Hospital-in-the-Home experience of first 23 COVID-19 patients at a regional NSW hospital

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Abstract

Ambulatory care is an important service for patients with the COVID-19 infection especially in a regional area where most of the patients underwent home isolation. Escalation of treatment and timely transition to inpatient care are critical when COVID-19 patients deteriorate. Equally important is ensuring transfer into facility is carried out in a well-planned, safe manner to prevent exposure to health care professionals as well as other inpatients. This study is a summary of our COVID Hospital-in-the-Home (HITH) service and clinical presentation of COVID-19 patients.

At the end of 2019, Novel Coronavirus or Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-COV-2) was identified as a cause of pneumonia and it rapidly spread throughout the world resulting in a global pandemic with more than 3 million confirmed cases of COVID-19 or Coronavirus disease 2019 infection in March 2020 worldwide (https://coronavirus.jhu.edu/map.html).

As part of the COVID-19 pandemic response, a COVID screening clinic was established and commenced...
operation on 19 March 2020 onsite at Port Macquarie Base Hospital (PMBH), NSW (https://www.health.nsw.gov.au/Infectious/covid-19/Pages/default.aspx).

Our Hospital-in-the-Home (HITH) team also expanded developing a new service for ambulatory care of COVID-19 patients. The HITH COVID team, led by our respiratory physician, functions with a HITH registrar and HITH Clinical Nurse Consultant within office hours and an on-take medical officer rostered for after hours. HITH COVID team predominately provides daily telehealth assessment (phone call/videoconference if available) which escalates a medical review either at home/dedicated HITH clinic or facilitates direct admission for those who require inpatient medical care.

There was a total of 23 patients (12 male and 11 female) admitted to the HITH COVID team service at PMBH. Median of age distribution was 75 years (inter-quartile range (IQR), 68.5–78.5). Seventeen out of 23 (73.9%) patients had underlying comorbidities and approximately 70% of them had cardiovascular risk factors such as hypertension and hypercholesterolaemia (Table 1). Sixteen out of 23 (69.6%) were admitted during the first week of symptoms. All our patients had history of overseas travel. Twenty-two out of 23 (95.7%) reported being on a cruise ship. The most common symptoms on admission were cough and fatigue (78%).

A total of 7 patients out of 23 required inpatient admission (Table 2). Two patients required face-to-face assessment at home and HITH COVID clinic. Three patients required review at Emergency Department due to their presentation being out of HITH office hours. The rest were monitored at home by HITH COVID team through telehealth assessment.

For those seven patients who required inpatient admissions, median duration of ICU admission was 7.5 (IQR 4–11.5) days. Six out of seven patients required oxygen through nasal prongs, four required up to Hudson mask and two required up to high flow oxygen support. There were no intubated patients. Median number of days of oxygen support for those who required oxygen was 6.5 days. Six out of seven (96%) patients recovered within 30 days of admission to HITH, and one patient died. The patient who died was a 91-year-old man who presented to the hospital on Day 14 of onset of symptoms with increasing shortness of breath, cough, fevers and extreme lethargy. COVID-19 infection was confirmed by the positive SARS-COV-2 PCR test result. On admission, he was afibrile, blood pressure of 136/70, heart rate of 88 b.p.m., SaO2 93% on room air and his respiratory rate was 20/min. He rapidly deteriorated on Day 3 of admission to PMBH with severe hypoxia SaO2 74%, high fevers of 40°C and acute respiratory failure. His chest X-ray showed progressive bilateral pneumonia. He was given 15 L oxygen through non-rebreather and empirically treated with intravenous antibiotics for possible hospital-acquired infection. Unfortunately, he deteriorated further. Comfort care was introduced, and he died on Day 6 of admission.

**Discussion**

Our HITH service in Port Macquarie is well established and has been functioning for over 15 years. HITH service extended to include ambulatory care of COVID-19 patients as part of our pandemic response. Approximately half of the patients only required telehealth assessment. During the initial operating days of the HITH COVID team, there was no dedicated clinic that could have potentially prevented some emergency presentations. Our service developed COVID-19

| TABLE 1 Baseline demographics and clinical characteristics of 23 patients |
|---------------------------------------------------------------|
| **Characteristics**                                           | 23 patients |
| **Age category**, n (%) (years)                               | 75 (68.5–78.5) |
| <60                                                          | 0 |
| 60–70                                                       | 9 (39.2) |
| 71–80                                                       | 11 (47.8) |
| 81–90                                                       | 2 (8.7) |
| >90                                                         | 1 (4.3) |
| Male sex, n (%)                                              | 12 (52.2) |
| Co-morbid medical conditions, n (%)                           | 16 (70) |
| Hypertension/cardiovascular risk factors                      | 16 (70) |
| Cardiac disease                                              | 6 (26) |
| Lung disease                                                 | 5 (21.7) |
| Diabetes                                                     | 2 (8.7) |
| Others                                                       | 4 (17.4) |
| Stage of disease on presentation after symptom onset, n (%)   | 16 (70) |
| First week                                                   | 5 (22) |
| Third week                                                   | 2 (8) |
| Symptoms on admission, n (%)                                 | 18 (78) |
| Cough                                                        | 14 (61) |
| History of fever or documented fevers                        | 12 (52) |
| Shortness of breath                                          | 18 (78) |
| Fatigue/lethargy                                             | 13 (57) |
| Loss of appetite                                             | 4 (17) |
| Anosmia/ageusia                                              | 6 (26) |
| Diarrhoea                                                    | 12 (52) |
| Mode of medical assessment during the HITH admission, n (%)   | 2 (8.7) |
| Telehealth assessment only                                   | 3 (13) |
| HITH clinic review/home visit                                | 7 (30) |
| ED review                                                    | 7 (30) |
| Inpatient admissions                                         | 7 (30) |

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screening questionnaires including initial assessment and daily monitoring tool as well as utilising portable oximeter to assess individual patients’ severity of symptoms, stage of illness and risk of deterioration.

Our HITH COVID team works well due to many factors. First, we established HITH COVID Service criteria and admission procedure guidelines to facilitate ease of access. We developed pathways to guide our staff in assessing patients through telehealth using questionnaires along with clear instructions of when and how to escalate treatment and arrange medical review if required. Second, the team co-ordinates with Emergency team, Respiratory team, ICU team, General practitioners and other health professionals in providing medical care as a multi-disciplinary holistic approach. Third, the team establishes a good working relationship with local Public Health network. The team liaises with Public Health officials and reinforces patients’ understanding of self-isolation, social distancing with others in their home, hand hygiene and good cough etiquette.

This coordinated outreach and management approach has helped to ensure that patients were cared for in their own homes, identified patients who were deteriorating and arranged timely and safe transition to hospital admission without exposure to other inpatients and staff.

Self-isolation can be stressful and causes anxiety about the disease, which can be overwhelming. Emotional support by the HITH COVID team has been highly appreciated and valued by patients and their family during home isolation.

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**Ethics approval**

Data were de-identified, and the project is exempt from the requirement for ethical review by a Human Research Ethics Committee (HREC) in accordance with section 5.1.22. of the National Statement on Ethical Conduct in Human Research (2007).