


Case Report

COVID-19 Pandemic Planning and Management: The Case of New Zealand General Practice Medical Centres

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Abstract: The objective of this study was to explore the potential enhancement of response within GP medical centres in New Zealand when facing heightened healthcare demand during a pandemic. This investigation sheds light on effective crisis management and leadership. By elucidating the contributions of this research, we gain a deeper appreciation of its importance in advancing our understanding of pandemic management. This study has yielded fresh insights and knowledge, beneficial to both academic and real-world applications, particularly concerning the adoption and effects of leadership and management within the healthcare domain amidst crisis situations. Using a multiple case study design, we conducted 86 in-depth interviews with staff from 16 General Practice centres in New Zealand. The critical activities delivered during the first six months of the COVID pandemic to keep New Zealand communities safe during the initial COVID-19 outbreak were (a) leadership in health service planning, including workforce planning, new operational processes, and expansion in the use of Information Communication Technology systems by the GP medical centres; (b) environment disinfection using national guidelines, education and establishment of respiratory clinics and expanding testing sites in GP medical centres; and (c) education and outreach to the patients including the protection of Māori, Pasifika, and remote communities. The decision to adopt a localised response to the pandemic, centralise testing, and better understand local-level needs prompted GP medical centres to communicate and engage early and effectively with patients. This enabled centres to lead and manage the COVID-19 pandemic with greater efficiency in the first six months of the outbreak. The New Zealand government's "team of 5 million" COVID-compliance campaign program provided clear and persistent communication by the Ministry of Health. This campaign assisted in a better national understanding and compliance with the regulation of the COVID-19 pandemic. The dedication of medical centre managers to forward planning using contingency and accrued funding and setting up Community-Based Assessment Centres and respiratory clinics, including walk-in and outreach services, proved to be highly effective. GP centres led the way in COVID-19 pandemic planning, response, and management.

Keywords: general practice medical centres; general practitioner; COVID-19; Information Communication Technology (ICT); Community Based Assessment Centre (CBAC); respiratory clinics; Ministry of Health; Primary Health Organisation; primary care; Very Low-Cost Access Clinic (VLCAC); New Zealand



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1. Introduction

The COVID-19 pandemic tested well-funded and modern healthcare systems worldwide. The first New Zealand case was confirmed on 28 February 2020 after which the entire country was placed in lockdown on 25 March 2020, and its international border closed [1]. While the rules of infection prevention and infection control are common steps worldwide, critical measures and challenges vary in different medical settings and demographics. Meeting patients face-to-face, the proximity of patients and staff to each other in the waiting room and the lengthy duration of each treatment became vectors in

COVID-19 transmission [2,3]. Early identification of the vulnerability of remote communities, including Māori and Pasifika community populations, was a notable feature of the New Zealand health sector's response to the pandemic environment. The New Zealand government implemented initiatives to maintain the existing health system function and optimise frontline workforce capability, including allowing telehealth ability and opening testing and respiratory clinics within primary care sites, particularly General Practice (GP) medical centres [4]. In preparing for and responding to the COVID-19 pandemic, the primary health services faced workforce shortages and operational challenges exacerbated by new pandemic regulations in their effort to eliminate the community spread of COVID-19.

New Zealand's remote communities, including Māori and Pasifika are characterised by limited access to primary care and experienced poorer health outcomes than the rest of the New Zealand population before the COVID-19 pandemic [5]. In the past, Māori and Pasifika communities exhibited health challenges and suffer from various factors that made them more vulnerable to the COVID-19 pandemic [5]. As the government acted to prevent COVID-19 from spreading, GP medical centres located in remote District Health Boards (DHBs) with a high number of Māori and Pasifika enrolled patients drew on the experiences and expertise of their practice managers and community to provide in-time assistance to support their centre's continued operations [6].

General Practice services played a central role in New Zealand's response to the COVID-19 pandemic [7]. The virus was first detected in the country in late February 2020, and cases surged rapidly by mid-March [8]. A total nationwide lockdown was imposed on 25 March 2020 that included even remote islands [9]. In response, the Royal New Zealand College of General Practitioners (RNZCGP) swiftly advised GP medical centres to adopt virtual triage and conduct over 70% of consultations virtually [10]. During this period, the Ministry of Health (Ministry of Health) formulated protocols for screening, case identification, and patient isolation [9]. The New Zealand government allocated \$20 million to enhance telehealth capacity in GP medical centres and community health services [11]. This prompted GP medical centres to leverage technology, utilizing systems such as Patient Management, Electronic Medication Prescription, and Virtual Reality platforms [10].

Prior to the pandemic, most GP medical centres primarily offered in-person care, supplemented by limited telemedicine capabilities [12]. However, the adoption of telehealth was hindered by various challenges, including resistance from health systems, inadequate network connections, and lack of clinician education [13,14]. The onset of COVID-19 compelled these centres to rapidly embrace digital solutions to meet patient demands.

Throughout the pandemic, patients responded positively to telehealth services, valuing the convenience and easy access to care [15]. However, some clinicians expressed reservations, preferring in-person consultations, particularly for complex cases [15]. By December 2020, digital technology adoption contributed to a significant reduction in transmission and deaths [16]. As the pandemic progressed, New Zealand's successful containment strategies relied on a combination of digital tools, preventive measures, and effective health communication [16]. The nation's commitment to vaccination faced challenges, with around 26% of adults expressing hesitancy [17]. The government tackled this via communication campaigns, resulting in 90% of the population receiving two COVID-19 vaccine doses by August 2022 [9].

GP medical centres in New Zealand played a pivotal role in responding to the pandemic by swiftly adopting telehealth solutions and digital tools to ensure patient care. Continued emphasis on digital integration and health communication will be critical for future pandemic response and healthcare improvement. In this paper, we explore the leadership, planning, response, and management of the COVID-19 pandemic in GP medical centres during the early stages of the pandemic highlighting the shared experiences of general practice staff, specifically practice managers.

2. Materials and Methods

This study centres on the response of GP medical centres to the COVID-19 pandemic in New Zealand during the initial six months of the community outbreak. We adopted a qualitative approach with an embedded multiple case study design. What became evident in our investigation was the number of participants that discussed the leadership planning, response, and management of the pandemic within their medical centres. This exploration aims to contribute new insights to both academic and practitioner understanding of pandemic management by capturing the adoption processes utilized during this critical period. The selection of GP medical centres was based on their ability to maintain patient service levels and revenue streams. A total of 16 GP medical centres from nine District Health Boards (DHBs) participated in this research, representing various urban, rural, and suburban practices across different decile areas of New Zealand.

The data collection was predominantly via in-depth interviews with doctors, nurses, GP centre management, and support staff teams. The NZ Ministry of Health's COVID-19 disruption report was utilized as secondary data to triangulate the interview findings [7]. The participants were selected based on their direct involvement in their respective medical centres' COVID-19 prevention operations. The participants were drawn from different roles within the GP medical centres, including practice managers, business managers, front-desk administrative staff, lead GPs, and practice lead nurses. These roles were strategically chosen to encompass various aspects of the medical centres' responses to the pandemic. The selection process was initiated by practice managers who identified individuals responsible for leading the medical aspect of the centre's response from pre-COVID-19 to the lockdown phase. Recommendations were gathered from participants and confirmed individually to ensure their suitability. The recruitment process involved reaching out to GP practices, obtaining email addresses, sending customized invitation letters, and coordinating interview dates with practice managers. Consent forms were signed before the interviews, and a one-page interview guide was provided to participants.

Multiple GPs, nurses, and administrative staff were interviewed from each GP medical centre to mitigate potential biases and enhance data comprehensiveness. The interviews were digitally recorded, transcribed, and analysed using a within-case and cross-case approach. Themes and patterns were identified via a systematic coding process, considering both commonalities and differences between cases. This process adhered to the principles of theoretical replication. The researcher employed a combination of analysis methods, including qualitative analysis software, visual and hand-coding, and data condensation. The research findings were then organized, categorized, and compared across cases, ultimately leading to the development of a conceptual model.

Overall, this study adopted a comprehensive methodology, integrating various techniques to provide a thorough understanding of GP medical centres' responses to the COVID-19 pandemic in New Zealand. The rigorous approach to data collection and analysis enhances the credibility and validity of the study's findings.

3. Results

Participants discussed in detail several physical changes in GP medical centres operations during the initial pandemic period. In total, 14 out of the 16 GP centres implemented respiratory clinics, and 11 out of 16 provided Community-Based Assessment Centres (CBAC). All 86 research participants were involved in changing the physical layout of their workstations and facilities to accommodate social distancing rules. In addition, GP centres frequently divided their facility into red and green zones. All centres appeared to adopt telehealth as the first point of patient contact. Telehealth was utilised to triage patients, provide GP consult services, and mitigate the loss of revenue. All the 16 centres confirmed converting to telehealth within 48 h of the lockdown announcement. All research participants acknowledged the significant work required by staff to implement new work practices within a very limited time frame and gave credence to the ubiquitous message that the health and well-being of patients were of primary importance in the process. Each

interviewed staff member’s reflection tended to identify temporary solutions using existing practice Information and Communication Technology (ICT) systems and hardware being utilised initially, as well as personal smartphones. Table 1 shows the themes (main findings), sub-themes (influencing factors) of planning, and physical changes in the centres during the initial six months of the COVID-19 pandemic.

Table 1. GP medical centres response to the COVID-19 pandemic.

General Practice Medical Centres Planning and Management Response to the COVID-19 Pandemic				
Main Findings	Influencing Factors	N = 86	Frequency	Percentage Score
Education and outreach programs	• Coping with lockdown	22	30	25%
	• Regional pandemic rules and guidelines	19	31	22%
	• Clinical diagnosis using telehealth	12	17	13%
	• Adequate usage of personal protective equipment (PPE)	55	70	63%
	• Endemic condition management and flu vax	19	33	22%
	• Fear of catching COVID-19	29	38	34%
Disinfection Protocols	• Swabbing, surface cleaning and disinfection	48	70	56%
	• Restriction on getting to the waiting room inside the practice	43	59	50%
	• Red and green zone/divided workgroup and fixed caring team	74	103	86%
	• Implemented CBAC/response to lockdown and pandemic	30	48	35%
	• Screening and triaging at the door	47	91	55%
	• Patient quarantine, isolation, social distancing, respiratory hygiene	25	31	29%
Leadership in health service planning	• Regular disinfection at the clean zone, good indoor air ventilation	10	13	12%
	• Coordination and funding	29	38	34%
	• Communication	23	28	27%
	• Assurance, transparency, and support	16	19	19%
	• Onsite staff shortage due to remote working and/or pre-existing-health conditions	19	22	22%

The practice managers moved to incorporate temporary solutions but also planned for the future of telehealth during the pandemic and the need for a balanced healthcare service approach. Table 2 shows the new service GP medical centres provided within their mandate.

All the participants reported that their GP centres coordinated with the Ministry of Health to receive COVID-19 funding and communication on online guidelines and training in infection prevention during the first lockdown. This created assurance, transparency, and support to the GP medical centres [18]. All the medical centres with respiratory clinics and CBAC testing centres reported staff shortages. This was mainly due to extended services and staff unable to attend clinics in person due to underlying health conditions. There was also significant work required to disinfect the clinical environment (e.g., surface cleaning, disinfecting, and indoor air ventilation). Staff were assigned to either the red or green zone designated areas where they performed screening and triaging at the entrance and ensuring social distancing for respiratory hygiene. Two GP medical centres (GPMC4 and GPMC6) offered free clinics and outreach services supported by the Ministry of Health. Both practices are geographically located within high population Māori and Pasifika areas [19]. This indicates that the Ministry of Health understood the vulnerability of the Māori and Pasifika communities in terms of pervasive social and economic disadvantage in areas such as housing, education, and employment.

Table 2. GP medical centres services provided during the COVID-19 pandemic (✓ = Yes; × = No).

Participating Centres	Provided CBAC	Respiratory/Walk-In Clinics	Internal Contingency Funding	Disinfecting Clinical Environment	Offered Education Programmes	Health Service Planning and Funding	Offered Free Clinics and VLCA Clinics	Provided Outreach Services
GPMC1	×	×	✓	✓	✓	✓	×	×
GPMC2	✓	✓	✓	✓	✓	✓	×	×
GPMC3	✓	×	×	✓	✓	✓	×	×
GPMC4	✓	✓	✓	✓	✓	✓	✓	✓
GPMC5	✓	✓	×	✓	✓	✓	×	×
GPMC6	✓	✓	×	✓	✓	✓	✓	✓
GPMC7	✓	✓	×	✓	✓	✓	×	×
GPMC8	✓	✓	✓	✓	✓	✓	×	×
GPMC9	×	✓	✓	✓	✓	✓	×	×
GPMC10	✓	✓	✓	✓	✓	✓	✓VLCA only	×
GPMC11	×	✓	✓	✓	✓	✓	×	×
GPMC12	✓	✓	✓	✓	✓	✓	×	×
GPMC13	✓	✓	×	✓	✓	✓	×	×
GPMC14	×	✓	✓	✓	✓	✓	×	×
GPMC15	×	×	×	✓	✓	✓	×	×
GPMC16	✓	✓	✓	✓	✓	✓	×	×
TELE-NZ	n/a	n/a	n/a	✓	✓	n/a	n/a	n/a

Moreover, many health interventions were implemented to curb the spread of COVID-19, which proved difficult to implement because of crowded housing and extended family groups living together. Health service workers had to educate the community about new social distancing regulations that interrupted their cultural life. While recognising that health authorities try to minimise risk among disadvantaged communities, measures often do not take the socioeconomic, historical and cultural contexts into consideration. However, in this study, Māori and Pasifika GP medical centres led the way in pandemic planning in their geographic regions. Out of the 16 medical centres that participated in this study, the two centres with the highest Māori and Pasifika populations successfully managed the pandemic by providing (1) free clinics (including telemedicine services to patients, and offering VLCA clinics) and (2) free outreach services to the community that involved home visits by nurses or doctors when required by patients. Both practice managers indicated that this was funded from their internal contingency funds.

“The way I run the business is that we invest a part of our profits back into the business, so 30% or 40% is held back for capped expense and stuff here . . . In April and May, we gave patients free video and phone consultations. Because the biggest thing for us is that they have access because the last thing we want is them not wanting to call us because they’re going to get a bill or something... a lot of our patients we’re hit with joblessness and a raft of things. I mean, health is not even a top-four issue for them. It’s like housing, food on the table, family stuff, stressors that we needed to adjust to, that kind of thing...”

Pandemic planning with these two medical centres has mitigated risks and eliminated the COVID-19 outbreak in their communities. Table 3 shows the access to primary care by ethnicity in January 2020, published by the Ministry of Health [11]. In both cases, the CBACs services included primary health support to people who were either unable or unwilling to visit CBACs in the form of home-based services and tele-triage.

Table 3. Access to Primary Care by Ethnicity (January 2020) (Ministry of Health, 2022).

District Health Board	Medical Centre	Total			Māori			Pacifika			Other			
		Total Enrolled	Total Population	%	Total Enrolled	Total Population	%	Total Enrolled	Total Population	%	Total Enrolled	Total Population	%	
North Island	Waitemata DHB	GPMC1 GPMC6	592,493	639,420	93%	52,376	63,180	83%	45,246	45,150	100%	494,871	531,090	93%
	Hutt Valley DHB	GPMC2 GPMC5	149,647	151,540	99%	24,383	26,410	92%	11,821	11,900	99%	113,443	113,230	100%
	Capital and Coast DHB	GPMC3	299,749	323,770	93%	33,209	36,920	90%	22,489	22,320	101%	244,051	264,530	92%
	Tairāwhiti DHB	GPMC4	48,860	49,685	98%	24,586	24,920	99%	1,007	1,270	79%	23,267	23,495	99%
	Auckland DHB	GPMC7	459,586	554,630	83%	32,953	44,030	75%	55,752	56,450	99%	370,881	454,150	82%
South Island	CDHB (Canterbury)	GPMC8 GPMC9	538,251	578,340	93%	46,219	53,300	87%	15,564	14,460	100%	476,468	510,580	93%
		GPMC12 GPMC14												
		GPMC15 GPMC16												
	SDHB (Southern)	GPMC10 GPMC13	317,372	335,990	94%	29,534	34,080	87%	7,144	7,050	101%	280,694	294,860	95%
SCDHB (South Canterbury)	GPMC11	59,153	60,465	98%	4,543	5,420	84%	1,009	715	141%	53,601	54,330	99%	
Telehealth/National	Telehealth support staff		4,715,811	5,000,905	94%	718,427	786,150	91%	343,134	324,755	106%	3,654,250	3,890,000	94%

4. Discussion

4.1. Planning and Management

In response to COVID-19, it is crucial to define leadership in health service planning. In this study, we suggest leadership includes the coordination of funding, communication in terms of transmission of information, and the sharing of knowledge by electronic means using existing information communication technology (ICT) systems [10]. Additionally, working with local health authorities and health departments to form a reactive working procedure that includes staff capacity planning which incorporates new demands for testing and respiratory clinics. In a broader sense, leadership is a crucial part of management and planning and a vital part of education, outreach, and physical environment safety for GP medical centres. It was a way of working, an attitude, and a commitment to prevent the spread of COVID-19 locally, regionally, and nationally. In New Zealand, the information systems within the GP medical centres comprise seven modules. The reason for implementing these systems before the COVID-19 pandemic was to operate paperless transactions in medical settings. The medical centres did not support the complete implementation of all seven modules prior to the COVID-19 outbreak. However, they were available for all medical centres across the nation.

The modules comprise electronic referral systems, electronic prescription systems, electronic lab systems, video consult systems, doctor info, patient clinical data management systems, and patient administration data management systems. When the COVID-19 outbreak occurred, ICT became a mandatory part of panoramic planning and management. In addition, GP medical centres use ICT to provide telemedicine services to patients and transparency and support to staff working in remote settings. We found that GP management in three of our cases (GPMC4, GPMC6, and GPMC12) was extremely receptive and supportive of implementing ICT systems. They implemented the latest version of the ICT modules and ran pilot programmes for implementing the systems way before the COVID-19 outbreak. Additionally, they made the change to digitalisation a part of their organisational culture so that people were not only willing to accept the digitalisation process but also accept the role of ICT and recognise the benefits they would reap from using it [20].

“I had those very heated boardroom conversations in 2017, 2018, and 2019; we made changes and guess what? Pandemic hits, and then we’re ready. 2020 now, everything was done. Everything was just ready to go... I know of practices where they hadn’t done GP phone consulting. They had done nothing but a classic model, they were just struggling because business just dropped, and they didn’t know how to even use the technology, that’s a big barrier.”

We found that the managers who involved their staff in implementing ICT before the COVID-19 pandemic managed the transition into the digitalisation of their practice faster and easier during the pandemic. For example, in planning telehealth capabilities, their GPs already knew how to use the systems in remote settings and provide digital health. They only had to focus on educating their patients on using ICT. Therefore, it was easier to identify where to expend effort in the planning and management of the centre. In addition, admin staff were able to provide ideas on how to make the digital workflow as smooth as possible. While all 16 medical centres indicated they had daily planning meetings, partly in response to constant changes in guidelines from Ministry of Health, four of them (GPMC4, GPMC6 and GPMC12) had a head start in the ICT domain. Consequently, they had more time to focus on providing other services to the community.

4.2. COVID-19 Testing in Community-Based Assessment Clinics (CBACs) and Disinfection Protocols

Based on the New Zealand National Health Emergency Plan [11], the purpose of the CBACs was to provide additional primary-care capacity to the GP medical centres when there was a sudden increase in demand for triaging and testing for COVID-19 [21]. The implementation of CBACs allowed the medical centres to have a separate facility for

patients with COVID-19 symptoms during the first outbreak. These special clinics provided clinical assessment, advice, triage, and referrals to other services. The medical centres that implemented CBACs were responsible for clinical leadership, onsite management, administrative, and other support responsibilities. The CBACs were approved by DHBs when the GP medical centre guaranteed the resources for the planned clinical services.

Additionally, the CBACs were located where they could best meet the local community's needs. The National Health Emergency Plan activated the implementation of CBACs as a solution to COVID-19 testing when a large number of people needed to be tested while reducing the risk of cross-infection. Eleven of the 16 participating medical centres implemented CBAC facilities. This helped the centres continue to provide care for people requiring treatment for other conditions. The implementation priority was given to the communities of high-needs populations with low socio-economic backgrounds. These medical centres became the leaders in their communities in the response management to COVID-19. In addition to the CBAC, they divided their clinics into respiratory, normal appointments and as walk-in clinics for those with no COVID-19 symptoms. The practice managers indicated that training nurses on swabbing in the early stage of the outbreak was a good strategy as this service provided extra revenue to the centres, which covered the loss of revenue due to the lockdown.

“There was a 30% threshold (for reduction in income) to apply for funding for payroll, but we didn't hit that because of capitation and the fact that we were, I think, about 25% (down on income)... But a 25% drop is still high... With the swabbing, there was a time in July or August when Ashley Bloomfield and the crew wanted, like anybody in South Auckland, to be swabbed. . . . I think we did nearly \$80,000 worth of swabbing last month.”

All GP medical centre executive management team and senior GPs had regular meetings to discuss the situation at hand. This covered potential risks to revenue and hygiene practices at each stage of the pandemic. They were responsible for leading the operational, policy, communication, logistics and financial responses. This close working relationship built on many years of establishing and maintaining trust between the GPs and management allowed the organisations to respond to new financial issues and maintain open and transparent communication.

“We lost a lot of staff. . . not only were we operating half clinics, doctors (were) working only half days, and. . . other staff were only working half days as well. But we've donated about four or five doctors to CBAC services, including my administration staff and two nurses.”

More importantly, retired GP practitioners' volunteer time was instrumental in maintaining CBAC operational capacity whilst providing routine GP services to meet community demands. DHB subsidies meant medical centres were able to pay the administrative staff their regular pay regardless of their work hours.

“We got subsidised through the DHB, but it took a very long time to come through. At the same time, we had said to our staff that they would work half days, but they will be paid full days, it wasn't their fault. So that was a big drain. . . The doctors were also volunteers. One of our old doctors used to be here; she came over to help, and she was retired. And she came over to help, and she didn't get paid. . . I think they (the staff) appreciated us supporting them by paying them for full days when they were working half a day. This was set without wage subsidy. . . they felt supported. There was really good communication.”

Ensuring that the medical centre could continue to deliver necessary health services was a key priority for all staff. While the government response was an essential factor in New Zealand's successful response to the COVID-19 pandemic at the initial stage, a formal partnership with Primary Health Organisations and GP medical centres and

the coordinated response by the medical centre staff were all key to the management of the pandemic.

“There was mutual respect between management and staff, which was actually really good to see. We appreciate them every day of the week. But we really appreciated that everybody turned up, everybody.”

The practice managers also acknowledged the importance of adhering to disinfection protocols in and around the centres’ physical environment. During the initial lockdown phase, there was daily cleaning and disinfection of the GP consulting room, waiting areas, reception desks, and all other areas accessed by visiting patients. In addition, staff training in swabbing, surface disinfection, triaging patients at the entrance door, and ensuring respiratory hygiene through social distancing all led to successfully managing the pandemic. The nursing staff also understood the clinical environment well enough to recognise the problem faced by administrative staff and potential risk of the outbreak in the medical centre.

“Then another challenge for our clinic is we don’t do all booked appointments. We are 65% booked and 35% in urgent care, where people walk in... So, you’re going to have different protocols to keep them out. So, we had to put a nurse outside the door so they could be screened, and they went in full PPE gear. Because you can’t plan for walk-ins, you don’t know how many are going to walk in. It’s the type of customer demographic that we have here that has that sort of service.”

The admin staff also advised patients to call ahead and report any fever or respiratory symptoms while being triaged over the phone. All the medical centres used triage to identify symptomatic patients with signs including fever, cough, loss of taste and smell, diarrhoea, or flu-like symptoms. The aim was to avoid patients with these symptoms using the practice entrance, waiting, and treatment areas. Most GP medical centres performed body temperature measurement and infectious risk assessment recording, asked about any recent travel to high-risk areas, occupation, close contact with infected COVID-19 patients, or any clustering history as per other countries’ standards [12–15].

The New Zealand Government required every traveller to stay in a Managed Isolation and Quarantine (MIQ) facility for 14 days [16]. MIQ played an essential part in containing the community spread of COVID-19. However, despite MIQ, some people would show symptoms of COVID-19 after leaving the quarantine facility. Additionally, any close contact with a COVID-19 case with any of the known symptoms usually ended up in a CBAC to get tested or would call their GP. All patients were triaged over the phone with admin staff or at the entrance with the nursing staff. This approach effectively avoided the risk of further community spread [17,19]. Indoor ventilation for clean air was also a part of the disinfection protocol that involved ensuring that all air conditioners were operating full-time to maintain clean air circulation.

4.3. Targeted Communications Campaign and Outreach Service to the Community

The New Zealand Government’s response to the COVID-19 pandemic was considered very successful on a global scale. A significant part of the success was the communication of public health measures via fighting COVID-19 with a team of 5 million messaging [18]. In addition, to ensure communication of regional pandemic rules and guidelines were disseminated across areas with high Māori and Pacifica populations, the medical centres provided outreach services targeting health issues, including respiratory hygiene, physical distancing, testing provision, and protection of elders and patients with underlying chronic health conditions.

“Outreach work that we do, where we go and visit them for whatever reason. So, a nurse might go and do their blood (tests) or check them out at home. They could be over sixty-five, disabled, or just have no vehicle. By keeping things affordable, so (that) things are free.”

The Ministry of Health provided specific step-by-step guidelines for eliminating COVID-19, reducing community spread and building trust with GP medical centres and patients. The Ministry framed the 'lockdown' as an urgent, collective cause to protect the population. The GP medical centres concentrated on the micro-level operations and adapting prevention guidelines that fit their businesses. The rapid turnaround times and changing guidance required the medical centres to communicate closely with their patients. A large part of the change was to use digital solutions such as telehealth services to implement a comprehensive health risk mitigation strategy for patients and staff. However, the use of technology also came with its own challenges.

"Technology is a hard one. I think the ministry is looking at it at a macro level. We have a free Wi-Fi network for patients here in the reception that is as far as we can reach. We've looked at things like buying people's phone credit; that are on prepaid phones. But there's a question around the usage of it and the behaviour. It's just like giving a homeless person \$5 are they going to spend on food?... it's that kind of thing. So, there's that kind of balancing act, so it's very hard."

Additionally, providing equitable telemedicine access, meeting COVID-safe health services requirements and assistance whilst procuring personal protective equipment (PPEs) and providing flexibility in the use of funding was a difficult balancing task. Fortunately, the Ministry of Health provided new funding and enabled a shift to the use of telehealth for all appropriate consultations between GPs and patients. Telehealth capabilities were implemented not only for GP consultations but also as a mechanism to reach vulnerable populations, perform welfare checks, and support mental health patients, ensuring that these patient groups were coping with the lockdown. Telehealth allowed nurses to continue to be employed full- and generated much needed revenue for the practice. Maintaining staff to perform flu vaccination clinics and sustain daily operations was a tough balancing act that required difficult decisions by the centre managers.

"We have looked into an 0800 number for patient dial-in, but again, it's a very expensive exercise. Again, it (would) cost us anywhere between \$12,000 to \$20,000. And you kind of go, well, do you want to throw money at the 0800 number to improve access? Meaning that the volume of calls could increase, but it doesn't mean that I have enough staff to answer all the calls or do we take that money and tap into more affordable services or easier to access (services) like subsidised or free services. So those kinds of decisions you make in a board room, and you kind of know what you want to do."

Previous epidemics have shown that neglecting routine care during an epidemic can result in increased morbidity and mortality related to other causes [20,21]. The establishment of drive-throughs, mass outdoor flu vaccination clinics, and separate respiratory clinics for patients with fever and respiratory symptoms resulted in the protection of other patients and healthcare staff from potential infection and allowed GPs to provide regular essential primary care services to their patients. In addition, there was a series of online education modules provided by the Ministry of Health and RNZCGP to healthcare staff, specifically frontline healthcare workers working in CBACs and respiratory clinics, on proper and adequate usage of PPE. The education modules also targeted residential age care and disability care workers, GPs and nurses working in CBACs, and primary health workers in hospitals and emergency departments [19]. Education on infection prevention and control for COVID-19 has proven to be another aspect of New Zealand's successful COVID-19 response.

4.3.1. Strengths and Weaknesses of the Study

The outcomes derived from this study are intricately linked to the specific circumstances of GP medical centres grappling with a pandemic scenario within the confines of New Zealand. It is of paramount significance to acknowledge the idiosyncratic contextual elements and distinct healthcare frameworks operative in varying geographical regions. Consequently, a judicious approach becomes imperative when contemplating

the extension of these findings to dissimilar healthcare ecosystems or distinct phases of a pandemic trajectory.

The context-sensitive nature of the findings necessitates a circumspect stance when it comes to drawing broad-based inferences, thereby advocating for a measured interpretation of the outcomes beyond the immediate purview of our investigation. The diverse array of healthcare settings, geographical locations, and temporal stages of pandemic evolution warrants a cautious assessment before undertaking any extrapolation of the implications beyond the confines of our study's specific context.

In light of these considerations, the current findings beckon a more comprehensive exploration and validation across a broader spectrum of scenarios. Consequently, subsequent research endeavours should encompass a more diversified range of settings and circumstances to further corroborate, refine, and potentially expand the existing findings. Such an undertaking promises to contribute to a nuanced and globally relevant understanding of healthcare systems' responses in the face of pandemic challenges.

4.3.2. Theoretical and Analytical Contribution of the Study

The theories and analysis put forth in this study add to our grasp of how physical settings in GP medical centres evolve during a pandemic. Moreover, it offers valuable practical perspectives for proficiently orchestrating and executing pandemic-related protocols within GP medical centres during times of medical and health-related crises. Additionally, it underscores the potential supplementary services that medical centres can extend to mitigate community transmission during a pandemic, drawing insights from New Zealand's success in managing the COVID-19 pandemic relative to other advanced nations.

5. Conclusions

In the broader context, the research outcomes signify specific changes, advantages, or consequences that are targeted and predicted to emerge from the study. These outcomes are framed in relation to particular populations or beneficiaries. Within the scope of healthcare SMEs, these outcomes are typically categorized as short-term, medium-term, and long-term, contingent upon the timeframe for their realisation.

Short-term outcomes embody the immediate and direct alterations that arise as a direct outcome of applying the research discoveries. Meanwhile, medium-term outcomes encapsulate the intermediary changes that stem from sustained intervention strategies. On the other hand, long-term outcomes encompass the ultimate objectives and effects that health-related SMEs strive to attain over an extended duration.

The research not only provides valuable insights and comprehension into pandemic management and the imperative digitalisation endeavours needed to effectively address patient demands, but also furnishes health-related businesses with insights into the leadership and management practices applicable during crises. This contributes to the sharing of knowledge and collaboration among researchers, practitioners, policymakers, and government entities such as the Ministry of Health. This collaborative effort enriches the collective knowledge repository and facilitates the exchange of ideas, experiences, and lessons gleaned from the pandemic.

Leadership in health service planning, centralising testing facilities, localising pandemic rules and guidelines, education in environment disinfection, and community outreach programs led to better management of the COVID-19 pandemic. Recognition that Māori and Pasifika communities were at increased risk due to their social and economic limitations and pre-existing health issues combined with high population mobility was vital in preventing COVID-19 from spreading during the initial six months of lockdown [21]. Effective and transparent leadership in setting infection control strategies and guidelines with regularly updated communication from the Ministry of Health, Primary Health Organisations and the NZ government campaign of uniting against COVID-19 resulted in New Zealand being a world leader in eliminating COVID-19 community spread in 2020.

Lessons from other pandemics and the COVID-19 pandemic emphasise the critical importance of GP medical centres engaging early and effectively with their patients and using a single source of trusted information adapted to meet local conditions to communicate with their patients [22]. The New Zealand investment into campaigning and supporting primary care during the pandemic was an essential element of the Ministry of Health strategy, enabling optimal frontline care tailored to community needs while mitigating the spread and protecting the ongoing health of the nation's most vulnerable citizens. The pandemic is far from over but has now moved to a different phase. The lessons from the first phase including MIQ rules [23] and the "team of 5 million" campaign [24] should not be lost. GPs have proven themselves to be an irreplaceable centrepiece of the NZ health infrastructure, and they need to be valued as such [25] especially during crises and disasters and as they pertain to the most vulnerable segments in society [26]. Working together, it is shown that the Ministry of Health and GPs can achieve great things, under great pressure, in a short period of time. While there are significant challenges to come, mutual respect and cooperation between the Ministry of Health and GPs is the key to overcoming them. In summary, the research findings hold a pivotal role in guiding evidence-based decision making, fostering ongoing enhancements in GP medical centre services, and tackling the challenges that could arise in future pandemics or natural calamities.

Drawing upon the qualitative approach adopted in this study, further research inquiries should explore and extend the findings from this investigation. Firstly, it is worthwhile to investigate the relationship between rapid changes in GP medical service delivery and patient satisfaction in the midst of the pandemic. Delving into the connection between swift alterations in medical services during the pandemic and the satisfaction of patients offers a promising avenue for exploration. Furthermore, a deeper analysis of the enduring effects of the digitalisation capabilities established during this period on future primary care services can yield valuable insights, potentially enhancing patient outcomes. Secondly, it is important to equip our medical practitioners with the skills on how to balance digitalisation and human interaction. Along these lines, an avenue of investigation pertains to assessing the equilibrium between the advantages of digitalisation and the importance of in-person interactions and direct communication between General Practitioners and their patients. Finally, as the pandemic threat gradually diminishes, a comprehensive study of patient inclinations and the resulting impact on the doctor–patient relationship stands to shape future healthcare delivery models. By addressing these research directions, a more comprehensive understanding of the evolving landscape of healthcare delivery and patient experiences can be attained.

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