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RESEARCH ARTICLE

Practices in Follow-Up Care for COVID-19 Positive Patients in Home Isolation: A Retrospective Audit Study

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Abstract

Objective: To understand the practices of follow up of positive COVID-19 patients in home isolation. The objective is to evaluate adherence to established procedures, policies, and frameworks.

Design: This is a prospective observational study.

Setting: The study is conducted within the south western Sydney (SWS), encompassing both primary and secondary levels of care. Data are collected from multiple healthcare facilities within the district to ensure a representative sample.

Participant: A total of 510 files of the COVID-19 positive patients under home isolation in SWS were audited between August 2021 and October 2021. Data was collected from the electronic medical records.

Primary and Secondary Outcome Measures: The primary outcome measures include adherence to follow-up procedures, frequency of patient monitoring, and utilization of technology such as pulse oximeters. Secondary outcome measures include changes in patient risk categorization and the need for escalation of care.

Results: Weekly file reviews revealed varying levels of adherence to follow-up procedures. The utilization of technology, such as pulse oximeter, increased over the audit period, indicating improvements in patient in-home monitoring practices. However, challenges such as ensuring daily follow-up calls and addressing outliers in follow-up timelines were identified.

Conclusion: The findings highlight the importance of prospective review and feedback mechanisms to ensure the effectiveness of follow-up care for COVID-19 positive patients in home isolation. Continuous quality improvement efforts, including the integration of technology and addressing workflow challenges, are necessary to optimize patient outcomes.

1. Strengths and Limitations of the Study

- This study represents the first prospective file review within the SWS region to evaluate follow-up care for COVID-19 positive patients undergoing home isolation during the pandemic. Its findings contribute valuable insights into the current practices and challenges faced in managing this cohort population.
- Data are collected from multiple healthcare facilities within SWS, enhancing the generalizability of findings to a diverse patient population.

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- The study leveraged audit and feedback data as part of a quality improvement strategy, reflecting a proactive approach to optimizing follow-up care procedures. This utilization of existing healthcare data is pragmatic and underscores the resourcefulness and efficiency of the study design.
- Methodological strengths include weekly prospective file reviews and feedback mechanism which allow modifications of current practice to meet the unprecedent pandemic.
- The prospective nature of the study introduces inherent limitations, there is a risk of missing or inaccurately recorded information, particularly if patient files are not audited due to various reasons.

2. Background

In December 2019 the novel coronavirus disease (COVID-19) was first identified in the Wuhan province in China.[1] By early 2020, the Wold Health Organisation (WHO) declared COVID-19 as the global pandemic.[2] Since the onset of this pandemic the healthcare system across New South Wales in Australian has experienced unprecedented change in facilitating responses for control and prevention of COVID-19 as well as healthcare for patients.[3] The highly contagious nature of the virus has resulted in appropriately risk assessed COVID-19 positive patients isolating in hotels or their own home as a measure of infection prevention for healthcare workers and others.[4] During the pandemic there was a surge in the hospitalisation of COVID-19 infected patients in Australia. In order to limit the spread of this disease, patients were offered in-home remote monitoring services on a larger scale to limit their visits to the hospitals and medical centres. [5,6]

In-home remote monitoring and care have emerged as crucial strategies for effectively managing hospital resources during the COVID-19 pandemic.[6,7] As the situation evolved, the expansion of in-home monitoring procedures and technologies became imperative to meet the growing demand.[7] The advantages of in-home monitoring and follow-up for patients are multifaceted, encompassing timely and secure access to clinical care, regular interaction with clinical teams fostering a positive patient experience, and the assurance of comprehensive plans in place for potential escalation of care.[8,9] Additionally, for clinicians, these approaches mitigate the risk of exposure while facilitating meaningful patient care provision. From a health service perspective, they offer enhanced flexibility in responding to workforce demands, increased safety for staff and visitors, and improved operational efficiency and sustainability.[7]

In April 2020, the South Western Sydney Local Health District (SWSLHD) developed procedures for the follow-up of COVID-19-positive patients in home isolation. These procedures addressed several key aspects, including the safe management of patients in in-home isolation, criteria for admission to acute care facilities, and guidelines for the release of patients from home isolation.[10] The procedure outlined a comprehensive approach to caring for individuals within the community or among staff who tested positive for COVID-19 at Temporary Flu Assessment clinics (FACs) and were deemed suitable for home isolation. Patient follow-up entailed daily phone calls by clinical staff, with additional care provided or escalation to a higher level of care as necessary based on the outcomes of these calls.[10]

In August 2021, the SWSLHD, in the arm of the wave of the Delta COVID-19, undertook a significant update of its procedures, more than a year after their initial implementation. While preserving the core protocols established previously, these updates introduced several notable enhancements. Among them were the introduction of triage and risk categorization systems, the formation of a multidisciplinary team known as the COVID-19 Response Team, and the establishment of a dedicated COVID-19 Medical Team supported by a clinical governance structure to facilitate patient monitoring.[11] Noteworthy additions included the incorporation of technology, particularly the integration of pulse oximeters to complement in-home monitoring efforts. Additionally, distinct levels of clinical intervention were introduced, categorized as virtual care Green, virtual care Amber, or HITH Red, each accompanied by corresponding patient flowcharts, assessment matrices, initial evaluation procedures, and follow-up assessment protocols, alongside standardized documentation standards.[11]

3. Methods

3.1 Study Aim

This study aims at undertaking a file audit to understand the practices of follow-up of positive COVID-19 patients in home isolation in SWS. The objective is to evaluate adherence to established procedures, policies, and frameworks.

3.2 Study Design

This was a prospective observational study via files audit and feedback across multiple sites within the

SWSLHD between August and October 2021. The study utilized proactive audit and feedback data as part of a strategy to support adherence to current procedures, policies, and frameworks related to the follow-up of positive COVID-19 patients in home isolation.

Daily prospective files were audited by an independent research staff via the electronic medical record (eMR). An audit tool was developed by the research team to capture procedural aspects and tested with the clinical team who were conducting the daily follow-up. Weekly feedback mechanism was developed with anonymous data report summarising the finding for adherence to the current procedures, policies and frameworks. The feedback was provided to the senior executive team of the COVID-19 Response Team for information and action. This allowed modifications of current practice to meet the unprecedent pandemic.

3.2 Patient and Public Involvement

Patients or the public were not involved in the design, conduct, reporting or dissemination plans of this research.

3.3 Data Collection

Data were sourced from eMR and stored securely in password-protected drives within the research office. The study data encompassed various aspects of policy and procedure actions by the multidisciplinary team of the COVID-19 Response Team and patient data, including risk stratification, assessment, screening, support, escalation, and discharge information. De-identified data of patients diagnosed with COVID-19 and undergoing home isolation, or about to undergo home isolation, constituted part of a daily audit sample/weekly feedback process, allowing for the description of the care model and any subsequent changes in a timely manner.

3.4 Statistical Analysis

Frequencies and percentages of responses and bar charts were used to describe frequencies and measures over time periods. This study is reported according to the STROBE guidelines.[12]

4. Results

The study findings were generated using the audit data of the eMR patient files of the random proportion of patients who were enrolled in the follow-up program. Daily data was collected from the eMR between August 26, 2021 and October 16, 2021. The audit tool underwent a pilot phase on August 19, 2021, with feedback incorporated from auditors and research staff. Subsequently, the audit and feedback process commenced the week of August 26, 2021. Data regarding patients on the follow-up in-home monitoring program were entered into the audit tool by three auditors. At the end of each week a report was compiled to understand adherence with procedure and describe changes.

Exclusion criteria included patient files which had no initial assessment was made due to the patient had not yet received an initial assessment call, was an inpatient or could not be contacted (Table 1).

Table 1. *Overview of sampled data for each week*

	Week 1 (26/8/21)	Week 2 (02/09/21)	Week 3 (09/09/21)	Week 4 (16/09/21)	Week 5 (23/09/21)	Week 6 (30/09/21)	Week 7 (7/10/21)	Week 8 (14/10/21)
Files selected (number)	35	79	75	71	75	75	50	50
Patients audited (number)	35	72	61	44	55	75	36	50

Five hundred and ten (510) patients were selected of which 428 patient files were audited (83.9%). Majority of the patient files (N=79) were audited in week 2, of which 72 files were audited (91.1%). Subsequently, 75 files were audited in week 3, 5 and 6 of which 61 files were audited in week 3 (81.3%), 55 were audited in week 5 (73.3%) and 75 were audited in week 6 (100%). In week 4 and week 7, only smaller proportion (62%, 72%) of the selected files were eligible for the audit while 100% files were audited in week 1 (N=35) and 8 (N=50).

Figure 1 shows distribution of gender of audited patients. There were more females in the audit groups for 7 out of the 8 weeks of audit, excluding in week 2. More than 50% of the audited patient data were of females while the remaining audited files were of the male patients across all weeks excluding the week 2. In week 2, 53% of the audited files were of male patients while remaining 46% were of female patients.

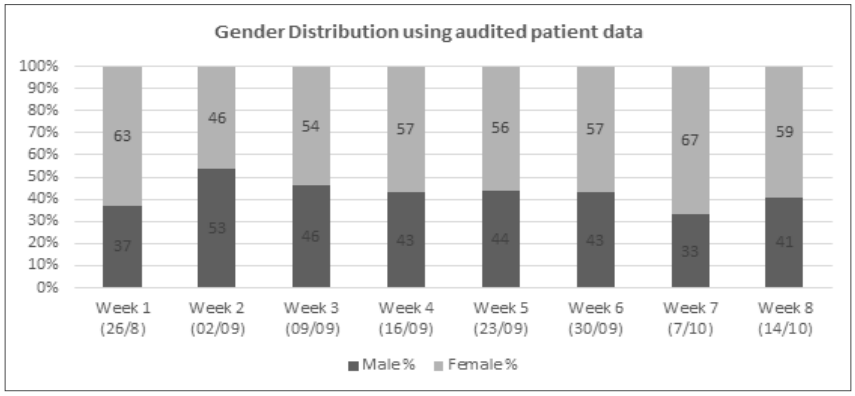


Figure 1. *Distribution of gender based on the audit data*

Timeline chart (Fig 2) shows changes to follow-up procedures and introduction of intervention due to the evolving nature of the pandemic in SWSLHD such as responses to technology (pulse oximeters, Curious Thing) and logistics / scaling to deliver pulse oximeters to patients. Figure 3 shows the distribution of patients stratified or identified in the risk categories. There was as incline of more Amber and Red category of patients throughout the study period.

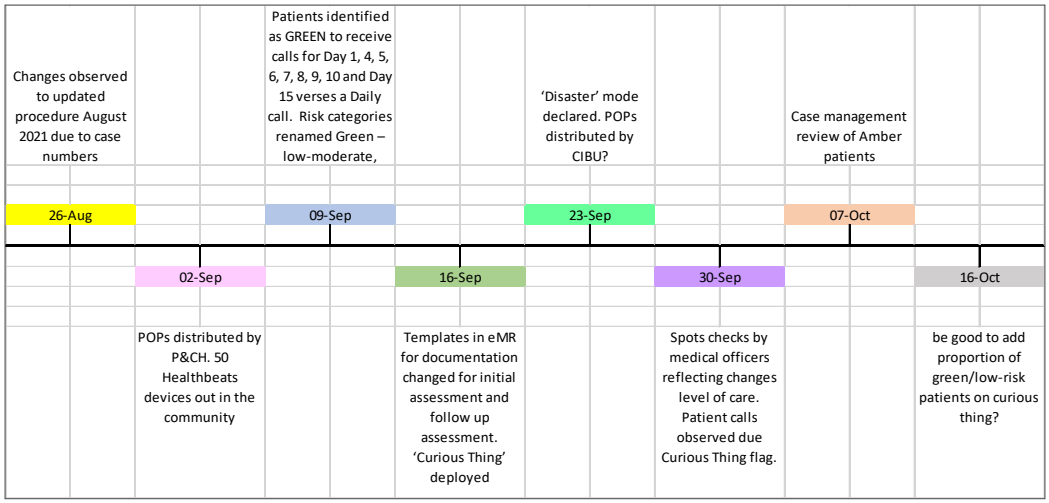


Figure 2. *Timeline chart*

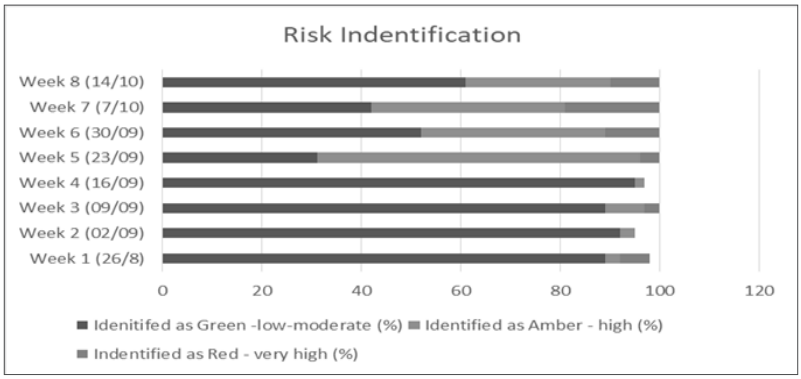


Figure 3. *Distribution of the audited patients based on their degree of risk*

Figure 4 shows progressive increase in percentage of patients who received a pulse oximeter for their in-home monitoring of oxygen saturation. This was indicated if the patient had a POP reading noted in eMR. In week 1, 83% patients had a pulse oximeter for their follow-up care following which the trend was declining following which the trend of percentage who had a pulse oximeter for their follow-up care increased. Supplemental Figure 1 shows the mean days between the initial assessment and patients' first pulse oximeter reading noted in eMR, indicating the average days between the initial assessments is greatest in week 4 (3.37), lowest in week 3 (1.57) and shows a declining trend over the 8 weeks of audit. This showed that pulse oximeter distribution occurred and was utilised by patients during their follow-up journey and shortly after the initial assessment during the 8 weeks of audit.

Supplemental Figure 2 shows the mean days from when the patient had their positive COVID-19 test / swab to their initial assessment via phone call. Data shows means days decreased over the duration of the audit to indicate increased follow-up program efficiency due to the introduction of intervention.

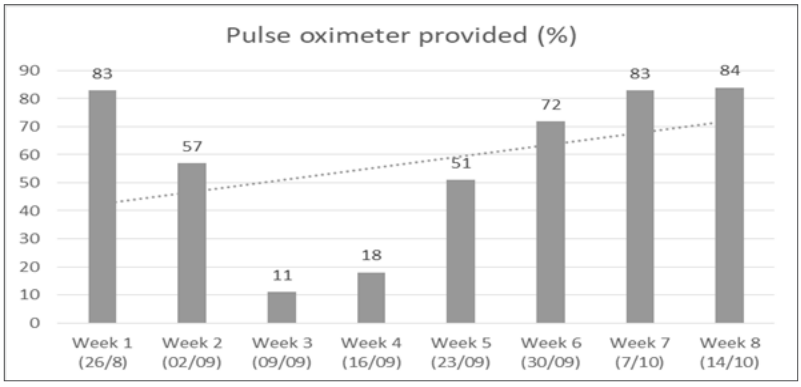
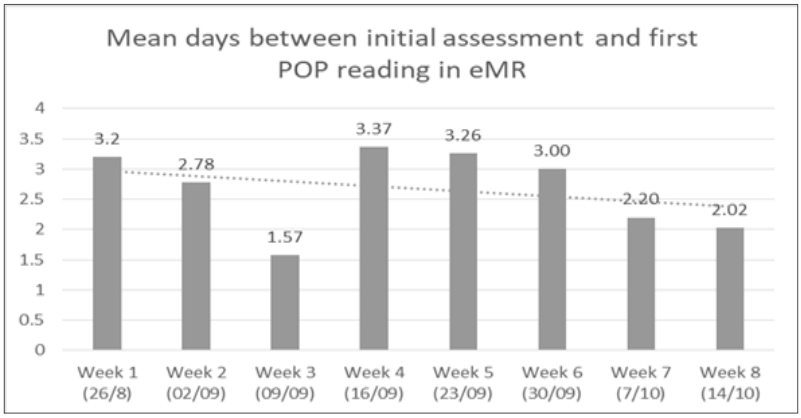
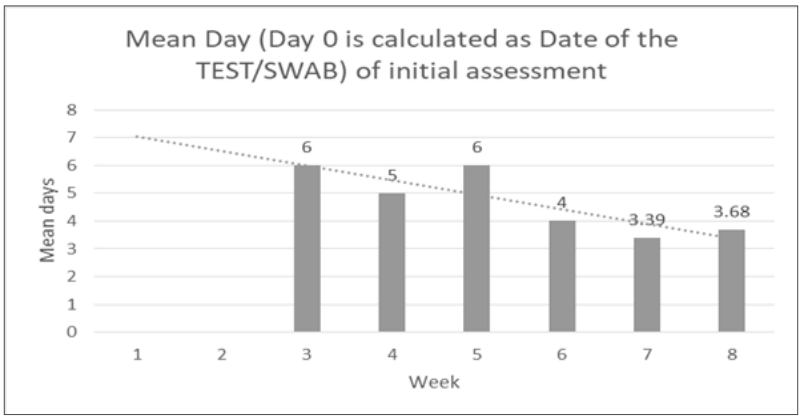


Figure 4. *Percentage of pulse oximeter who had a pulse oximeter for their follow-up care*



Supplemental Figure 1. *Mean days between initial assessment and first pulse oximeter reading in eMR*



Supplemental Figure 2. *Mean Day between COVID-19 test / swab and initial assessment*

5. Discussion

This prospective cohort study provides valuable insights into the practices in follow-up care for COVID-19 positive patients undergoing home isolation in south western Sydney between the wave of an unprecedented pandemic in 2021. By conducting a proactive comprehensive file audit, the study aimed to evaluate adherence to established procedures, policies, and frameworks within the SWSLHD and identify areas for rapid improvement so as to manage the fast-pace and demands as a result from the COVID-19 pandemic. The findings reveal a mixed picture regarding adherence to follow-up procedures over the audit period. While some aspects of follow-up care showed improvement, such as the increased utilization of technology such as pulse oximeters for patient monitoring, challenges in ensuring consistent daily follow-up calls and addressing outliers in follow-up timelines were identified. This highlights the need for ongoing quality improvement efforts to optimize patient outcomes and rapid response and prioritisations if accurate and timely data are accessible.

An audit study conducted in the Sydney Local Health

District (SLHD) which included real-time audit (audited 293 cases) to assess a Continuous Quality Improvement activity to improve the quality of public health data in the SLHD Public Health Unit during the first wave of COVID-19 pandemic. This study echoed the importance of utilising a team, separate from operational staff, to conduct a real-time audit of data quality was an efficient and effective way of improving epidemiological data.[13] The findings of the study had further signified the importance objectives and outcome of this study in south western Sydney.

During the first wave of the pandemic in spring 2020, the audit study conducted in the United Kingdom found that the use of pulse oximeter increased from the baseline of 6.0% to a peak of 10.4% followed by a rise to 10.6% during the second wave and 7.4% during the third wave. This study showed increased utilisation of technology such as pulse oximeter during the pandemic which was consistent with our study findings.[14]

One of the strengths of this study is its novelty within the SWS region, being the first to evaluate follow-up care for COVID-19 positive patients in home isolation using audit and feedback data during the pandemic. The inclusion of data from multiple healthcare facilities within SWSLHD enhances the generalizability of the findings to a diverse patient population, providing valuable insights for healthcare providers and policymakers.

However, several limitations should be acknowledged. The prospective nature of the study introduces inherent limitations, there is a risk of missing or inaccurately recorded information, particularly if patient files are not audited due to various reasons. Additionally, the study period was relatively short, and the findings may not capture long-term trends or changes in follow-up practices beyond the specified timeframe.

Moving forward, continuous monitoring and evaluation of follow-up practices are essential to address the identified challenges and ensure the effectiveness of home isolation care for COVID-19 positive patients or in a boarder term eligible patients who require chronic care management. This may involve implementing targeted interventions to improve adherence to follow-up procedures, enhancing communication and coordination among healthcare teams, and leveraging technology to streamline patient in-home monitoring and support processes.

6. Conclusion

This study underscores the importance of regular audit and timely feedback mechanisms in driving quality improvement initiatives for follow-up care of COVID-19 positive patients in home isolation. By identifying areas for enhancement and implementing evidence-based interventions, healthcare providers can strive to deliver optimal care and support to patients while effectively managing resources during the ongoing pandemic. The model from this study can be translated to other chronic care management disease which require to deliver evidence-based in-home monitoring for eligible patients at their home.

Data Availability Statement

Data are available on request from the lead author.

Ethics Statements

Patient Consent for Publication

Not required.

Ethics Approval

This study received approval from the South Western Sydney Local Health District's Human Research Ethics Committee (Reference: 2021/ETHQA21/3).

Contributorship Statement

JC developed the idea and methodology of the study and provided governance and oversight. JR coordinated the audits. JC and JR analysed and interpreted the data. All authors approved the final version of this manuscript.

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Competing Interests

The authors have no financial or professional relationships which may pose a competing interest.

Patient and Public Involvement

Patients or the public were not involved in the design, conduct, reporting or dissemination plans of this research

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