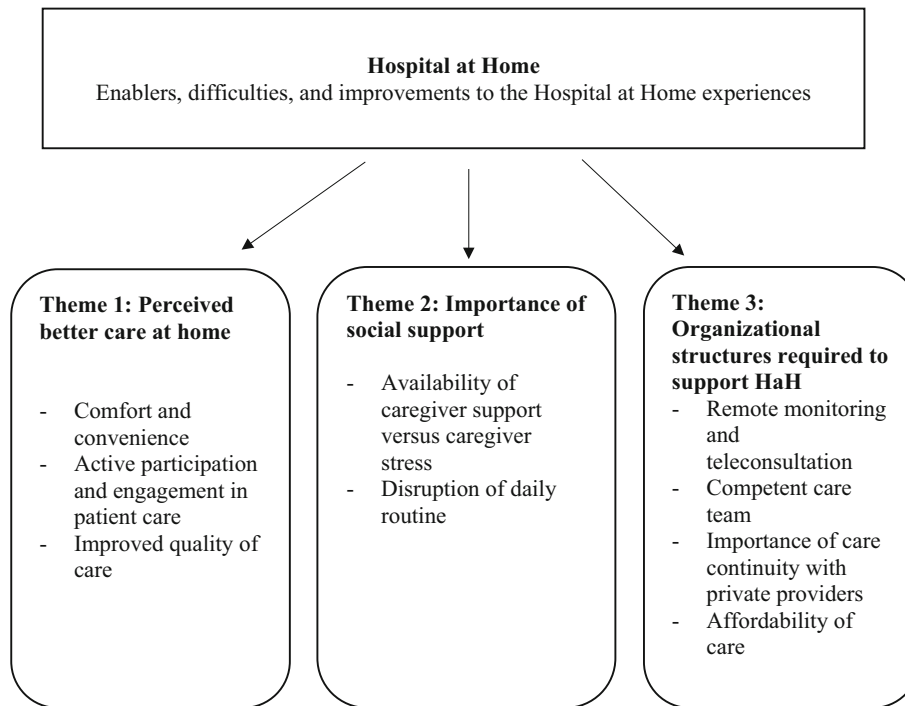


Figure 1 Dynamic representation of themes and subthemes.

“When you are here [at home] then...it [health] is your responsibility. Then you are more concern[ed], which is good...you don’t have to rely on someone to do it, you can do it yourself, better.” [Patient, female, 50 yo]

Similarly, caregivers felt more involved in patient care. There were able to partake in doctor’s rounds with the patients. This was especially appreciated, given the ward visitor restrictions during the COVID-19 pandemic. Additionally, participants felt interactions with the care team were more personal.

“If they [the doctors] need[ed] to update me, they would just speak to me over the video call. So, it is very responsive...very personalized...not intrusive. Sometimes when you want to discuss with the doctor [in the hospital], it’s out in the open.” [LAR, male, 92 yo]

Improved Quality of Care. Patients reported better sleep, appetite, and mood, which they perceived to help with faster recovery. Several patients and caregivers perceived that HAH had improved the overall quality of care. For example, they described that HaH decreased their risk of contracting hospital-acquired infections and reduced unnecessary admission to hospitals for elderly patients, especially those with recurring infections. Patients with dementia were able to recover in a familiar environment which reduced delirium. All the LARs perceived higher family satisfaction, in knowing

that elderly patients were able to recover in a conducive environment.

“[NUHS@Home provides a] more familiar environment, so she [dementia patient] feels less afraid and less confused...we rarely see her agitated at home, as compared to the hospital.” [LAR, female, 90 yo]

This program provided patients with a dedicated care team, which improved the perception of continuity of care.

“...in the hospital at home, one nurse taking care of my condition [in NUHS@Home]...I got more attention from her and she would probably have a more understanding of my condition...” [Patient, female, 55 yo]

Theme 2: Importance of social support

The availability of caregiver support was important for HaH. Furthermore, it was common for participants to employ live-in domestic helpers that provided additional support for HaH patients. Nonetheless, some family members did express caregiver stress and disruption of daily routine during the HaH period.

Availability of Caregiver Support Versus Caregiver Stress. All participants expressed the importance of having caregiver support during the HaH period. It was common for caregiving duties to be distributed amongst multiple family members living in the same household. In cases where caregivers did not reside in the same household, they lived within proximity

to patients. Many households often employed live-in, paid, domestic helpers. During the HaH program, these helpers were frequently entrusted to provide physical caregiving roles, particularly for elderly HaH patients.

“She [the domestic helper] sleeps just outside his [the patient’s] room...he would know how to call if he needs help...She’s [the helper’s] very responsive...” [LAR, male, 92 yo]

However, the perceived lack of caregiver support and round-the-clock direct supervision from the care team had made some patients prefer staying in a hospital ward.

“...I think the hospital [was] better. Because there will be nurses all down there [the hospital]. [If I] want to ask something, also can...my wife all make noise already, [asking me] why you cannot stay [in the] hospital.” [Patient, male, 54 yo]

Several participants expressed caregiver stress. Some were concerned that patients were not getting 24/7 direct clinical supervision, and immediate care may be delayed in the HaH care model. Some caregivers felt that they had to take responsibility to supervise the patient.

“...it is a new experience since I am not medically trained. So, there will be a situation where I don’t know what to do. So, I don’t want to judge the situation wrongly. A bit of stressful [stress] for me.” [Caregiver, male, 53 yo]

“I can’t really sleep soundly, I would also be 3/4 awake, or half asleep...Have to be a bit more wary of her [the patient].” [Caregiver, male, 75 yo]

Disruption of Daily Routine. A few participants highlighted that frequent in-person visits, up to three times a day, especially early in the morning and later at night, had inconvenienced and disrupted the families’ normal routines.

“When y’all [care team] come ah, sometimes they [my family members] need to pack their mattress and pillow ah. So, morning and weekends Sunday they [are] not working...they want to sleep, 8am then y’all come already... too many people in my house.” [Patient, male, 54 yo]

Working caregivers preferred to work from home while patients were admitted to HaH. This presented additional challenges of work arrangements or taking time off to be at home. Sometimes, caregivers had to use unpaid time off to care for their loved ones.

“Sometimes the doctors and nurse come, then they come and talk to me... then that means my work schedule need to be adjusted, because sometimes I have meetings.” [Caregiver, female, 35 yo]

“...when you are at home, somebody will have to take care [of the patient]. Like in my case, I have to apply for leave, I need to take care of her [the patient] ... there is a cost. Cost in the sense that when I apply leave [for work], I got [have] no pay.” [Caregiver, male, 75 yo]

However, some working caregivers found it worthwhile to juggle work and caregiving responsibilities, especially if they perceived better care for their loved ones.

“So physically, although I am working. Doctor call... nurse call... I’m the one who answer...Quite a lot of the time, I have to work halfway and answer [care providers’] calls. But the fact that he [the patient] is able to be home, to be in familiar environment, that’s more important than the inconvenience that I encountered to answer questions here and during working hours.” [Caregiver, female, 62 yo]

Participants with flexible working arrangements were also more likely to juggle work and caregiving responsibilities.

“...at home, they [my employers] can do like zoom call for my working day, while [I am] around with her [the patient] ...I can...work from home via zoom.” [Caregiver, male, 47 yo]

Theme 3: Organizational structures required to support HaH

This theme summarized the various organizational structures which can support HaH processes. This included remote monitoring of vital signs and teleconsultations, the trustworthiness of the care team, the importance of care continuity with private providers, and the affordability of HaH.

Remote Monitoring and Teleconsultation. Most participants felt assured with vital signs monitoring and accepting towards teleconsultation with their providers through video calls, voice calls, and texts.

“...it’s better...The fact that he [the provider] video called me, I was more assured that oh, maybe it was nothing... it is not something that needed immediate attention.” [Patient, female, 35 yo]

“...monitoring the vital signs was important, like knowing that the temperature and knowing that her heart rate and everything was normal. It gives us assurance.” [Caregiver, female, 29 yo]

In contrast, several other participants highlighted issues with vital signs monitoring, including the discomfort of the wearable patch, and instability of transmission of readings. Despite these issues, most participants felt that the inconveniences were minor and acceptable. They were reassured through constant communication with the care team.

“Once I go shower, the patch will not stick again... and you sweat so much, it will come out.” [Patient, male, 59 yo]

“...I think initially they [care team] were still uncertain about whether it's [VSM] functioning and whether the blood pressure data was being sent... Yeah, I think there wasn't real-time feedback...so we are not sure whether it is sent over or not.” [LAR, female, 90 yo]

Competent Care Team. Participants agreed that all care teams needed to be competent to deliver clinical care in a remote and home setting. Participants also agreed that assurance from the care teams was important, especially in HaH. Participants were appreciative of receiving frequent calls and visits and having providers that were approachable, patient, and prompt in follow-ups.

“Subsequently, every time she [the nurse] came, she would call me and told [tell] me what she has done. So, I can't ask for more...Because that's reassuring. I know what was happening at home when she was here.” [Caregiver, male, 49 yo]

I felt they were professional, friendly, they assured her [the patient]. I really want to commend the group [care team]. I think they were great. [LAR, female, 82 yo]

Importance of Care Continuity with Private Providers. While participants had positive experiences with the HaH care team, several others felt that the partnership and communication between the hospital-based care team and 3rd-party medical house-call providers could be improved to increase a sense of care continuity.

“They [3rd-party community service providers] do not know what exactly she [the patient] was treated for, so they would start asking questions, “so what was she admitted for?” ...Not very assuring...” [LAR, female, 72 yo]

Affordability of Care. Participants had differing views on the cost of HaH. Some participants felt that it should not exceed those of hospital stay since 24/7 in-person care was not provided. Others were willing to pay more for the perceived better comfort and the attention they get from the care team.

Nonetheless, the cost was a key factor when enrolling for HaH, and there was a consensus that HaH should be subsidized.

“I'm willing to pay more than being hospitalized in the hospital...the convenience and the attention far outweighs that [the additional cost incurred].” [LAR, male, 92 yo]

“The main concern will be price, home care, the blood test, MRI [Magnetic Resonance Imaging], are we going to pay? How much is the cost? And how is the person going to pay? Cash or Medisave [government-administered medical savings account]?” [Patient, male, 59 yo]

DISCUSSION

This study explored the perspectives and experiences of patients and their caregivers receiving hospital-at-home care. Similar to studies of HaH programs in the USA and the UK,^{16,21} our findings suggested that the patient-centeredness of delivering care at home was associated with perceptions of comfort, convenience, and better quality of care. Key challenges reported in this study were the stress and inconvenience caused to caregivers. Key enablers that could influence the uptake of the HaH model were the availability of caregiver support, competency, and continuity of care teams, and affordability of HaH care.

Social support played a vital role in managing health events and safety at home in HaH care.^{13,22} In some Western contexts (e.g., various regions in the UK or Northern America),¹¹ patients often lived away from their families, thus resulting in complex care arrangements. HaH programs conducted in the UK, the USA, and France reported between 21 and 49% of their HaH patients living alone.^{22–25} Hence, some patients in these settings had to find informal care from caregivers living elsewhere, arrange alternative care arrangements, or manage care for themselves.²² However, all patients in our study either lived with or near their caregivers. Such household makeup is common in many Asian communities.¹² Hence, family members as caregivers in our study were very involved in the decision-making process and care arrangement for the patients. Additionally, “filial piety”, an Asian virtue of respect for one's elders, often translates into the family feeling obliged to provide support for members who are sick.²⁶ Our findings reflected this phenomenon, where caregivers and family members typically made employment or lifestyle adjustments to accommodate in-person visits from the HaH care team. Similar sentiments of the added responsibility of family members were also reported in previous studies investigating the public perception of HaH in Singapore.^{8,19}

Concerns about emergencies at home commonly reflected in other HaH studies^{13,22} were also expressed by participants in this study, but such concerns were predominantly expressed by caregivers rather than by patients themselves. Nonetheless, family members accepted this burden if they perceived that the HaH team provided a better quality of care for their loved ones. As such, our findings clearly identify the family members as key stakeholders in HaH care, and successful HaH programs in such communities must support, involve, and empower family members.

While caregivers were involved in the decision-making process, care arrangements, and caregiving duties for the patients, our findings revealed a strong dependency on live-in domestic helpers to provide caregiving support to assist elderly patients with activities of daily living, compared to studies on HaH in France and the UK.^{22,25} Live-in foreign domestic helpers are frequently employed in Asian communities especially in Singapore to provide caregiving support.²⁷ Domestic helpers were excluded as participants in this study, but this phenomenon presents potential opportunities for further exploration and identifies domestic helpers as additional stakeholders in HaH care that healthcare teams must be aware of and engage with.

Our findings resonated with prior HaH studies that indicated the importance of competent care teams in the HaH program.^{28,29} Given that patients did not have round-the-clock direct supervision, competent clinicians who were approachable, patient, and prompt towards communicating with both patients and family members were deemed to be essential features to home recovery. Many HaH programs collaborate with 3rd-party medical providers, and our study suggested that clear and detailed communication with such providers was critical to improving the perception of care continuity.

Although HaH was not chargeable to patients in this study, our results suggest that cost and payment mechanisms are key deciding factors for selecting this model of care if the program were to be continued. This is similar to other local studies about the public perception of a hypothetical HaH program.^{8,19} Findings further substantiate that the success and sustainability of HaH programs in any healthcare system depend strongly on the affordability and availability of supportive subsidies and insurance.³⁰

LIMITATIONS AND IMPLICATIONS FOR FUTURE RESEARCH

First, the interviews were conducted over phone calls due to COVID-19 restrictions, and nonverbal cues were not analyzed. Second, this study was subjected to recall bias, as participants were asked about their experiences after being discharged six weeks from HaH. As admission to this program was voluntary, our results only featured patients and caregivers who already agreed to participate in HaH and may not be representative of the general population's perspectives. Third, paid domestic helpers were excluded despite being

the caregiver in some cases. Future studies should consider the experiences of paid domestic helpers in HaH, and evaluate the public and private payment modes of these helpers. Finally, most participants in this study were younger, and first-hand accounts from elderly patients were not well represented. Nonetheless, this study is the first to explore the experiences of participants receiving HaH in Singapore. Our findings can be generalized to both health systems in Asian countries exploring the HaH care model or existing HaH programs in urban centers in the USA, Europe, or Australia with large Asian communities.

CONCLUSION

Although HaH is new to Singapore, the majority of the participants were receptive and felt that it was a safe method to treat non-severe acute patients in Asian society. Key challenges reported in this study were the stress and inconvenience caused to caregivers. We have identified three key enablers for developing successful HaH programs in these communities: (1) The HaH care team must consider patient's family members as key stakeholders in the patients' therapeutic alliance and develop ways to support them better; (2) The HaH care team must be accessible, approachable, and reassuring, and communicate frequently and timely with patients and their families; and (3) Healthcare financing strategies to ensure HaH out-of-pockets costs affordable which are critical to keeping HaH as an option for patients and families.

Data Access, Responsibility, and Analysis: The principal investigator had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Data Sharing Statement: The datasets during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Declarations:

Conflict of Interest: The authors declare that they do not have a conflict of interest.

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