Managing patients with chronic pain during the Covid-19 outbreak: considerations for the

rapid introduction of remotely supported (e-health) pain management services

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Introduction

Across the world pain treatment centres have closed their doors. Due to the Covid-19 pandemic, healthcare providers are abruptly changing their care delivery to protect patients and staff from infection, and to reallocate resource towards the greatest acute needs. Elective, routine, and non-emergency casework has stopped in secondary and tertiary centres, while in primary care, patients are requested to stay away or 'socially distance', and in residential care facilities and hospices, strict isolation and separation protocols have been introduced.

Before the Covid-19 pandemic, telemedicine and eHealth approaches were being developed and tested in a gradual fashion with many studies focusing on lessons learned and barriers to using digital solutions. [3,36,51] Overnight, however, treating or supporting people with non-urgent and long-term conditions at a distance from healthcare providers has become imperative. These immediate changes are happening across healthcare systems. Telemedicine is being used to demand-manage the flow of patients with respiratory distress accessing emergency departments, [24] video consultation is being introduced in multiple settings; [22] and using social media is being discussed positively for its potential to direct people to trusted resources, to counteract misinformation, and to provide psychological first aid. [35]

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Pain management providers face the challenge of delivering face-to-face service through different modes. Fortunately, there is a rich stream of research and clinical experience in the use of different technological solutions. Table 1 provides a summary of the definitions and terminology in use.

We consider four related factors to help guide healthcare professionals caring for patients with chronic pain: (i) the public health consequences of Covid-19 for patients with pain; (ii) the consequences of not treating these patients for the unknown duration of this pandemic; (iii) options for remote assessment and management; and (iv) clinical evidence supporting remote therapies. Finally, we provide guidance for those attempting to rapidly transition to remote care with technology, and discuss the lessons for the future of the pain treatment centre.

1. Public health considerations

Pain prevention and control – particularly for chronic pain – will inevitably be disrupted by the Covid-19 pandemic. Diversion of resources will be planned (e.g., cancelling elective surgery and outpatient procedures for chronic disease management) and unplanned (e.g., medication shortages due to panic buying and inaccessibility of remaining healthcare options during movement restrictions). Longer-term, healthcare workers are likely to be at higher risk of lasting psychological morbidity based on evidence from the 2002-03 SARS epidemic. [32]

The effect of the pandemic on pain burden will be differentially distributed across and within populations, depending on population characteristics emerging as determinants of the pandemic, including older age, population density, socio-economic gradient, smoking prevalence, levels of chronic disease morbidity, availability of diagnostic testing and access to health care. Some of these characteristics are also associated with higher levels of chronic

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pain prevalence and burden (e.g., older age, socio-economic status, smoking prevalence, chronic disease comorbidity, and access to health care). [5] Therefore, populations with higher existing pain burden are more likely to experience higher incidence of Covid-19 infections, greater disruption to their usual healthcare access, and worse downstream consequences of abruptly altered health care. In addition, some at-risk population subgroups also have poor access to technologies used in remote care. [48]

Prevention of chronic pain within populations currently depends on best practice management of acute pain and early recognition of the risk of progression to chronic pain. [6] Drivers of acute pain burden include injury-related pain and treatment-related pain (e.g., following surgery). Social isolation measures will directly influence the number and type of injuries experienced within populations (e.g., fewer road traffic and workplace accidents, increases in conflict/interpersonal violence, and domestic injuries). Changes in the overall volume and type of surgery (more emergency and high acuity elective surgery) are occurring as health systems pivot to respond to the pandemic. Preventing chronic pain is complex at the best of times, but in a global health pandemic, risk factors for pain morbidity and mortality will be magnified.

2. Not treating chronic pain

The high prevalence of chronic pain risks inuring us to suffering; one can easily mistake common for trivial. When people with chronic pain are denied assessment and treatment, their condition can worsen significantly; spontaneous recovery is rare. People living with chronic pain have the largest global morbidity, measured by years lived in disability. [44] People waiting for assessment often report severe levels of pain that interfere with their ability to function, and reports of severe pain are associated with more severe levels of depression in 50%, and

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suicidal thinking in 34.6%. [8] Children and adolescents also report high symptom burden when awaiting evaluation. [43] Further, people waiting over six months for assessment experience deteriorating health-related quality of life, increased pain, and increased depression. [29]

The risks of harm from under-treatment can be exacerbated further by the risk of harm from inappropriate treatment. In many countries, most notably the US and Canada, chronic pain management is practiced in the shadow of a crisis of the oversupply and overuse of opioids. [47] Given that best practice for prevention of opioid harms is unclear, referral to pain professionals for pain medicine management is common. [4] In the US, few pain clinics can care for high volumes of patients and referring everyone for opioid stewardship is unrealistic.[10] In North America, we already see an increase in serious mental health problems as some turn to illicit sources of opioids, while others suffer in silence. [23] Not treating chronic pain will have consequences for individuals, healthcare systems and providers in the short- and long-term, increasing quantity, severity, and complexity of need.

3. Distance assessment and treatment with technology

To address the needs of people with chronic pain, one should look first to pervasive and inexpensive technology such as the telephone. [40] Telemedicine, including telephone consultation, Short-Message-Services and video-conferencing are used worldwide and are broadly analogous to traditional care, although the benefits and costs of telemedicine are still largely unknown. [27, 33] They are minimally disruptive and require a broadly similar healthcare resource.

Clinical assessment relying on patient-reported outcome measures (PROMs) can be undertaken remotely. Mobile telephones with camera technology allow for shareable images

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of paper assessments. In addition, many local electronic health record (EHR) systems already allow electronic administration of measures. Several web-based systems have been optimised for people with pain, such as the CHOIR system in the US [9] or the PAIN OUT system in Europe.[41] Such systems allow clinicians to review measures prior to appointments. Interdisciplinary evaluations can be modified for distance use prior to the visit, supporting history and interview. Even aspects of the physical exam can be undertaken virtually, for example in judging appearance, movement, or in self-examination under guidance. While there are limitations to the lack of hands-on physical exam possible with telehealth, a modified virtual exam may allow an initial treatment plan to be started.

Pain self-management options are available using different technologies (e.g., the internet, email, computers, and 'smart' phones) which play a central role in health care provided to patients. Most studies have been concerned with remotely-delivered self-management interventions for chronic pain, undertaken at one's convenience and without having to leave the home. [11,13,14,42,45] These interventions aim to provide the same information and training in self-management skills as provided in face-to-face pain management programs but use technology in different ways. Interventions have been examined in controlled trials. [19,46]

The focus on technology promises increased access and scalability, although evaluations of their impact in reaching scale are scarce. Several of these interventions are already freely available in some parts of the world, and many others are commercially in development or are being offered. [15] A caveat on commercially developed interventions, however, is the current lack of quality control over the content, security, and marketing claims. The burgeoning app market is a good example and caution should be exercised. [27]

Table 2 summarises guidance for those unfamiliar with telemedicine and digital treatments who are tasked with their rapid deployment.

4. Evidence for efficacy and harm of telemedicine and DTx interventions

Although telephones are in common clinical use, full-scale telemedicine for people with chronic pain is rare. In general, the evidence is similar to that from primary care studies and is cautiously optimistic, but recognizes barriers to implementation, unforeseen harm, and potential for inequity in access and use. [16,20,30,39]

Most innovation has been in the development of internet delivered therapies for people with chronic pain. Many remotely delivered programs can be accessed directly and have minimal requirements. In children and adolescents with mixed chronic pain (e.g., sickle cell disease, musculoskeletal pain, juvenile idiopathic arthritis, headache), remote psychological therapies delivered via the internet or mobile applications show small beneficial effects for reducing pain intensity, including headache severity, after treatment, but not maintained at follow-up.[19] The first Cochrane systematic review of technological interventions for chronic pain in adults found 15 studies with 2000 participants.[17] Several systematic reviews have been published since. [7,12,31,46] Reviews identify small to moderate reductions in pain, disability and distress in intervention groups compared to any control (including active, standard care, or waitlist control). [7,31] Unsurprisingly, when compared to only active control (e.g., face-to-face therapies), no difference in treatment effect was found between remote and in-person therapies. [31] Remotely delivered physical exercise interventions are also available, with benefits comparable to usual care for reducing pain, and beneficial compared to no treatment. [1]

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Although promising, there are concerns related to the evidence underlying remote therapies; relatively few studies assessed for harm, and dropout can be substantial. Access and engagement are important to track and report, particularly as disadvantaged groups use technology less (e.g., older adults, disabled people). [2] 'Therapeutic alliance' is important but may be more challenging to establish, foster and maintain remotely. That said, a large trial delivering psychological therapy via an online pain course showed improvement in pain, disability, and emotional functioning compared to waiting list, but few differences between groups with varying amounts of therapist contact. [14] Understanding who struggles to engage and use eHealth provision is crucial to maximise effectiveness, as are concerns about privacy, transparency (e.g. therapist-generated vs. automated messages), and training needs of staff accustomed to face-to-face working.

Virtual and augmented reality are rarely used with chronic pain but have potential for remote use, going beyond distraction, with a focus on improving function and reducing distress. [18] Early studies are promising but small. [21,25]

5. Discussion

Covid-19 will have consequences for people with chronic pain, a large population with the greatest global burden of disease. The downstream consequences of disrupting treatments for chronic pain have yet to be modelled but are likely to be substantial. Many healthcare professionals specialising in pain have skills directly relevant to the acute response to the pandemic and so will be redeployed; others may be able to maintain some service delivery to affected individuals.

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Telemedicine and eHealth interventions for service delivery will be attempted and will be novel for many. Ubiquitous communication technology is relatively inexpensive to access. It is practically possible to communicate with patients if the personnel and infrastructure are available. In some treatments, such as psychologically-orientated self-management, investment in developing web-based or application-based platforms delivering pain self-management has produced some evidence of efficacy and some products are freely available to download. Healthcare providers need to be aware that many of the behavioural components of e-health self-management are not only potentially helpful for managing pain, but also for emotional distress related to the Covid-19 pandemic. In Table 3 we suggest research priorities to improve the evidence for distance interventions and learn from this abrupt change in our practice.

Changing practice in such an unplanned way will have positive and negative consequences, many unforeseen. Systems can establish protocols that can enable them to oversee, monitor, and capture important patient and provider outcomes and perspectives. When we come to re-design services after the pandemic we will need to share that experience and use it to learn what works, modify what does not work, and to build new models of care for people living with chronic pain.

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Acknowledgements

Table 1: Definitions and terminology used in remotely supported pain management

Term	Definition
Telehealth and Telemedicine	Telemedicine is the older term used more narrowly to refer to: "…the use of technologies and telecommunication systems to administer healthcare to patients who are geographically separated from providers." [38] Telehealth is a the more modern broader term referring to all possible health and social care use of technology: "Telehealth is defined as the delivery and facilitation of health and health-related services including medical care, provider and patient education, health information services, and self-care via telecommunications and digital communication technologies. Live video conferencing, mobile health apps, "store and forward" electronic transmission, and remote patient monitoring (RPM) are examples of technologies used in telehealth." [38]
eHealth	Electronic health (eHealth) is the "…cost-effective and secure use of information and communications technologies in support of health and health-related fields, including health-care services, health surveillance, health literature, and health education, knowledge and research." [1]
mHealth	Mobile health (mHealth) refers to "…healthcare applications and programs patients use on their smartphones, tablets, or laptops. These applications allow patients to track health measurements, set medication and appointment reminders, and share information with clinicians." [38]
Virtual Reality	Virtual reality uses two- or three-dimensional technology to allow patients to access and interact within an often immersive 'virtual world'. Virtual reality requires multisensory input to create this world. [28]
Augmented reality	Augmented reality involves a transparent screen or projection, or a virtual image being overlaid onto the physical world around us. It involves maintaining intact perception of the real world with a digital object or presence inserted into the world. [37]
Remote treatment or therapy	Meeting with a patient via telephone, cellular phone, the internet or other electronic media in place of or in addition to conventional face-to-face visits to deliver treatment (term is most often used in psychotherapy).
DTx	"Digital therapeutics (DTx) deliver evidence-based therapeutic interventions to patients that are driven by high quality software programs to prevent, manage, or treat a medical disorder or disease. They are used independently or together with medications, devices, or other therapies to optimize patient care and health outcomes. DTx products incorporate advanced technology best practices relating to design, clinical validation, usability, and data security." [15]

Table 2: Practical recommendations for the rapid introduction of remotely supported pain management

1. *Get to know your technology options*: Understand the technology available and how to make the best experience possible for the patient. Consider audio and video quality, background distractions, and lighting. If using videoconferencing, be sure you are positioned to make proper eye contact with the patient and are not looking at other screens. If possible, maintain your contacts with patients on a regular basis (e.g. once a week or once a month) and avoid switching to PRN contact only.

2. *Technical problems are OK*: If technical issues are encountered during the session, use the opportunity to model and practice effective problem-solving skills with the patient. Have a backup option agreed upon with the patient in advance.

3. *Appointment scheduling considerations*: Ask patients to schedule sessions with you at a time and in a place that is relatively free of distractions so that they will be able to focus on your discussion. Problem solve with patients to find a time when they are free from caring responsibilities, when privacy is possible, and that does not conflict with their partner's remote work. In the case of child or adolescent patients, help to structure the session to allow time with both the child and parent. Whenever multiple people are in the room ask for introductions of all present.

4. *Complementary resources*: Identify the remote intervention options available to the patient, which may include a combination of pure self-help (e.g., books, online materials, web-based intervention, smartphone app), and/or remote sessions with the healthcare provider. Use an "information prescription" to identify a self-help recommendation and refer the patient to use it.

5. *Reinforce positives*: Remote sessions provide an opportunity for healthcare providers to positively reinforce patients' self-management efforts. One of the best ways to do this is to ask for details about strategy use (e.g. what strategies seem to work, where and when did you use the strategy, what was the outcome). Ask patients about how they motivated themselves to use that strategy and how things went differently when they used it. If patients are using self-help online interventions, ask patients specifically what part of the online programme or app they have reached and how they have been using the strategies.

6. *Problem solve*: Work with the patient to problem solve around difficulties in managing pain. Use a patient-centered approach that encourages them to identify barriers and implement potential solutions. Context is all-important. The current context of Covid-19 brings specific challenges to problem solving, and potential anxiety behaviour should be accounted for.

7. *Experiential learning:* If possible, include some experiential learning in the session, i.e. work with the patient on a task that may help them in managing pain. This might take the form of helping them develop a daily schedule for their pain management efforts (i.e. taking medication, doing physical exercises, engaging in physical activities that are meaningful to them). Or it might involve guiding the patient through a brief imagery, meditation, or relaxation exercise. Try to enhance patient mastery of the task by asking the patient what about the task or exercise was easier for them (and why) and what challenges they experienced and how they might address them.

8. *Setting goals:* At the end of the session, work with the patient to identify specific goals that are meaningful to them and do-able that they should complete before your next session. Let them know you will start the next session by going over the goals with them.

9. *Self-help activities*: Integrate self-help activities into the overall treatment goals. At the end of the session, assign patients a specific self-help task to complete before the next session (e.g., download app, work through the first exercise).

10. *Remember the context*: Always be flexible: this is a stressful time for everyone, but particularly for those with long-term conditions. Each patient will be dealing with extra pressures (e.g., financial, childcare, health of others) that may be influence her or his pain and ability to cope.

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Table 3. Research priorities for remotely supported (e-health) pain management

services

1. Translational research on how behavioural science can be used effectively in remotely supported or delivered services.

2. Clinical trials, real world evaluations, and n-of-1 evaluations of efficacy and safety of individual assessment and treatment approaches.

3. Implementation science to study factors that determine eHealth intervention uptake, use, continued use (or stopping), satisfaction, and preferences for eHealth interventions from the perspective of patients, healthcare providers, and healthcare systems.

4. Studies exploring novel ways to use mHealth treatments: e.g. using video-over internet to guide patients through learned coping skills as they engage in challenging tasks, exploring ways to meaningfully involve significant others in treatment.

5. Identify best practice for combining face to face treatment with telehealth services: e.g. studies testing e-health strategies for enhancing engagement with on-site pain services or research examining optimal approaches for using eHealth interventions to extend and build upon gains initially achieved in face to face encounters.

6. Theory-based studies of mediators that explain the benefits of telemedicine treatments (e.g. increases in self-efficacy, therapeutic alliance, or social support).

7. Study how to best integrate mHealth innovations for ecological momentary assessment using new wearable technologies for activity monitoring, geolocation, movement, and physiological monitoring.

8. Study how best to integrate mHealth innovations for ecological momentary intervention using portable and wearable technology for just-in-time or near-time messaging or instruction.

9. Developing new models for using remote telehealth technologies to enhance the coordination of pain treatment services across disciplines to facilitate meaningful patient engagement.

10. Development and exploration of business models (e.g., reimbursement, insurance, state sponsored systems, etc) to support financial provision of remote treatments, potentially across traditional geographic, medical governance, and political borders.

11. Health economic studies to explore the costs, benefits, and impact of new systems that can potentially be accessed at scale.

12. Studies to improve the implementation and reach of mHealth innovations to specific populations at higher risk of poor health outcomes (e.g., socioeconomically disadvantaged, culturally and linguistically diverse, Indigenous).

13. An assessment of how technology might change the traditional provision of pain services, including resource allocation, and how chronic pain treatment centres can be reimagined.

14. Greater determination of the priorities for research, and consensus across different stakeholders, with specific populations, as recently undertaken with older adults. [49]