

Virtual models of chronic disease management: lessons from the experiences of virtual care during the COVID-19 response

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Abstract.

Objective. This study examined Gold Coast staff and patient experiences with the rapid expansion of a virtual model of chronic disease management during the COVID-19 pandemic.

Methods. The study undertook a survey of enrolled patients ($n = 24$) and focus groups with clinical and administrative staff ($n = 44$) delivering chronic disease programs at Gold Coast Health in Queensland. The study also examined routinely collected activity data for the chronic disease programs before COVID (January–February 2020) and for the first 3 months of the COVID-19 response (March–May 2020).

Results. Chronic disease programs continued to provide similar numbers of appointments over the COVID-19 response period, but there was a marked increase in the proportion of appointments that were delivered virtually, either by telephone or video conference. Most patients were satisfied with their virtual care experiences and felt that their health care needs were met.

Conclusions. The COVID-19 response provided an opportunity to learn and further develop models of virtual care. Staff and patients were generally supportive of continuing to include virtual appointments in the future. Ongoing concerns were predominantly around the support available to patients and staff to ensure they are trained and equipped to manage the technology and new mode of communicating.

What is known about the topic? Emerging evidence suggests that virtual models of health care delivery, such as telephone and video consultations and remote patient monitoring, can be safe and cost-effective alternatives to traditional face-to-face chronic disease management programs. Virtual care is associated with equal or improved clinical outcomes, as well as efficiency improvements, such as reduced failure to attend rates.

What does this paper add? The increasing burden of chronic disease across Australia, as well as the need to minimise the risk of vulnerable patient groups attending in-hospital appointments where it is safe and appropriate to do so, means that expanding the delivery of virtual chronic disease management will become increasingly necessary. The results of this study provide an opportunity to learn from a rapid rollout of virtual care for these staff and patient groups and will help inform advances in this area.

What are the implications for practitioners? Existing evidence, demographic pressures and the COVID-19 pandemic response all point to virtual care as a viable and safe alternative to traditional models of chronic disease management. The lessons presented here provide more detailed guidance on the support that staff and patients require to ensure virtual care is a seamless and safe alternative or adjunct to traditional chronic disease management programs.

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Introduction

Virtual models of health care delivery, such as telehealth, telemedicine and telephone consultations, have rapidly increased worldwide over the past decade. This has largely been driven by advances in technology and emerging knowledge around more effective and economic ways of safely caring for patients.^{1,2} Conducting patient consultations via telephone or videoconference

provides an alternative to patients who may have difficulty in attending appointments in person due to physical or geographical barriers.^{2,3}

Simultaneously, countries including Australia are witnessing a continuing rise in the burden of chronic diseases on population health and healthcare systems.^{4–6} In response, healthcare providers are exploring and testing innovative ways of using virtual

or remote methods for providing patient diagnosis, treatment and education, supporting and monitoring patients, improving access to health services, promoting treatment adherence and managing chronic disease.^{4,5,7–9}

The community and health system response to the COVID-19 pandemic, especially social distancing requirements, has further reinforced the importance of considering alternative models of care, particularly opportunities to deliver more care virtually where it is safe and appropriate to do so.^{3,10} Accordingly, Gold Coast Health in Queensland was prompted to find safe, alternative means of delivering care and communicating with patients in its community-based chronic disease programs. This response expedited some technological and service delivery changes that were already in the planning stages and provided an opportunity for these staff and patient groups to learn from a rapid rollout of virtual health, defined here as video and telephone consultations. This paper describes the introduction of a virtual model of care for the management of patients with chronic disease, drawing out practical lessons regarding implementation and support requirements.

Although existing evidence is mixed, many studies do report that virtual chronic disease care can be as, if not more, effective than traditional face-to-face care provided in a healthcare setting.^{5,11–15} Studies have identified clinical benefits of virtual care for chronic disease patients, including improvements in heart failure symptoms, chronic respiratory symptoms, glycaemic control in diabetes, blood pressure in hypertensive patients, quality of life, mental health and reductions in deaths and hospitalisation.^{5–8,15–19} Other non-clinical benefits of virtual care include improved appointment attendance, increased patient knowledge and self-management and patients feeling more supported.^{16,20–23} Programs based on a virtual delivery model use various approaches and have demonstrated varying levels of success, indicating that further research is necessary to better understand the most effective models for managing chronic diseases.¹⁶

As parts of Australia continue to experience surges in the number of COVID-19 cases, it is necessary for health services to continue to plan and respond, which will include limiting face-to-face care where safe and appropriate, and encouraging further delivery of health care through virtual models. It is important that these plans continue to incorporate developing evidence and experiential learning regarding the safe management of patients in the community, using technology to support their recovery and well-being. This paper reports on patient and staff experiences of virtual care in four community-based chronic disease programs at Gold Coast Health: diabetes, heart failure, cardiac rehabilitation and pulmonary rehabilitation. These programs typically provide a range of individual clinical consultations with medical, nursing and/or allied health professionals (e.g. speech pathology, nutrition or physiotherapy), as well as group education and exercise sessions where appropriate. Prior to the COVID-19 response, all group sessions and most individual consultations were delivered face to face in community health centres. In March 2020, program staff worked with their patient cohorts to schedule virtual clinical consultations where it was safe and appropriate to do so. Lessons from these experiences are fundamental for Gold Coast Health and other health services across the country in developing and expanding alternative and flexible models to care for patients in the community.

Methods

This paper draws on activity data, a patient survey and staff focus groups to provide a comprehensive analysis of the activity and experiences of virtual chronic disease management. Activity data were extracted from the four aforementioned chronic disease programs in scope, with basic descriptive statistics for the period immediately preceding the COVID-19 response (January–February 2020) and the period covering the initial COVID-19 response (March–May 2020). It is not possible to report on outcome data in this paper due to insufficient time since program delivery for outcomes to be observed.

A survey was sent to a sample of patients enrolled in the chronic disease programs to better understand their experiences with virtual appointments and the devices they used. The sample selected consisted of patients who had agreed to be contacted for research purposes and were known to have participated in at least one telephone or video consultation during the COVID-19 response period. A link to an online survey was texted to patients with a recorded mobile telephone number, with instructions to request a paper copy of the survey if they preferred. If patients did not have a recorded mobile telephone number, they were posted a paper copy of the survey. The survey asked about the benefits and challenges of virtual appointments and how patients' experiences could be improved. No follow-up or reminder contacts were made. Although the response rate was low (12%; 24 responses from 207 surveys), the data provide a snapshot of experiences that are useful when combined with activity data and staff experiences. From these data, basic summary statistics were derived.

Six focus groups were undertaken across the chronic disease programs, capturing feedback from 44 clinical and administrative staff working in these community-based teams. All staff involved in coordinating or delivering care in these four chronic disease programs were invited to participate through an email invitation from their team leader, scheduled at times to allow for maximum attendance. The focus groups consisted of a mix of administrative and clinical staff working across the four programs. The study authors facilitated the focus groups, and staff were prompted to discuss their experiences with delivering virtual care to patients over this period, including the benefits and challenges they experienced and how their experience could be improved. Observational notes were taken by the research team and consolidated for completeness. A mix of deductive and inductive thematic coding identified areas of consensus and other commonalities across the discussions.

This paper provides an overview of activity and patient and staff experience data to describe the overall experience of virtual care for patients with chronic disease and staff delivering the programs and to draw out lessons for the future development of this service that will be of value to health services across Australia.

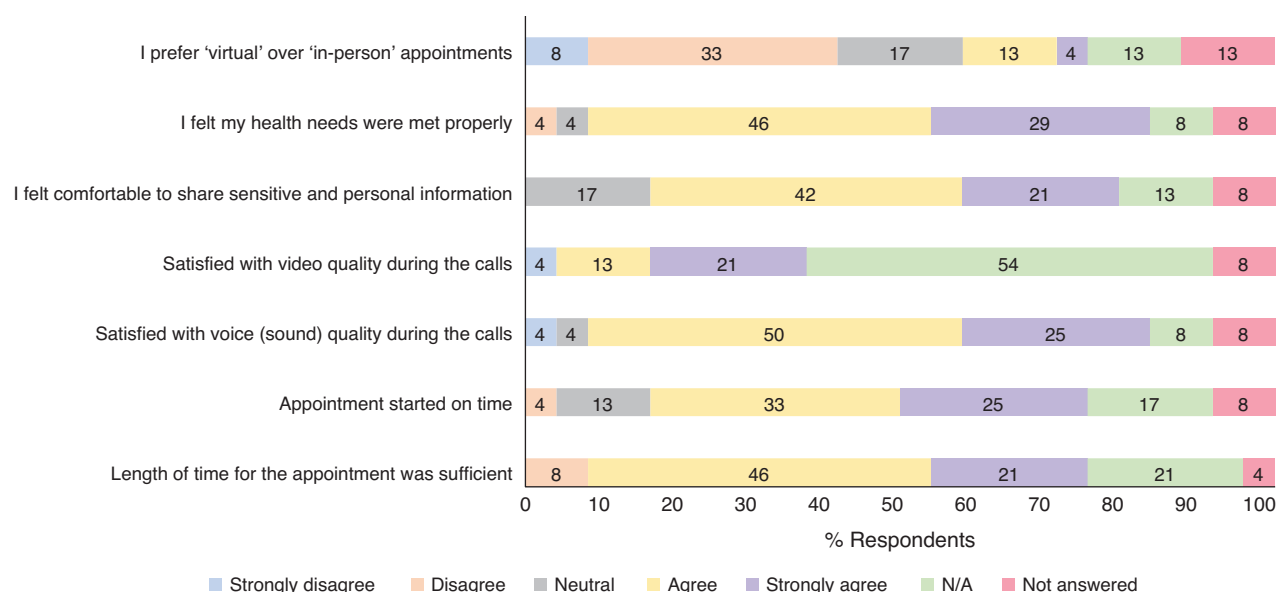
This study was reviewed by the Chair of the Gold Coast Hospital and Health Service Human Research Ethics Committee (HREC) and deemed not to require HREC review on the basis that it is a Quality Activity. The study was assigned the following HREC reference number: LNR/2018/QGC/43980.

Results

The total occasions of service provided by the chronic disease programs remained quite consistent over the pre-COVID

Table 1. Chronic disease program activity data, January–May 2020Unless indicated otherwise, data are given as *n* (%). F2F, face to face; FTA, failure to attend; N/A, not applicable; OOS, occasions of service

| | January 2020 | February 2020 | March 2020 | April 2020 | May 2020 | Total |
|--|--------------|---------------|-------------|-------------|-------------|-------------|
| Total no. OOS | 2506 | 2732 | 2608 | 2332 | 2469 | 12 647 |
| No. video appointments | 0 (0) | 0 (0) | 0 (0) | 8 (0.3) | 25 (1.0) | 33 (0.3) |
| No. telephone appointments | 718 (28.7) | 714 (26.1) | 1182 (45.3) | 1634 (70.1) | 1465 (59.3) | 5713 (45.2) |
| No. F2F appointments | 1462 (58.3) | 1399 (51.2) | 1034 (39.6) | 574 (24.6) | 755 (30.6) | 5224 (41.3) |
| No. home visits | 40 (1.6) | 159 (5.8) | 146 (5.6) | 115 (4.9) | 219 (8.9) | 679 (5.4) |
| No. F2F group appointments – individual patients | 286 (11.4) | 460 (16.8) | 246 (9.4) | 1 (0.0) | 5 (0.2) | 998 (7.9) |
| No. FTAs | 235 | 210 | 182 | 107 | 111 | 845 |
| No. FTA face-to-face appointments ^A | 225 (15.4) | 191 (13.7) | 154 (14.9) | 35 (6.1) | 47 (6.2) | 652 (12.5) |
| No. FTA telephone appointments ^A | 10 (1.4) | 19 (2.7) | 28 (2.4) | 72 (4.4) | 63 (4.3) | 192 (3.4) |
| No. FTA video appointments ^A | 0 (N/A) | 0 (N/A) | 0 (N/A) | 0 (N/A) | 1 (4.0) | 1 (3.0) |
| No. appointments rescheduled | 916 | 856 | 1017 | 678 | 786 | 4253 |
| No. appointments cancelled | 1603 | 1011 | 910 | 625 | 375 | 4524 |
| No. discharges from chronic disease program | 289 | 271 | 313 | 321 | 327 | 1521 |

^APercentage of the total OOS.**Fig. 1.** Patient-reported experiences with virtual care during COVID-19. N/A, not applicable.

(January: *n* = 2506) and COVID (April: *n* = 2332) periods according to available data (Table 1). The number of individual face-to-face appointments decreased over the COVID-19 period (January: *n* = 1462; April: *n* = 574) and the number of individual 'virtual' appointments increased considerably (January: *n* = 718; April: *n* = 1642). Most of these virtual appointments were via telephone (April: *n* = 1634) and a smaller number of appointments were via video (April: *n* = 8). The number of cancelled or rescheduled appointments peaked in March (cancelled: *n* = 910; rescheduled: *n* = 1017) when the health service responded to initial COVID-19 restrictions regarding social distancing. However, the total number of patients failing to attend their appointments consistently decreased over the COVID-19 period. Overall, the failure to attend rate was considerably and consistently lower for virtual appointments (3.2%) than it was for face-to-face appointments (12.5%).

Patient experiences of virtual care

Of the 24 patients who completed the survey, 38% were aged between 55 and 69 years and 42% were aged >70 years. Patients reported speaking with a wide range of staff during their virtual appointments; most frequently with a doctor (42%), physiotherapist (29%), dietician (25%) or a nurse (25%). Fig. 1 summarises respondents' overall experiences with virtual appointments.

Most respondents either agreed or strongly agreed that the length of their appointment was sufficient (46% and 21% respectively), the appointment started on time (33% and 25% respectively), the quality of the call was satisfactory (50% and 25% respectively), they were comfortable sharing information (42% and 21% respectively) and their health needs were addressed (46% and 29% respectively).

Those respondents who provided free-text responses on the benefits of virtual care reported time and money saved on travel

as the main benefit, particularly if they had disabilities that made travelling to appointments even more challenging. Among the patients, 46% reported they would welcome a mix of virtual and face-to-face appointments in the future, whereas 42% reported they only wanted to have face-to-face appointments.

The challenges or suggestions for improvement were variable, but included some elements that the health service could address, such as providing a more specific appointment time in advance to allow patients to plan and set up technology. Some patients were only informed that they would receive a telephone call from a clinician on a certain day, but not provided with a specific appointment time. There were some challenges that patients could address with the support of the health service, such as poor Internet connection, remembering to charge their telephone or outdated software and operating systems.

Staff experiences of virtual care

Staff involved in coordinating or delivering virtual chronic disease care had the opportunity to reflect on their experiences and how virtual care approaches could be further improved to deliver seamless care to patients with chronic disease in the community. These staff included administrative, nursing, medical and allied health professionals. Feedback demonstrated that these staff were generally positive regarding the transition to delivering more virtual care and recognised that it was a novel situation that required everybody to adapt accordingly. Overwhelmingly, staff involved in the chronic disease programs had adapted to the changes to their mode of care delivery resulting from COVID-19. They understood and supported the changes to their service and worked hard to embrace new technology with minimal support or training.

As indicated in Table 1, most virtual appointments were conducted via the telephone (99% of all virtual appointments between January and May 2020). In most cases, staff and patients chose the telephone as an easy and accessible platform for communicating, and did not consider that there was any added benefit from having a video function. In some cases, patients did not have the equipment to support video consultations, or staff and patients reverted to a telephone call after experiencing connection problems in an attempted video consultation. Staff reported that they were generally skilled at undertaking telephone assessments and saw advantages and disadvantages of telephone appointments. Telephone appointments were considered more time efficient than face-to-face appointments because patients could be offered a broad 'window' appointment time and the clinician could keep moving through appointments if the patient did not answer the telephone or the call took more or less time than expected. Staff also perceived the benefits of virtual care for patients who were frail or found it difficult to travel for other reasons and could therefore avoid coming to the community-based centre for their care.

Conversely, staff had concerns regarding the cost burden on patients: keeping an up-to-date operating system and device, downloading applications and data costs. They also reported that telephone appointments in particular did not allow them to pick up on visual cues from the patient, such as weight, symptoms or other clinical judgements, and that it took longer to explain things, particularly to patients who were more visual or kinaesthetic learners. Some staff felt that video consultations would address concerns around the inability to see visual cues and

support learning models, whereas others were uncertain of the added value of video consultations over telephone consultations.

Technology challenges were experienced by many staff and patients. Staff reported that patients required considerable support in setting up their devices and connecting to video appointments. Staff themselves were not experts in the technology and were uncertain on how to best provide this support. They were concerned that a considerable amount of their time was taken with troubleshooting the technology and setting up appointments. There were several communication challenges with video consultations for both staff and patients. Staff reported that it was difficult to instruct patients to position their camera so they could capture what they were demonstrating. Some staff were also reluctant to type notes during appointments in case it appeared that they were not engaged, whereas other staff reported that video and telephone appointments made it easier to simultaneously type notes because they did not feel they could do that during face-to-face appointments.

Despite several challenges with virtual appointments, most staff felt that a mix of face-to-face and virtual appointments would be feasible in the future, with an initial face-to-face appointment that ascertained the patient's digital literacy and informed the ongoing proportion of virtual (video and/or telephone) and face-to-face appointments. Staff reported that this model of care should be coupled with further support and education in technology and appropriate communication techniques for virtual appointments: camera positioning and room layout; policies for ensuring patient safety and escalation procedures; catering to different interaction styles; and alternatives for kinaesthetic learners.

Staff also suggested sourcing resources that could be provided to patients virtually, including education and exercise videos and other materials. Staff discussed developing a suite of online materials, such as videos or written materials, and compiling resources from other sources that they could put together in a bespoke pack for each patient as required. They were enthusiastic about expanding online materials and eager to build on their technological skills in editing and web hosting.

Discussion

Both patients and staff were generally enthusiastic and supportive of more virtual models of care and were responsive to what they recognised as a necessary shift in the mode of care delivery in response to a crisis situation. COVID-19 expedited several planned changes, but there was limited opportunity at the height of the crisis response to fully embed the breadth of necessary support functions or ensure patients and staff had the appropriate training and sufficient equipment. The findings presented here largely reflect those previously reported in the literature²⁻⁴ while contributing more detailed lessons regarding the implementation and support required to embed virtual models of care delivery.

Staff and patients did have some frustrations (particularly around software, devices and connectivity) and requested additional support, but could see the value of virtual appointments as an adjunct, rather than a replacement, to face-to-face care. Challenges with technology were commonly reported by patients enrolled in comparable virtual care programs.^{7,10} Nonetheless, most staff and patients were open to including virtual appointments in the future delivery of chronic disease care. Consistent

with previous studies, the ongoing concerns were predominantly around the support available to patients and staff to ensure they are appropriately trained and equipped to manage the technology and the alternative modes of communicating.^{10,14}

Patient safety is paramount for those in community-based chronic disease programs, ensuring that there is a safe, reliable and appropriate means of communication that allows for clinical assessments, the provision of education materials and the opportunity for participation in exercise sessions and other activities.²⁴ Although training and education will be fundamental to the success of virtual care, the findings here support other research in concluding that it is essential that an assessment of patients' digital literacy is undertaken before enrolling patients in a partial or fully virtual model of care.²² This is supported by literature suggesting that virtual care training should be tailored to the literacy level and education status of patients, and that additional support or training are provided where necessary.^{14,22} The digital literacy assessment and support can be conducted by a non-clinician, where appropriate, so that clinical staff can focus fully on providing direct patient care.

Although there is strong potential for efficacy in virtual chronic disease management programs, prior consideration should be given to several lessons identified from this study in supporting the more detailed implementation and delivery of virtual models of care. Chronic disease programs should offer a flexible range of virtual and face-to-face appointments, individualised according to a patient's identified clinical and social needs, as well as level of digital literacy. Staff require targeted and ongoing support in the use of devices and software, with clear instructions and support in troubleshooting with patients. Patients require devices and/or data to enable them to safely participate in virtual appointments, delivered at no extra direct cost to the patient. Chronic disease programs require support in developing and/or sourcing online resources that can be provided to patients to supplement their virtual and face-to-face appointments. Staff require support and education in establishing appropriate communication styles and 'rules of engagement' to ensure that virtual communications are equal to or better than face-to-face communications.

Conclusion

Virtual models of health care delivery for patients with chronic disease were developing across Australia and internationally before the COVID-19 pandemic, with telehealth becoming an increasingly convenient alternative for delivering care across large geographical areas and making specialist care more accessible to larger populations.^{17,25} A growing body of evidence suggests that virtual care is equally or more effective than providing care through traditional models of delivery.^{5,11–15} The results from this evaluation demonstrate the value and viability of offering virtual care, with more detailed lessons regarding the specific support required for clinicians and patients. Further research on this program is required to better understand the impact on patient outcomes and service costs. Nevertheless, the lessons from this evaluation are especially important across Queensland and Australia given the geographical spread of the population and burdensome travel required for some patients to receive care.

Virtual care is not a replacement for traditional communications, rather another option for delivering care without the

necessity for patients to attend appointments in person, saving patients time and money and providing critical support and care to patients in need.^{2,12,20,21} Virtual care can be a valued, viable and preferred method of providing and receiving care and, if adopted more widely in Australian health services, has the potential to be a more effective, financially viable and sustainable model of care delivery.

Competing interests

None declared.

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