

Impact of COVID-19 Restrictions on Hospital at Home

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Abstract

Hospital at home (HAH) programs have been operating in several countries since the first randomised trials in the late 1970s confirmed their effectiveness. Summarised here are the findings of a rapid literature review (based on searches conducted in MEDLINE, EMBASE, the Cochrane Library) of the effect of COVID-19 restrictions on HAH. COVID-19 has resulted in increased numbers of patients who do not have COVID-19 referred to HAH from the ward or emergency department to maximise hospital inpatient capacity for those that do have the disease. Telehealth and videoconferencing have been employed effectively to monitor patients' conditions. Compared to similar hospitalized patients, HAH patients experience better clinical outcomes; it is a safe and effective way of caring for non-severe COVID-19 patients and those with severe cases and have overcome the acute phase. HAH can be used to reduce the healthcare pressure on hospitals compounded by COVID-19 and the adaptation may have a permanent place in the care of vulnerable patients.

Keywords: Home Monitoring; Telehealth; COVID-19; Clinical Deterioration; Vulnerable Patients

Abbreviation

HAH: Hospital at Home

Introduction

In March 2020, a dozen physicians at Papa Giovanni XXIII Hospital in Bergamo, the epicentre of Italy's Covid-19 crisis, issued a plea to the world that the Western health care systems, built around the concept of patient-centered care, may need to change and deliver care to many patients at home [1]. Hospital at home (HAH) programs usually include medical staff and nurse, with the support of administrative staff, physiotherapists, and social workers. Along with clinical and physical assessment, a variety of procedures are available, including blood tests, microbiology cultures, bedside ultrasound, and electrocardiogram [2,3]. HAH programs are scalable; staff volume can be adapted to the workload. Summarised here are the findings of a rapid literature review of the impact of COVID-19 restrictions on HAH.

Materials and Methods

The criteria set were peer-reviewed articles, inclusion of activity data (such as number of participants) and outcome data (such as participant satisfaction or change in clinical state) and reporting of factors underlying program performance. The searches were conducted in early November 2020, using Boolean search strings (including "and", "or", "filetype", "intitle" and "parentheses") in MEDLINE, EMBASE,

the Cochrane Library and other sources. Terms applied involved: hospital in the home, hospital at home, COVID-19, and pandemic. Manual reviews were also undertaken by following up references provided in relevant papers. Forty-seven studies were identified, and 18 of these met the inclusion criteria, 13 were peer-reviewed and 5 were not but from reputable sources. All the articles used were published in English and in 2020 with the exceptions of three. Settings cited in the paper included Mount Sinai Hospital in New York, Tufts Medical Centre in Boston, Port Macquarie Base Hospital in Australia, and Denver Health and Hospital Authority in Colorado.

Results and Discussion

Establishment of additional services

Port Macquarie Base Hospital established a COVID screening clinic onsite on 19 March 2020, as part of the COVID-19 response, including a new ambulatory care service for people with COVID-19 [4]. In Wisconsin, Marshfield Clinic used HAH to expand acute care for COVID-19 patients [3]. Mount Sinai Hospital expanded its HAH program in early April 2020 to respond to the pandemic. Initially, Mount Sinai required patients with COVID-19 to be aged 65 and younger, afebrile for 48 hours or longer, and 8 days or longer since symptom onset, but older patients were accepted within two weeks of setting this threshold as demand for care continued to grow. In mid-March 2020, Cleveland Clinic in Ohio commenced a COVID-19 HAH program [5].

Increased demand

Covid-19 caused a surge in demand for HAH services, often as high as 40%. This was the case at Dispatch Health in Denver, Colorado, which was delivering care to 170,000 by July 2020 [3]. By May 2020, Mount Sinai had 2,250 people with COVID-19 in its HAH program. A total of 233 patients were referred to the Denver Health and Hospital Authority HAH between 3 April and 24 May 2020. Port Macquarie Base Hospital COVID-19 HAH team admitted 23 patients in the first few weeks of opening. From 11 March to 25 May 2020, Cleveland Clinic HAH had 1,924 COVID-19 patients [5].

Admission criteria

Across the settings, procedures were in place to ensure patients are suitable for home monitoring and care. Typically, eligibility criteria include confirmed or suspected COVID-19 infection. Sometimes, one or two risk factors for disease complications are considered [6]. At the Cleveland Clinic HAH, admissions occur when patients are discharged from hospital or after an ambulatory assessment [5].

Deployment of telehealth to complement in-person visits

Videoconferencing and telehealth became central to service delivery. Physicians visit patients virtually to oversee and supervise nurses making in-person visits to patients at their homes. At Marshfield Clinic in Wisconsin, Disptach Health in Colorado, Mount Sinai Health System in New York, Tufts Medical Centre in Boston [3], patients receive about two telephone calls a day from medical staff, usually a nurse. Most (87%) of the COVID-19 patients in the Port Macquarie Base HAH have telehealth service [4]. In addition to daily telehealth monitoring, Mount Sinai HAH COVID-19 patients have two in-person visits a day from nurses. Real-time monitoring of patient symptoms via telehealth is a key component of the Cleveland Clinic HAH [5]. Nurses at the Liverpool HAH contact their COVID-19 patients by telephone twice daily; identified issues of concern are referred to an on-call respiratory physician [7].

Creation of multidisciplinary teams

A multidisciplinary team (that includes a nurse, medical technician, therapists, and social workers) headed by a respiratory physician delivers HAH COVID-19 services. The team at Port Macquarie Base Hospital has an assessment screening and monitoring system for symptom severity and clinical deterioration. At Dispatch Health, an emergency physician makes virtual consults for diagnosis and

treatment decisions [3]. The range of services delivered to patients at home include oxygen treatments, intravenous infusions, X-rays and laboratory monitoring. In instances of clinical deterioration, patients are transferred to an Emergency Department for acute monitoring.

Improved patient experience

HAH has been positively received in the settings reviewed, with 95% of referred patients participating in the programs. HAH COVID-19 patients have fewer unscheduled readmissions and higher satisfaction with care than in-patients. At Marshfield Clinic, for example, the patients had approximately 40% lower readmissions, with satisfaction level reaching 95% [3]. Among Mount Sinai HAH patients, unplanned readmissions were 50% fewer. Nearly all the 23 COVID-19 patients admitted to the Port Macquarie Base Hospital HAH recovered (one died), and patients and their family value the emotional support provided [4]. Only 9 (0.005%) of the Cleveland Clinic HAH's 1,924 COVID-19 patients died, and patients' satisfaction with care was high [5].

Diabetes, hypertension and obesity are the most frequently found risk factors for decompensation.

Patients' mean age ranged from 49 years (Denver Health Hospital Authority) to 75 years (Port Macquarie Base Hospital). However, at the Cleveland Clinic HAH, 3.5% of the COVID-19 patients were under the age of 18 years [5].

Reduced care costs

Costs are also lower. For instance, at Mount Sinai, costs are between 20% and 30%, compared to hospitalized patients [3]. Part of the reasons for the reduced treatment costs is that less patients require escalated care; at the Denver Health and Hospital Authority HAH, only 13% of the patients were in this category [6].

Over the past four decades, Hospital at Home has been associated with multiple benefits, including better patient experience and clinical outcomes [8] and higher cost-effectiveness [9,10]. In an analysis [11] of 2,185,421 admissions to 19 hospitals across 96 diagnosis related groups in Australia and New Zealand (1 January 2011 - 31 December 2017), including HAH admissions (3.7%), the proportion of patients who died in hospital was lower for HAH than non-HAH care (0.3% v 1.4%) and re-admission within 28 days was less frequent (2.3% v 3.6%). The 50 diagnosis related groups with the largest HAH activity included infections, venous thromboembolism, cancer, and major surgical procedures. Montalto, *et al.* [11]'s study suggested that HAH may be preferred because of factors such as age, obesity, diabetes, immunosuppression, living in residential care, or previous admissions for similar indications.

A structured point prevalence study [12] surveying the suitability of ward inpatients at the Royal Melbourne Hospital, Australia, (10 - 11 April 2019) estimated that one-tenth of hospitalised inpatients are potentially suitable for home-based inpatient bed substitutive care. Also found was that clinicians experienced in providing home-based care were almost 3 times more likely to identify such patients, compared with patients' own treating clinicians in acute medical and surgical wards. Some experienced healthcare providers have estimated 25 - 30% of inpatients could have their care completed in HAH [13].

Unsurprisingly, across several settings, HAH is one of the leading strategies that have been adopted to contain COVID-19 transmission and limit the acuity of the disease [14]. Mid-May 2020, Adventist Health in California established its own virtual technology-dependent hospital for COVID-19 patients and admitted about 150 cases. In North Carolina, Atrium Health commenced a virtual hospital program in late March 2020 to treat COVID-19 positive patients at home. In Chicago, Common Spirit Health boosted its HAH program with additional telehealth capacity for COVID-19 cases.

The Hospital in the Home Society Australasia [15] has found that the COVID-19 pandemic has affected HAH in two ways: (a) increased numbers of patients who do not have COVID-19 referred to HAH from the ward or emergency department to maximise hospital inpatient capacity for those that do have COVID-19 and (b) new referrals of patients suspected or proven to have COVID-19 with clinical features

on the less severe end of the spectrum but requiring some element of hospital care. Early adopters of the model, such as Johns Hopkins Hospital and Presbyterian Healthcare Services, dispatched physicians to patients' homes, while newer programs reduce costs using a small team of physicians and/or nurse practitioners to oversee care virtually and sending nurses and other staff to patients' homes [3].

A key component of HAH is effective management of social and behavioural health needs. These determinants of health are often overlooked. For instance, an analysis [16] of 4,500 people attending Sydney Local Health District hospitals, Australia, between 2013 and 2015, showed that older people (mean age 57.5 years), people from disadvantaged postcodes and people who speak languages other than English were less likely to participate in HAH. The Royal Commission into Aged Care Quality and Safety [17], Australia, noted that "Hospital in the Home is an attractive model of care for management of a COVID-19 outbreak in an aged care facility but the precondition of resident safety is only likely to be met if the outbreak is limited to a small number of cases in residents and staff".

As noted by Trico, *et al.* [18], rapid reviews are sometimes susceptible to biased findings. In the present review, there is the potential that the non-inclusion of HAH programs from non-English speaking countries and those reported in the grey literature (non-peer reviewed publications) can contain experiences different to those detailed. This may be unlikely given the large evidence for the effectiveness of HAH programs in many settings. Thus, the limitations are not of the magnitude that can diminish the value of this rapid qualitative review.

Conclusion

Hospital at home can be used to manage the healthcare pressure on hospitals compounded by COVID-19. The adaptation of an existing model of care to respond to the pandemic may become permanent in the care of vulnerable patients.

Conflict of Interest

Nil.

Bibliography

1. Nacoti M., *et al.* "At the epicentre of the COVID-19 pandemic and humanitarian crisis in Italy: Changing perspective on preparation and mitigation". *New England Journal of Medicine Catalyst* (2020): 1-5.
2. Coloma E and Nicolas D. "Hospital at home units in the post-COVID-19 era". *European Journal of Clinical Investigation* 50.11 (2020): e13390.
3. Hostetter M and Klein S. "Has the time finally come for hospital at home?" *The Commonwealth Fund* 7 (2020): 9-15.
4. Lwin N., *et al.* "Hospital-in-the-home experience of the first 23 COVID-19 patients at a regional NSW hospital". *International Medicine Journal* 25.11 (2020): 1271-1273.
5. Medina M., *et al.* "Home monitoring for COVID-19". *Cleveland Clinic Journal of Medicine* (2020).
6. Ryan PP, *et al.* "A novel virtual hospital at home model during the coronavirus disease 2019 (COVID-19) pandemic". *Infection Control and Hospital Epidemiology* (2020): 1-3.
7. Dickson HG. "Hospital in the Home: Needed now more than ever". *Medical Journal of Australia* 213.1 (2020): 14-15.
8. Pericas JM., *et al.* "Hospital at home for the management of COVID-19: Preliminary experience with 63 patients". *Infection* (2020): 1-6.
9. Hill JD, *et al.* "A randomised trial of home-versus-hospital management for patients with suspected myocardial infarction". *The Lancet* 22 (1978): 837-841.

10. Johns Hopkins Healthcare Solutions. Hospital at Home (2020).
11. Montalto M., *et al.* "Home ward bound: features of hospital in the home use by major Australian hospitals, 2011-2017". *Medical Journal of Australia* 213.1 (2020): 22-27.
12. Lim SM., *et al.* "Home first! Identification of hospitalised patients for home-based models of care". *Journal of the American Medical Directors Association* 22.2 (2021): 413-417.
13. Cuello M and Breen T. "Is it time for hospital at home". *The GIST Healthcare* (2020).
14. Drees J. "5 Hospital at home initiatives from Adventist Health, Mayo Clinic and more". *Becker's Hospital Review* (2020).
15. Hospital in the Home Society Australasia Ltd. "Role of Hospital in the Home for COVID-19". (2020).
16. Page J. "Referral patterns to hospital in the home for patients in an inner Metropolitan Health District – Inequality or inequity?". *The University of New South Wales* (2016).
17. Royal Commission into Aged Care Quality and Safety. "Aged care and COVID-19: A Special Report". 30 September (2020): 20.
18. Trico AC., *et al.* "A scoping review of rapid review methods". *BMC Medicine* 13.224 (2015): s12916-015.

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