Awareness, Knowledge, and Management of Long COVID Among a Small Cohort of Primary Care-based Physiotherapists in New Zealand

Sarah Rhodes *PhD*
Lecturer, Centre for Health, Activity and Rehabilitation Research, School of Physiotherapy, University of Otago, Dunedin, New Zealand

Ella Waite *BPhty (Hons) Physio*
Physiotherapist, Bureta Physiotherapy + Wellness, Tauranga, New Zealand

ABSTRACT

Long COVID is an emerging condition predicted to have a high impact on the health system, with primary care often being the point of contact for people living with long COVID. However, there is currently very little known about primary care physiotherapists' assessment and management of long COVID in New Zealand. An online survey was distributed to New Zealand-based physiotherapists working in primary care via Physiotherapy New Zealand special interest group and branch networks, with the aim of exploring current knowledge and awareness of long COVID diagnosis, assessment, and management. Forty one responses were analysed and highlighted good recognition of long COVID symptoms and secondary effects. There was a limited degree of confidence in long COVID symptom management and a lack of consistency in assessment and management strategies currently being applied. Respondents perceived a lack of awareness by the public and other health professionals of the physiotherapist's role in long COVID, possibly creating a barrier to patients with long COVID accessing services. In the absence of validated long COVID treatments, symptom management is of vital importance. There is a need to support primary care-based physiotherapists and ensure access to up-to-date, evidence informed information to provide best patient care.

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Key Words: Long COVID, Physiotherapy, Post-COVID-19 condition, Primary Care, Symptom Management

INTRODUCTION

Over 750 million people worldwide have been infected by coronavirus SARS-CoV-2 (COVID-19) (World Health Organization, 2022a), caused by a severe acute respiratory syndrome (Harenwall et al., 2021). Early in the COVID-19 pandemic there were an increasing number of reports of symptoms that persisted following the initial COVID-19 infection, subsequently known as long COVID (Callard & Perego, 2021).

Long COVID has an array of definitions and names including post COVID-19 syndrome, post-acute COVID-19, and chronic COVID (Ministry of Health, 2022b). The World Health Organization (WHO) uses the term post-COVID-19 condition and defines it as a history of probable or confirmed SARS CoV-2 infection, 3 months from the onset of COVID-19, with symptoms that last for at least 2 months and cannot be explained by an alternative diagnosis (World Health Organization, 2021). Long COVID affects multiple body systems (Kingstone et al., 2020). There are a wide range of symptoms, with the most common ones being fatigue, brain fog, and dyspnoea (Tran et al., 2022), and the condition can be extremely debilitating. It can impact people's ability to contribute to whānau, work, and community in the way they might have done previously. Long COVID can affect anyone following an acute COVID-19 infection (Yong, 2021) and the mechanism is not yet fully understood. Hypotheses include immune mediated pathogenesis (Sanyaolu et al., 2022), viral persistence, and hypercoagulability (Kichloo et al., 2020). Although there are little available data in New Zealand, overseas research suggests that older age, being female, and having obesity and other pre-existing health conditions are risk factors for developing the condition (Aiyegbusi et al., 2021).

Long COVID is predicted to have a high impact on an already stretched New Zealand health system. Over two million cases of acute COVID-19 infection have been reported in New Zealand (Ministry of Health, 2022a). It is estimated that one in eight people who have been infected with COVID-19 will develop long COVID (Ballering et al., 2022). In findings from the "Impacts of COVID-19 in Aotearoa" study, one in five respondents reported long COVID symptoms after their initial infection (Russell et al., 2023). These people could present to primary care with long COVID being their primary concern or secondary to pre-existing conditions (Baz et al., 2022; Greenhalgh et al., 2020). Physiotherapy is an established part of primary care in New Zealand, highlighting the need for physiotherapists to be knowledgeable in the diagnosis, assessment, and management of long COVID.

Due to its emerging nature, primary care physiotherapists' knowledge of long COVID management is not always well understood, as highlighted by a study undertaken in Austria (Scheiber et al., 2021). Findings from overseas may provide guidance for services in New Zealand, but upskilling of health

professionals is required (Whittaker et al., 2022). There appears to be a lack of understanding and information among some health professionals (Russell et al., 2023). Understanding current knowledge and management may highlight any knowledge or skills deficits, directing future action on how to best support physiotherapists in managing long COVID. The aims of this study were to (a) explore the current knowledge and awareness primary care physiotherapists have of long COVID, and (b) investigate current management strategies used by physiotherapists with patients with long COVID in New Zealand.

METHODS

Study design

This study used an online cross-sectional survey to explore awareness, knowledge, and management of long COVID among physiotherapists working in primary care. Qualitative and quantitative data were collected and analysed within the study. Ethical approval was obtained from the School of Physiotherapy Ethics Committee, University of Otago (reference number D22/125).

Survey development

The survey was developed initially as a Word document by the student researcher and project supervisor, then sent to a third-party reviewer who provided feedback on ease of reading questions and flow, acceptability, questionnaire length, and design. Amendments were made to reflect this feedback. The survey took approximately 25 min to complete. The online survey was then created using QualtricsXM survey software (Qualtrics LLC, Provo, UT, United States). The survey was split into seven sections: survey information and consent, demographics, awareness and knowledge, management, return to physical activity, management confidence and resources.

The section on *awareness and knowledge* included questions regarding the respondent's current knowledge of long COVID. Definition, symptoms, risk factors, and confidence in managing long COVID symptoms were explored, using multiple choice questions, scales, and open text box answers to allow elaboration. Confidence was defined as an individual's (self-assessed) level of certainty in recognising the clinical condition of long COVID when a patient presented to them. The *management* section ascertained if respondents had encountered patients with long COVID and sought greater detail about treatments, referrals, and challenges. These questions were mostly answered with open text boxes, aimed at capturing a range of experiences in more detail. Respondents were directed to questions relating to level of exposure to patients with long COVID. If respondents had not encountered patients with long COVID, they were directed to general management questions with open text responses. The *return to physical activity* section consisted of two open text box questions regarding the advice given and potential consequences of an early return to physical activity. A five-point Likert scale was used to assess *confidence in management of different symptoms*, with one representing "not at all confident" and five representing "extremely confident". The last section investigated *resources* via open text boxes and a five-point Likert scale. Questions related to usage and usefulness of existing resources, workplace education, and preferences for future resources.

Before accessing the survey, potential respondents were directed to read the participant information sheet at the start of the survey and provide consent. All survey responses were anonymous, and no questions or demographic data allowed for personal identification of respondents.

Recruitment and survey distribution

New Zealand registered physiotherapists holding an annual practising certificate and working in primary care were invited to participate in this research. A link to the online survey was added to the research directory webpage on the Physiotherapy New Zealand (PNZ) website. Members of PNZ branches and special interest groups were contacted through the central PNZ office by the communications and marketing manager. The survey was available for 6 weeks from May 19 to June 30, 2022. A reminder email was sent 1 week after the original survey was sent out.

Data extraction and analysis

The collected data were stored securely in the Qualtrics^{XM} online system, with password protected access. Qualtrics data were exported to Excel on a password protected computer to analyse data; incomplete responses were excluded from analysis. Multiple choice data were analysed using simple descriptive statistics to calculate distribution, frequency, and mean. Open question responses were analysed using a simple conceptual context analysis. Concepts were grouped and coded for frequency. Quotes were selected based on representation of the overall concepts that had been revealed.

RESULTS

Response number

A total of 50 respondents enrolled in the survey. Nine responses were excluded due to incomplete data. In total, 41 respondents fully completed the survey, and these responses were included in the analysis.

Demographic data

Most survey respondents worked in musculoskeletal clinical practice, based in private practice clinics. Over half of the respondents (53.7%) had ≥ 20 years of physiotherapy experience, and 29.3% of total respondents held postgraduate qualifications (Table 1).

Long COVID awareness

Twenty four per cent of respondents reported feeling fairly confident in identifying patients with long COVID. Reasons included (a) keeping up to date with literature, (b) being able to diagnose from subjective history and personal experience, and (c) exposure to other similar conditions, such as myalgic encephalomyelitis/chronic fatigue syndrome. There was recognition that long COVID was likely to have a big impact in New Zealand.

Seventeen per cent of physiotherapists surveyed were not aware of any way physiotherapy could manage long COVID. In addition, 7% did not feel confident in being able to identify patients presenting with long COVID. Reasons given included the lack of exposure to the condition, limited diagnostic evidence, and long COVID not being an area of interest to them.

Table 1

*Demographic Data (*N = *41)*

Variable	Frequency	
	n	%
Gender		
Male	5	12.2
Female	36	87.8
Age (years)		
20–29	6	14.6
30–39	9	22.0
40–49	14	34.1
50–59	10	24.4
60+	2	4.9
Ethnic group		
New Zealand European	31	75.6
Māori	2	4.9
Chinese	2	4.9
India	1	2.4
Other	8	19.5
Region of work		
Northland	3	7.3
Auckland	14	34.1
Waikato	7	17.1
Bay of Plenty	4	9.8
Hawkes Bay	1	2.4
Taranaki	5	12.2
Manawatu-Whanganui	1	2.4
Wellington	1	2.4
Marlborough	1	2.4
Canterbury	4	9.8
Otago	0	0.0
Geographical area of work		
Urban	20	48.8
Rural	7	17.1
Both	14	34.1
Area of practice		
Musculoskeletal	25	61.0
Sports physiotherapy	14	34.1

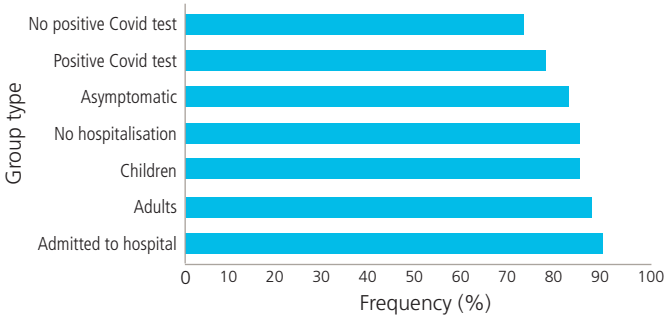
Variable	Frequency	
	n	%
Area of practice		
Older adults	14	34.1
Community	13	31.7
Neurology	13	31.7
Long-term conditions	9	22.0
Cardiorespiratory	7	17.1
Paediatrics	4	9.8
Occupational health	4	9.8
Women's health	3	7.3
Men's health	1	2.4
Oncology	1	2.4
Mental health	1	2.4
Other	5	12.2
Usual location of work		
Private clinic	27	65.9
Public hospital	11	26.8
Primary care/community	8	19.5
Private hospital	4	9.8
School	1	2.4
Tertiary institution	1	2.4
Research	1	2.4
Other	3	7.3
Years practising as a physiotherapist		
0–5	4	9.8
6–10	6	14.6
11–15	2	4.9
16–20	7	17.1
≥ 20	22	53.7
Highest qualification		
Graduate diploma	13	31.7
Bachelor's degree	16	39.0
Postgraduate qualification	8	19.5
Master's degree	2	4.9
PhD or other doctorate	2	4.9

There was no clear consensus from respondents on timelines for when patients should be classified as having long COVID, with only 50% indicating symptoms needed to be present for over 12 weeks. Almost three-quarters (73%) of respondents identified that someone could be classed as having long COVID without having a positive COVID-19 test previously (Figure 1).

A wide range of symptoms were recognised (Figure 2), with fatigue, respiratory, and cardiovascular symptoms commonly listed. Over half of respondents indicated knowledge about long COVID being a multi-system condition (Figure 3). A list of all recognised symptoms is included in Appendix A.

Figure 1

Awareness of Who Can Develop Long COVID



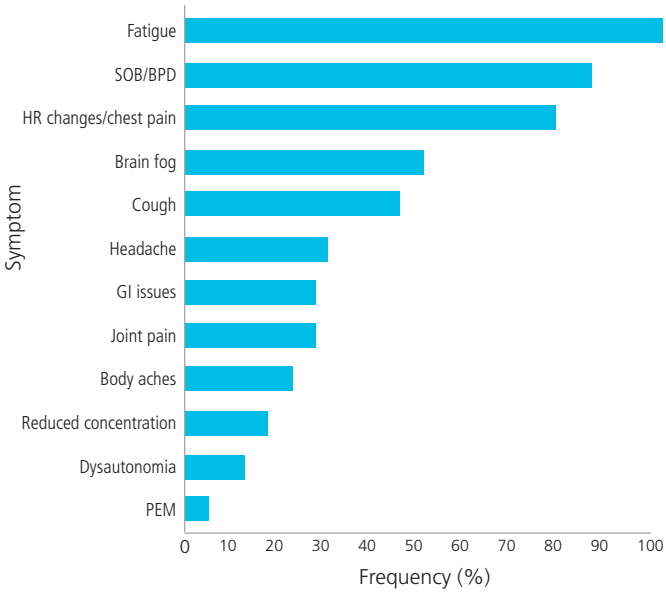
Seventy eight per cent of respondents indicated awareness of psychological symptoms secondary to long COVID, and the potential wider impact of these symptoms on health. This included shame and stigma associated with long COVID, anxiety, stress, and financial burden (Table 2).

Assessment and management of long COVID

Over half (56%) of primary care physiotherapy respondents had managed patients with long COVID but the number of patients seen was relatively low, with approximately two-thirds (64.7%) having seen fewer than five patients (Table 3). Half of all patients seen presented to physiotherapy with long COVID not being their primary concern. Responses indicated around 35% of patients with long COVID self-referred to physiotherapy. The number of sessions a patient with long COVID had was between one and ten (Table 3). Within these sessions a range of assessment, outcome measures, and management strategies were used (Tables 4 and 5). Eighteen per cent of physiotherapists reported using no tools to assess long COVID, possibly due to long COVID being secondary to the patient's clinical presentation.

Figure 2

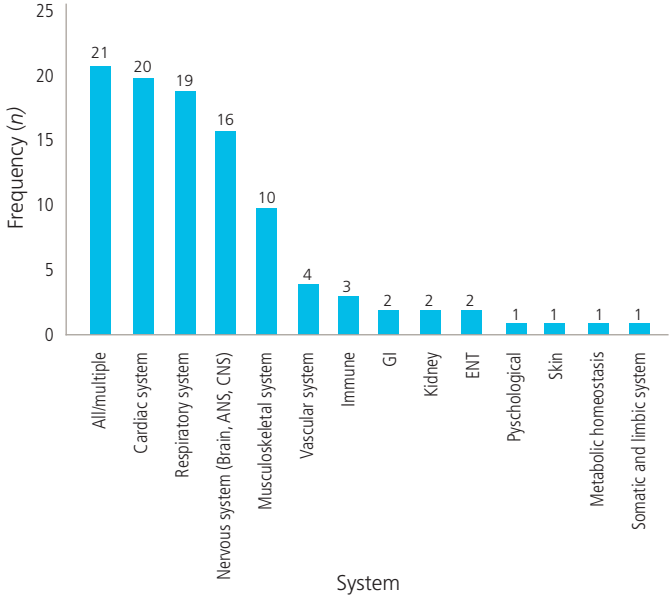
Recognised Symptoms of Long COVID



Note. BPD = breathing pattern disorder; GI = gastrointestinal; HR = heart rate; PEM = post-exertional malaise; SOB = shortness of breath.

Figure 3

Recognised Systems Involved in Long COVID



Note. ANS = autonomic nervous system; CNS = central nervous system; ENT = ear, nose and throat; GI = gastrointestinal.

Table 2

Quotes From Content Analysis on Perceived Secondary Effects of Long COVID by Physiotherapists

Theme	Example quote
Effects on mental health	"People's experience of acute infection can impact on their mental wellbeing, new anxiety or depression symptoms can be experienced as well as reoccurrence of previous health issues." "Can be the final straw for someone with mental health issues."
Impact on lives and function	"This condition handbrakes everything." "Can effect taha whānau and taha hinengaro when you are fatigued and not able to participate in activities with other people." "Significant disruption and ability to function in life."
Thoughts and perceptions	"Fear of not making a full recovery." "Often people who have mild symptoms and don't understand why they don't come right." "The psychological role in any health issue is well documented. People with a more 'positive' outlook on their situation usually do better/recover faster."
Shame and stigma of long COVID	"People don't understand. When I talk to people about my story, they visibly take two steps back from me." "Anxieties around stigma of condition."

Table 3

Current Exposure Statistics of Long COVID by New Zealand Primary Care Physiotherapists

Variable	Frequency	
	n	%
Have you seen patients with long COVID (*n* = 41)		
Yes	24	56.1
No	17	41.5
Patients with or suspected of having long COVID (*n* = 17)		
< 5	11	64.7
5–10	3	17.6
11–20	2	11.8
Patients referred from other services (*n* = 17)		
All	3	17.6
0	10	58.8
5	2	5.9
10	7	17.6
Referral source (*n* = 17)		
Self-referral	6	35.3
GP	2	11.8
Other physiotherapists	2	11.8
Emergency department	1	5.9
Respiratory specialist	1	5.9
Sports coach	1	5.9
In hospital	1	5.9
Average number of sessions for long COVID symptoms (*n* = 17)		
Not applicable	10	23.5
1–5	3	17.6
5–10	3	17.6
With other conditions	1	5.9
Symptoms respondents considered to be beyond scope of normal practice (*n* = 17)		
Cardiac symptoms	4	23.5
Neurological (headaches, brain fog)	3	17.6
Psychological aspect	2	11.8
Respiratory issues	1	5.9
Financial issues	1	5.9
Workplace management	1	5.9
Taste recognition	1	5.9
Monitoring excessive heart rate	1	5.9
Cold/'flu symptoms	1	5.9
Complex family dynamics	1	5.9
None	1	5.9
All	1	5.9

Table 4

*Current Assessment and Outcome Measure Tools Used by Physiotherapists for Patients With Long COVID (*N = *17)*

Variable	Frequency	
	n	%
Assessment tools (*n* = 17)		
Timed sit-to-stand (1 min or 30 s)	3	17.6
Subjective history	3	17.6
None	3	17.6
SPO_2/pulse oximetry	2	11.8
Heart rate/blood pressure	2	11.8
Nijmegen Questionnaire	2	11.8
6 min walk test	1	5.9
Dyspnoea scale	1	5.9
Fatigue severity scale	1	5.9
Rate of perceived exertion	1	5.9
Self-evaluation of Breathing Questionnaire	1	5.9
DePaul Symptom Questionnaire–Post-exertional malaise	1	5.9
Depression, anxiety, and stress scale–21 items (DASS21)	1	5.9
Pain scores	1	5.9
Leister Cough Questionnaire	1	5.9
Hi-Lo breathing assessment	1	5.9
Functional medicine Medical Symptoms/Toxicity Questionnaire	1	5.9
Buffalo Concussion Treadmill Test	1	5.9
Patient Specific Functional Scale	1	5.9
Spirometry	1	5.9
Post-COVID-19 Functional Status Scale	1	5.9
COVID-19 Yorkshire Rehabilitation Scale	1	5.9
Observation	1	5.9
Outcome measurement tools (*n* = 17)		
Return to normal function (sport/work/activities of daily living/physical activity)	12	29.4
Goals	3	17.6
Nothing	3	17.6
Questionnaires	2	11.8
Patient Specific Functional Scale	2	11.8
Heart rate	2	11.8
Decrease amount of rest	1	5.9
Buffalo Concussion Treadmill Test	1	5.9
General symptom score	1	5.9
Timed up and go	1	5.9
6 min walk test	1	5.9
Rating of exertion/fatigue	1	5.9
Exercise tolerance outcome measure	1	5.9

Note. SPO_2 = peripheral capillary oxygen saturation.

Table 5

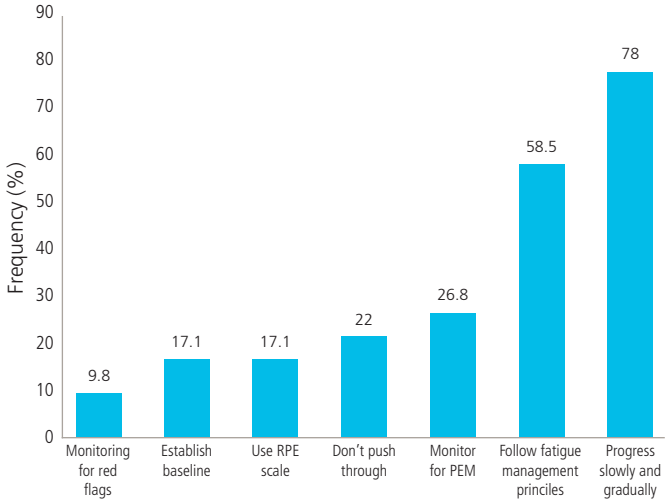
Current Management Strategies Used by Physiotherapists in Long COVID Treatment (N = *17)*

Variable	Frequency	
	n	%
Fatigue management		
Pacing	12	29.4
Education	12	29.4
Rest	3	17.6
Fatigue management	2	11.8
Energy envelope	1	5.9
Modify activity	1	5.9
Return to exercise		
Graded return	2	11.8
Active recovery	2	11.0
Training load management	1	5.9
Postural orthostatic tachycardia syndrome		
Postural orthostatic tachycardia syndrome management	1	5.9
Respiratory management		
Breathing pattern retraining	3	17.6
Cough suppression	1	5.9
Breathing control	1	5.9
Active cycle of breathing technique	1	5.9
Pulmonary rehabilitation	1	5.9
Breathing positioning	1	5.9
Breathing exercises	1	5.9
Self-management		
Apps	1	5.9
Relaxation/mediate	1	5.9
Sleep hygiene	1	5.9
Musculoskeletal management		
Kinesio-tape	1	5.9
Acupuncture	1	5.9
Soft tissue work	1	5.9
Other		
Referral	3	17.6
Listen and validate	2	11.8
Nothing	2	11.8
Encourage acceptance	1	5.9
Email contact throughout the week	1	5.9

Seventy-one per cent of respondents recognised the risk of fatigue and post-exertional malaise in patients with long COVID returning early to activity and impacting long COVID recovery, and there was a range of advice given (Figure 4). An improvement in symptoms after using strategies to manage breathlessness and exercise capacity was reported by 55% of respondents, with 27% reporting improvements in cough and fatigue levels. Just under a quarter (23.5%) of respondents who had seen patients with long COVID referred onwards for cardiac symptoms such as chest pain, erratic heart rate, or for further investigations, such as an echocardiogram (Table 3).

Figure 4

Recommendations for Long COVID Patients by Physiotherapists on Return to Physical Activity

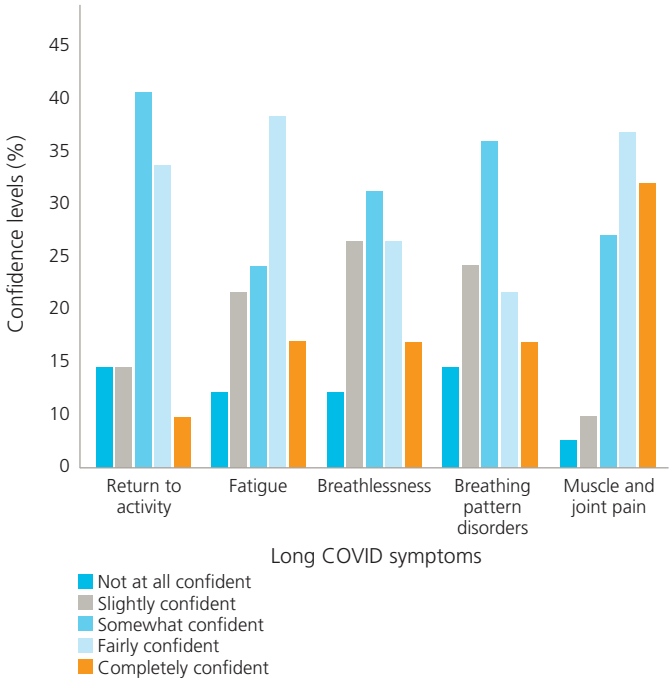


Note. PEM = post-exertional malaise; RPE = rate of perceived exertion.

Overall, respondents reported "least confident" about managing return to activity with only 5% reporting feeling "completely confident". Confidence was also low in managing breathing pattern disorders, with 13.5% reporting being "completely confident". A much higher proportion of respondents (30.6%) reported being "completely confident" in managing muscle and joint pain (Figure 5).

Figure 5

Physiotherapists' Confidence in Managing Different Long COVID Symptoms



Barriers identified to managing patients with long COVID were lack of funding, cost of physiotherapy services, alternative treatments sought, lack of resources, and lack of understanding of the role of physiotherapy within long COVID management.

Long COVID resources

There appears to be limited support provided on managing long COVID in physiotherapy workplaces. Approximately a quarter (27%) of respondents' workplaces provided some information for the management of long COVID, with 19% of respondents educating work colleagues about long COVID themselves. Physiotherapy education provided mainly comprised of discussions, handouts, and presentations.

The websites that respondents found most useful for long COVID information were the New Zealand Ministry of Health (Ministry of Health, 2022b), World Physiotherapy (World Physiotherapy, 2022), and World Health Organization (World Health Organization, 2022b). When prompted, respondents indicated the long COVID webinar by the Goodfellow Unit (Goodfellow Unit, 2022) and peoples' lived experiences were of great added benefit.

Respondents suggested a single website with all the information in one place, and options to select specific treatments and provide management plan resources to patients, would be useful. Booklets, interactive webinars, and short online videos with printable resources were also requested. Respondents indicated a desire for resources in different languages that could be given to patients with explanations of long COVID, as well as guidelines of physiotherapy interventions, and a list of health professionals who could help manage long COVID.

DISCUSSION

Physiotherapy awareness and uncertainty

Survey respondents had a high level of awareness of long COVID being a multisystem condition and good knowledge of common long COVID symptoms. This awareness is underlined by most respondents being confident in identifying patients with long COVID. There was a higher level of confidence in managing muscle and joint pain than other symptoms. Over half (57%; 3,421) of all registered physiotherapists in New Zealand work in private practice in primary care and the majority work in the musculoskeletal area (Physiotherapy Board of New Zealand, 2022). This is reflected by our survey respondents with 61% reporting musculoskeletal as their area of clinical practice. The level of confidence among physiotherapists within New Zealand compares favourably to a study of Austrian physiotherapists and physiotherapy students, where only 11% felt sufficiently informed about long COVID rehabilitation (Scheiber et al., 2021). However, respondents in our study reported less confidence around managing respiratory symptoms, which commonly present in long COVID; this may reflect the small number of respiratory physiotherapists working in primary care in New Zealand.

With initial classifications of long COVID being anywhere from 4–12 weeks (National Institute for Health and Care Excellence, 2020), the resulting variation in timelines has created uncertainty in providing a diagnosis of long COVID. This was reflected by some respondents reporting low levels of confidence in identifying long COVID, which mirrors the experiences of primary health care physicians overseas (Kingstone et al., 2020).

This uncertainty around diagnosis may also contribute to those living with long COVID feeling a lack of validation. Internationally, patients living with long COVID noted health professionals' lack of knowledge of their condition and felt it necessary to convince some health professionals that their symptoms were real rather than imagined (Au et al., 2022). Approximately a quarter (27%) of the survey respondents were not aware that those who had never returned a positive COVID-19 test could develop long COVID symptoms (Ziauddeen et al., 2022) and have a long COVID diagnosis. It is possible that those living with long COVID in New Zealand could have similar experiences to those living with long COVID overseas. These "long haulers" have described the hard work needed to prove their symptoms were real, in the face of standard medical tests returning normal results (Baz et al., 2022; Kingstone et al., 2020). Those without a positive COVID-19 polymerase chain reaction (PCR) test, antigen test, or antibody test, and therefore no formal COVID-19 diagnosis, have also struggled with accessing employment or income benefits overseas (Brown & Kelly, 2021). Additionally, in some cases, long COVID has forced these people to leave the workforce due to persistent symptoms impacting their ability to do their job. With primary care physiotherapists in New Zealand reporting good awareness of the wide range of symptoms of long COVID, it is hoped that those living with long COVID, who present to a physiotherapist in primary care, will receive the validation and support they deserve.

Primary care physiotherapists in New Zealand appeared to be aware of the secondary effects long COVID can have on daily lives. Among respondents, there was good awareness of the potential impact of living with long COVID, which has been highlighted elsewhere (Cabrera Martimbianco et al., 2021; Orrù et al., 2021). In a study of 507 individuals living in Italy during the COVID-19 pandemic, those who were at least 3 months post-COVID-19 infection had a lower self-reported quality of life (M = 60.85) than those who have never been infected (M = 75.54) using the EuroQol-5D Quality of life instrument (Orrù et al., 2021).

Social isolation, modified lifestyle, decreased activity, and financial and social burdens were all highlighted as factors that can contribute to psychological symptoms in our survey. This mirrors the psychological impact for those with long COVID overseas (Cabrera Martimbianco et al., 2021). Awareness of the psychological effects of the condition may mean primary care physiotherapists in New Zealand are more likely to offer a holistic approach to management of their patients with long COVID.

Although awareness was high regarding the psychological burden patients with long COVID might face, one respondent suggested a more positive outlook can aid in recovery, as indicated in Table 2. This "mind body" link has been shown to have a positive effect in reducing distress and helping cope within the myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS) population (Edwards et al., 2007), who experience

similar symptoms to long COVID. However a note of caution is required when communicating strategies such as this to patients, as many patients living with long COVID have had their symptoms dismissed or labelled as "anxiety" (Miyake & Martin, 2021) and such advice could be misconstrued and harmful.

Assessment and management

There was a lack of consistency in assessment and management tools used with those patients with long COVID who presented to physiotherapists in primary care. There are few validated outcome measures available for long COVID. However, recommendations have been made by the Center for Disease Prevention and Control and American Physical Therapy Association (American Physical Therapy Association, 2021; Martin, 2021) based on tools validated in either a population with long COVID or, more commonly, in other populations whom experience symptoms that are also associated with long COVID. These assessment tools include the Post-Covid-19 Functional Status Scale and EuroQol-5D for assessment of quality of life, and the 1 min sit-to-stand test and 6 min walk test for assessment of exercise capacity. Of all the assessment tools respondents reported using (Table 4), only seven linked to the 37 options suggested by the Center for Disease Prevention and Control and American Physical Therapy Association (American Physical Therapy Association, 2021; Dean & Olsén, 2022; Décary et al., 2021; Martin, 2021; Webber et al., 2021). The tools that did align with the recommendations included the Fatigue Severity Scale, 6 min walk test, and Timed Up and Go test, but a wide range of other assessment measures were also used (Table 4). This mirrors the experience of health professionals overseas, who, faced with the uncertainty surrounding long COVID report a reliance on the application of existing disease frameworks and assessment tools (Ladds et al., 2021). Given the current lack of specific and validated assessment tools for long COVID, coupled with the wide range of presenting symptoms, the lack of consistency of tools being used is unsurprising.

Drawing from other similar conditions to support those with long COVID was a strategy that appeared to be used when giving advice on returning to physical activity. Most of the advice given was around pacing, progressing slowly, and avoidance of over exertion, which mirrors the recommended advice given in the management of people with ME/CFS (Décary et al., 2021). The wide application of advice used for those with ME/CFS when returning to physical activity could be due to the respondents' knowledge around consequences of returning to physical activity too early. Seventy one per cent of respondents identified the prevalence and impact of post-exertional malaise and fatigue in long COVID. Close to 75% of patients with long COVID experience post-exertional malaise after 6 months, with the most common trigger being physical activity or exercise (Décary et al., 2021). With most of the exercise recommendations in current literature for post-acute COVID-19 rather than long COVID, it is reassuring that most respondents recognised the impact of post-exertional malaise and implemented evidence-based treatment for post-exertional malaise from ME/CFS guidelines. Very few respondents were completely confident in managing a return to physical activity for patients with long COVID (Figure 4) and this was highlighted by the wide range of responses given in our survey. The treatment approach for people with long COVID returning to exercise needs to be more consistent and evidence-informed, while still providing individualised advice (Humphreys et al., 2021).

There was good awareness of when symptoms were outside the scope of physiotherapy and referrals were warranted. Further development of clear referral pathways, to ensure access to timely and appropriate treatment for patients with long COVID is needed (Webber et al., 2021). Red flags that require onward referral include hypoxemia or oxygen desaturation detected during exercise, or the presence of chest pain (Chaplin, 2021; Scheiber et al., 2021). Respondents indicated an awareness of referrals for chest pain; however, no respondents had referred patients for hypoxemia or oxygen desaturation in this study. This may have been due to an absence of patients presenting with these symptoms, or it may reflect lack of awareness. The awareness of red flags in long COVID and appropriate onward referrals needs to become well established within the primary care physiotherapy population. An evidence-informed guideline would be beneficial to support physiotherapists in primary care to reliably screen for red flags within the long COVID population.

Role of physiotherapy

In our survey, respondents highlighted the importance of greater public awareness of the impact physiotherapy can have on managing long COVID. However, promotion of the physiotherapy role needs to go further than just public understanding. Other health practitioners' awareness of what physiotherapy can offer also needs to increase. With very few referrals to physiotherapy currently being received from other primary care providers, increasing the awareness of the physiotherapy role in long COVID management among other primary health care professionals is essential. Timely referrals and a multidisciplinary approach are being recommended as best practice for the management of long COVID within primary care (National Institute for Health and Care Excellence, 2020). Physiotherapy in primary care in New Zealand is a vital part of this approach, with our ability to support and manage many of the symptoms that people with long COVID present with. Long COVID management recommendations include daily life modifications and activity pacing underpinned by a holistic approach, which aligns with patient-centred care that is at the heart of physiotherapy (American Physical Therapy Association, 2021; Harenwall et al., 2021; Webber et al., 2021). The improvement in some long COVID symptoms noted by survey respondents suggests that the physiotherapy profession has the skills and capability to support long COVID management. These findings contrast to a study undertaken over a year ago highlighting a clear gap between the confidence and abilities of Austrian physiotherapists' in managing long COVID (Scheiber et al., 2021). Although global awareness of long COVID has developed over time, at the time our survey was distributed, long COVID was only just starting to emerge within New Zealand.

Increasing awareness of the roles of the different health professions within a management team, and what each can offer, is essential to providing the best care for people living with long COVID. Along with increased awareness by the public and other health care professionals, better understanding of the expertise different physiotherapy specialities offer is needed. There was a higher level of confidence in managing muscle and joint pain in those living with long COVID than in managing breathing pattern disorders. This is unsurprising given that most of our survey respondents identified as musculoskeletal physiotherapists. This lack of confidence in managing respiratory symptoms is mirrored in the study of Austrian physiotherapists, who had higher confidence with neuromuscular aspects of long COVID rehabilitation rather than respiratory (Scheiber et al., 2021). This highlights an increased need for specialised respiratory physiotherapists to be employed in primary care to support this aspect of long COVID management. Clear referral pathways between physiotherapists in different specialities could set up a more streamlined approach to patient management, giving those with long COVID the best chance of symptom resolution.

Future direction

Respondents highlighted the value of developing a singular resource, to have current literature and resources related to long COVID assessment and management in one place, such as an online repository. Funding is needed to support training for physiotherapists, and provision of more physiotherapists with respiratory experience, as part of a wider multi-disciplinary team to support the increasing numbers of patients with long COVID. In addition, funding to subsidise long COVID treatment would create more equitable access for all those living with long COVID in New Zealand.

Study limitations

A key limitation of the study was the low response number, which may have been influenced by the method of survey distribution. With only 41 completed responses, it provides a representation from a small cohort of primary care physiotherapists in New Zealand, and the results are therefore not generalisable to the wider physiotherapy profession working in primary care. These respondents may not accurately reflect the breadth of knowledge and clinical skills of those working in primary care, with most respondents based in musculoskeletal clinical practice. There were very few responses from physiotherapists working in the field of respiratory care, for example. Another point to note is that more than half of the survey population had over 20 years of physiotherapy experience and nearly a third reported having a post graduate qualification or higher. The results of the survey may therefore be skewed to those who are more informed and therefore may not accurately represent the knowledge and awareness of long COVID among all physiotherapists working in primary care.

CONCLUSION

This study describes the current awareness, knowledge, and management of long COVID by a small cohort of primary care physiotherapists in New Zealand. The findings indicate good awareness of long COVID and suggest some physiotherapists are drawing parallels to other conditions, such as ME/CFS. New Zealand physiotherapists faced similar challenges to overseas primary health care professionals with uncertainty in the diagnosis of long COVID and lack of validated tools, creating a lack of consistency in assessment and management of patients seen to date. Respondents identified one barrier within long COVID management as a lack of recognition of the potential role of physiotherapy in long COVID management by both the public and other health professionals. Findings indicated the growing importance of having access to key long COVID information and resources to support the physiotherapy workforce. Funding to increase the physiotherapy workforce in primary care has the potential to reduce the impact of long COVID on existing primary care services, such as GP practices, which are already overstretched (Royal New Zealand College of General Practitioners, 2023).

KEY POINTS

1. Primary care-based physiotherapists in New Zealand have good knowledge of the range of symptoms, systems, and secondary effects of long COVID.
2. Uncertainty around long COVID diagnosis continues to exist.
3. A lack of consistency exists in tools used in assessment and management of long COVID.
4. The role of primary care-based physiotherapists in long COVID management has not been fully recognised by the public or other health professionals.

DISCLOSURES

No funding was obtained for the completion of this study. There are no conflicts of interest that may be perceived to interfere or bias this study.

PERMISSIONS

Ethics approval was granted by University of Otago Ethics Committee (reference number D22/125).

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CONTRIBUTIONS OF AUTHORS

Conceptualisation and methodology – SR; Formal analysis and investigation – EW; Writing – original draft preparation – EW; Writing – review and editing – SR; Supervision – SR.

ADDRESS FOR CORRESPONDENCE

Sarah Rhodes, Centre for Health, Activity and Rehabilitation Research, School of Physiotherapy, University of Otago, PO Box 56, Dunedin 9054, New Zealand.

Email: sarah.rhodes@otago.ac.nz

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Appendix A

Table A1

*All Recognised Long COVID Symptoms by Physiotherapists (*N = *41)*

Variable	Frequency	
	n	%
Systemic		
Fatigue	40	97.6
Weakness	8	19.5
Malaise	6	14.6
Pain	4	9.8
Sleep difficulties	3	7.3
Altered immune response	2	4.9
Post exertional malaise	2	4.9
Inflammation	1	2.4
Neuropsychiatric		
Brain fog	20	48.8
Headache	12	29.3
Cognitive decline + decreased memory + confusion	11	26.8
Anxiety	5	12.2
Reduced concentration	5	12.2
Depression	4	9.8
Low mood	3	7.3
Light/sound sensitivity	1	2.4
Recognised cardiovascular symptoms		
Heart rate changes/chest pain	31	75.6
Exercise intolerance	12	29.3
Dizziness	7	17.1
Fainting	2	4.9
Nausea	2	4.9
Vascular disorders	3	7.3
Dysautonomia	5	12.2
Pulmonary/respiratory		
Short of breath/Breathing pattern dysfunction	34	82.9
Cough	18	43.9
Ear, nose, and throat		
Loss of taste	9	22.0
Loss of smell	7	17.1
Sore throat	2	4.9
Tinnitus	2	4.9
Earache	1	2.4
Sneezing	1	2.4
Swallow/speech	1	2.4
Hearing loss	1	2.4
Musculoskeletal		
Muscle aches	9	22.0
Joint pain	7	17.1
Body aches	7	17.1
Gastrointestinal		
Gastrointestinal issues	11	26.8
Stomach pain	1	2.4
Other		
Cardiovascular symptoms	3	7.3
Vision issues	3	7.3
Lipids	1	2.4
Vestibular	1	2.4
Psychosocial	1	2.4
Vertigo	1	2.4
Opinions of COVID-19	1	2.4
Dermatological		
Skin rash	3	7.3
Endocrine		
Blood sugars	1	2.4