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- Secondary school students' knowledge, attitude and behaviours towards sports-related concussion
- Knowledge, attitudes, and behaviours of New Zealand physiotherapists to sports-related concussion
- Tipping point for engagement in professional supervision by physiotherapy private practitioners
- Systematic review of Māori pain experiences and assessment tools

PHYSIOTHERAPY NEW ZEALAND
Kōmiri Aotearoa

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MOVEMENT FOR LIFE

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Communication – An Essential Tool in Extraordinary Times

As I write this, the world is suddenly a very different place. From New Zealand's first recorded COVID-19 case on 26 February to the Prime Minister's announcement on 23 March that the country would be going into lockdown, most aspects of life in Aotearoa New Zealand have changed dramatically. The situation continues to evolve by the day, and the ramifications are likely to be felt for many months, if not for years, to come.

Along with the strong messages we are receiving about the importance of washing our hands, we are also coming to grips with new concepts like "self-isolation", "social distancing", "flattening the curve" and, indeed, "lockdown". As from 11.59pm on Wednesday 25 March, Aotearoa New Zealand moved to alert level 4, which means, with the exception of essential service workers, we must stay home in our "bubble" for at least four weeks. For me, lockdown provides some certainty and relief, particularly given the screeds of information and misinformation that was circulating via different mediums in the lead-up to this decision. However, there are many aspects of life that remain uncertain, and there are many questions still to be answered as we watch and wait to see the impact this virus will have – and when some form of normality will return.

At a time like this, for the good of all New Zealanders, clear and effective communication is essential. In terms of our nationwide response, the Prime Minister clearly instructed us to follow the guidelines of the New Zealand Government as we endeavour to contain COVID-19 (New Zealand Government, 2020).

Working together, the Physiotherapy Board of New Zealand (Physiotherapy Board) and Physiotherapy New Zealand (PNZ) have responded quickly and expertly to communicate essential information with our physiotherapy community as it comes to hand (Physiotherapy New Zealand, 2020). Guidance and support have been provided on how physiotherapists can best protect themselves, the kind of services physiotherapists can continue to offer in community and private practice settings, and how to engage in telehealth/ehealth services. Behind the scenes, the Physiotherapy Board and PNZ continue to lobby ACC for telehealth/ehealth services to be extended for physiotherapists. Together, they have supported the move by the Ministry of Health to increase the capacity of the health workforce as part of the COVID-19 response (Ministry of Health, 2020). They have expressed their concern for the welfare of our physiotherapy workforce, and their gratitude to physiotherapists working in essential services at the frontline is clear.

For many of us, our usual methods of interacting with our patients, let alone our families and friends, has changed almost overnight. As a concept, the importance of good communication is not new. In fact, it is a key competency required of New Zealand physiotherapists (Physiotherapy Board of New Zealand, 2018), an essential component of obtaining informed consent, a necessary element of teamwork, and an attribute that we teach our physiotherapy students. We know that the patient-physiotherapist relationship is complex and dependent on a range of different elements, including interpersonal, clinical, and organisational factors (O'Keefe et al., 2016).

While we are coming to terms with our changed professional and personal situations, we also need to be mindful of establishing and maintaining positive interactions with our patients, as these are linked with positive outcomes, such as reduced pain, decreased disability, and higher treatment satisfaction (O'Keefe et al., 2016). Communication is also a salient component of patient-centred care, which is rated highly in positively influencing patient uptake of recommended health services and self-management strategies (O'Leary et al., 2020).

Given the current exceptional circumstances, now could be a good time to explore and learn creative and different ways to communicate with patients. In the short-term, given our isolation, we are going to be more reliant on telehealth/ehealth, using information and communication technologies to support healthcare practice (Howard & Kaufman 2018; World Health Organisation, n.d.). Telehealth/ehealth has often been used to reach people in remote and/or rural communities, but is increasingly being used in hospital settings to connect hospital clinicians and patients at home (McBeth 2019). It has been proven to be effective, viable, and acceptable for delivering physiotherapy to patients with acute and chronic conditions (Cottrell et al., 2018; Lee et al., 2019; Peretti et al., 2017., Saywell et al., 2017; van Egmond et al., 2018). In some fields, research has shown that telehealth/ehealth is at least equally effective as in-person appointments, but further robust evidence relating to this mode of service delivery, particularly in relation to its application for physiotherapy, is needed.

In the meantime, I encourage physiotherapists around Aotearoa New Zealand and, indeed, globally, to embrace new ways of communication, including using digital technologies. These may not only provide opportunities in the short-term, but also have a positive impact in the future, bringing benefits to all.

I hope that you will also find time to enjoy reading the papers in the first issue of the *New Zealand Journal of Physiotherapy* for 2020. These include the knowledge, attitudes, and behaviours of physiotherapists and secondary school students to sports-related concussion; engagement in professional supervision; and a systematic review of Māori pain experiences and assessment tools.

Kia kaha (stay strong)

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New Zealand Secondary School Students' Knowledge, Attitude and Behaviours Towards Sports-Related Concussion

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ABSTRACT

Sports-related concussion is a significant problem in New Zealand, with an estimated 21% of all traumatic brain injuries occurring in the sporting environment. The symptoms of sports-related concussion experienced by high school-aged athletes are often associated with a decline in academic performance, and are commonly more severe and persistent then those experienced by adult athletes. A 35-item, multi-choice questionnaire was used to ascertain New Zealand secondary school students' knowledge, attitudes, and behaviours of sports-related concussion. By comparing results from 2018 to those obtained in 2017, this study investigated the impact that a 2018 Accident Compensation Corporation (ACC) social media campaign may have had on New Zealand secondary school students' knowledge, attitudes, and behaviours regarding sports-related concussion. The main findings of this study show that the ACC social media campaign did not alter students' knowledge, attitudes, and behaviours toward sports-related concussion. Students were knowledgeable regarding concussion and showed positive attitudes towards correct management of the injury. Students had specific knowledge gaps regarding the onset of symptoms, activities to avoid post-concussion, the possible complications of multiple injuries, and recognition of the less discernible symptoms of concussion. These results suggest that secondary school students would benefit from further education on the possible long-term effects of sports-related concussion and the importance of effective management once a concussion has occurred.

Churton, E., Falconer, S. & Reid, D. A. (2020). New Zealand secondary school students' knowledge, attitude and behaviours towards sports-related concussion. *New Zealand Journal of Physiotherapy, 48*(1), 7–18. https://doi.org/10.15619/NZJP/48.1.02

Key Words: Concussion, Sports, Secondary School Students

INTRODUCTION

The Concussion in Sport Group consensus statement defines sports-related concussion (SRC) as a traumatic brain injury induced by biomechanical forces (McCrory et al., 2017). Concussion can be caused by a direct blow to the head or may result from forces transmitted to the head from a blow elsewhere on the body. A typical concussion is characterised by the rapid onset of short-lived neurological impairments that resolve spontaneously, although in some cases, the onset of signs and symptoms can be delayed or the symptoms may fail to resolve (McCrory et al., 2017). In New Zealand, SRC is a significant problem, with an estimated 21% of all traumatic brain injuries occurring in the sporting environment (Theadom et al., 2014). Individuals who sustain SRC may experience somatic or physical symptoms, such as headache, dizziness, or poor balance; cognitive difficulties, such as impaired concentration or memory loss; and sleep disturbance or altered mood (Wasserman et al., 2016). When compared to older athletes, the symptoms experienced by high school-aged athletes are often more severe and persistent (Williams et al., 2015), and are associated with a decline in academic performance (Wasserman et al., 2016).

There are currently no clinical tests that offer an immediate and reliable concussion diagnosis. Therefore, diagnosis relies on the interpretation of self-reported symptoms. However, as the majority of concussions occur without a loss of consciousness or clear neurological signs (McCrory et al., 2017), and the signs and symptoms of concussion are vague, not specific to concussion, and can occur in people without injury (Anderson et al., 2016), SRC is notoriously difficult to diagnose. Due to the confusion around the signs and symptoms of concussion, with many individuals believing there must be a loss of consciousness for a concussion to occur (Theadom et al., 2014), and the reliance on athletes recognising and self-reporting concussion symptoms, it is estimated that up to 30% of SRC is unreported and untreated (Hardaker, 2018).

New Zealand's national insurance company, the Accident Compensation Corporation (ACC), collects data on the number of claims and the costs associated with the treatment

of SRC (King et al., 2014). Between 2014 and 2018, across seven sporting codes (rugby union, football, rugby league, netball, hockey, touch rugby, and softball/baseball), those aged between 16 to 19 years lodged 8,498 ACC claims related to SRC. Rugby union represented 43.9% (3,728) of these claims, followed by 8.7% (737) in rugby league and 7.6% (644) in football. The total cost of claims within this age group was NZ$4,348,499, with rugby union again well ahead with 33.7% (NZ$1,466,020) of the total cost, followed by football with 7.8% (NZ$340,517), and cycling with 7.7% (NZ$336,435) (ACC, 2019). Unfortunately, as ACC data are only available for those who actively seek treatment, they do not provide an accurate representation of SRC in New Zealand and may indicate a level of underreporting of the condition. Furthermore, it is not possible to demonstrate the level of participation in sport of those sustaining SRC, the number of missed matches and trainings, and time spent in hospital or absent from school from these data (King et al., 2018).

Individuals who are unable to identify the signs and symptoms of concussion are unlikely to report them, meaning athletes with limited or incomplete knowledge of concussion could be at risk of delayed recovery or further injury (Fedor & Gunstad, 2015). A survey by Reid et al. (2018) assessed New Zealand secondary school students' knowledge and attitudes toward concussion in sport. This study highlighted that New Zealand secondary school students had good knowledge around concussion but that further education was required to increase their understanding of some of the symptoms of SRC, including amnesia, nausea, and insomnia. Further, it indicated that students did not appreciate that the symptoms of concussion may not be immediately evident and can emerge up to several days following injury. Students also lacked knowledge regarding the time frames for return to sport, the potential impact of multiple concussions, and the detrimental effects of electronic devices on cognitive recovery following concussion.

Whilst adequate knowledge is essential for youth athletes to understand and appropriately manage concussion, knowledge alone does not always lead to appropriate reporting behaviour. A key determinant of whether an athlete reports or intends to report their symptoms is their attitude toward SRC (Sye et al., 2006). When a lack of knowledge is excluded, the most common reasons youth athletes do not report symptoms of concussion are believing the injury is not serious enough to warrant medical attention and not wanting to be withheld from competition (Kurowski et al., 2015). Athletes reporting of concussion is negatively influenced by the fear of losing playing time, being involved in a game-versus-practice situation, and not wanting to let others down (Kay et al., 2015). To ensure athletes are communicating when they experience a potential concussion, it is critical that they are not only able to recognise the signs and symptoms of SRC but also understand the importance of reporting when they suspect a concussion has occurred (Wallace et al., 2017).

Weber et al. (2019) found that a positive attitude towards intent to report SRC does not necessarily translate to actual reporting behaviours. The way athletes approach the reporting of their concussion is strongly influenced by how they believe the injury will be managed, including how long they think they will be excluded from trainings and games (Register-Mihalik et al., 2017). An athlete's perception of the short- and long-term consequences of a concussion will also influence their approach to management, with those who believe that concussion is an insignificant injury being less likely to follow an appropriate rehabilitation programme (Register-Mihalik et al., 2017). Actual or perceived pressure to continue training or playing following a concussion also influences players' intentions to report concussion (Kroshus et al., 2015). Improving player knowledge alone does not entirely address concerns around concussion reporting and management. Therefore, in addition to promoting players' knowledge of concussion, it is vital that education initiatives address player attitudes towards concussion management (Kearney & See, 2017).

In 2017, a survey was undertaken by Reid et al. (2018) investigating the knowledge, attitudes and behaviours (KAB) of secondary school students following the release of the ACC guidelines in 2016 on the management of SRC in New Zealand (ACC, 2016). This survey was repeated in 2018 following the release of an ACC media campaign to increase the KAB of SRC in secondary school students (Reid et al., 2019). Therefore, the aim of this study was to compare the results of the 2017 and 2018 secondary school student surveys and investigate the impact of the ACC social media campaign on the New Zealand KAB regarding SRC.

METHODS

This study used a cross-sectional questionnaire design to ascertain the KAB of secondary school students in regard to SRC. The design of the 35-item, multi-choice questionnaire was based on previous studies of this nature (Murphy et al., 2015; Register-Mihalik et al., 2013; Sye et al., 2006). Four additional questions regarding behaviours towards SRC, which were not addressed in 2017, were added to the 2018 survey. These questions examined behaviours of players, coaches, and referees concerning the on-field management of concussion, such as asking participants if they had observed players being encouraged to play if a concussion had occurred.

Participants and recruitment

The 2018 secondary school student survey was undertaken between September and December 2018 in the North Island, encompassing a range of sporting events, most of which were held during School Sport New Zealand's Winter Tournament Week (September holiday period) (Table 1). Participants were aged 16 years or older, were involved in organised, coached secondary school sports or had recently left school. A participant information sheet was provided along with a hard copy of the survey, and as the survey was anonymous, consent was gained by the student being willing to complete the survey. Ethical approval was provided by Auckland University of Technology Ethics Committee (reference number 16/187) and the ACC Ethics Committee.

Intervention

Coinciding with the KAB data collection, ACC delivered a social media campaign to all students, parents, and coaches attending Tournament Week. This campaign comprised of one post on a

Table 1
Secondary School Students' 2018 Survey: Events, Sports and Locations

Event	Sport	Venue and date	Projected numbers
National Secondary Schools Tournament	Rugby league	Bruce Pullman Park, Auckland, September 3-7, 2018	528
Jock Hobbs Memorial National Under 19 Tournament	Rugby	Taupo, September 8-15, 2018	400
Schick Premierships AA Zone 2	Basketball	Rotorua Events Centre, Rotorua, September 5-7, 2018	330
New Zealand Secondary Schools Premiership Zone 2	Basketball	Central Energy Trust Arena, Palmerston North, September 5-8, 2018	370
Schick Premierships AA Zone 1	Basketball	North Shore Events Centre, Auckland, September 5-8, 2018	370
Schick Northern Cup	Basketball	Bruce Pullman Park, Auckland, September 5-7, 2018	250
New Zealand Secondary School Champs	Netball	Blake Park, Mt Maunganui, September 3-6, 2018	1,488
National Age Group Tournament	Football	Wellington, December 10-15, 2018	47
Total			3,756
Completed surveys			1,327
Response rate			35.3%

different aspect of concussion management shared via the ACC SportSmart Facebook page each day of the tournament. The following key messages were delivered:

- Suspect a concussion? If in doubt, sit them out. Concussion is serious – a doctor needs to check the player before they get back into the game.
- If you have a concussion, patience is key. It can take time for the brain to heal so it's important to allow yourself time out to ensure you are symptom free. Only get back onto the field once your doctor has said it's ok.
- What does a concussion look like? If a player seems confused, slower than usual, or is unbalanced, remove them from play and get them checked by a doctor.
- If a mate takes a knock in the game and looks like they're having a hard time with easy tasks, talk to them. A lack of concentration, blurry vision, and feeling sick or vomiting can be symptoms of concussion.
- Recognise the signs – https://www.accsportsmart.co.nz/concussion-2/.

The posts had a combined reach of 3,938 people, 521 engagements, 33 likes, 19 shares, and one comment.

Data analyses

All data from 2017 and 2018 were analysed descriptively via SPSS v25 (BM Corp, Chicago, Illinois, USA). Means and standard deviations were reported as appropriate for the data collected. *t*-tests were used to investigate between group comparisons for key variables of the two survey years. The *p* value was set at 0.05.

RESULTS

Of the 3,756 estimated attendees at the sporting tournaments, 1,327 students were recruited (Table 1), with an approximate response rate of 35.3%. Table 2 details the demographic characteristics of the participants who completed the survey.

Demographics

The gender of those who completed the survey differed between 2017 and 2018, with 17.6% of the 2017 respondents being female versus 60.3% in 2018. The number who identified as New Zealand Pākehā was 49.3% (2017) and 58.3% (2018); and as Māori was 23.2% (2017) and 33.5% (2018). The most common sport played in 2017 was rugby union, whereas in 2018, it was netball (approximately 50% of students). The majority of participants played sport at a regional level, and this had changed slightly over the two survey periods (43.4% vs 44.4%). Those with at least four years of playing experience increased from 70.6% (2017) to 87.2% (2018). The age of participants was similar for both years (mean age 17 ± 1.0 years).

Knowledge of concussion

Table 3 contains the responses to the 20 knowledge items in the survey. In this section of the questionnaire participants were able to choose more than one answer. There was no statistical difference in the mean scores for overall knowledge items from 2017 (15.2, SD 2.5 in both years; p = 1.00), with the range of correct answers falling between seven and 20 for both years. There was no difference in the response rates by sport code. The term "concussion" was known to 93% in 2018 (94% in 2017) of participants. When compared to 2017, more students in 2018 students were able to identify the most common signs and symptoms of blurred vision (79.1% 2017 vs 84.9% 2018),

Table 2

Demographics of the Students who Completed the Secondary School Students' Survey in 2017 and 2018

Demographic characteristics	2017 (*n* = 807)	Frequency or SD (%)	2018 (*n* = 1327)	Frequency or SD (%)
Age (years)	Mean 17.0	SD 1.1 Range 16 - 20	Mean 17.0	SD 1.0 Range 16 - 21
Gender				
Male	661	81.9%	524	39.7%
Female	142	17.6%	800	60.3%
Ethnicity				
New Zealand Pākehā	398	49.3%	773	58.3%
Māori	187	23.2%	444	33.5%
Pacific Peoples	151	18.7%	296	22.3%
Asian	42	5.2%	52	39.2%
Middle Eastern	5	0.6%	22	1.7%
Other	24	3.0%	24	1.8%
Main sport played				
Rugby union	418	51.8%	297	22.4%
Basketball	294	36.4%	340	25.6%
Netball	44	5.5%	656	49.4%
Rugby league	29	3.6%	61	4.6%
Other	19	2.4%	119	8.9%
Football (soccer)	2	0.2%	27	2.0%
Type of school				
Co-education	394	48.8%	832	62.7%
Left school	205	25.4%	225	17.0%
Single sex male	139	17.2%	94	7.1%
Single sex female	61	7.6%	179	13.5%
Highest participation level				
Regional	350	43.4%	589	44.4%
School	251	31.1%	522	39.3%
National	176	21.8%	210	15.8%
Club	22	2.7%	139	10.5%
Recreational	5	0.6%	12	0.9%
Number of years played				
4 years	570	70.6%	1157	87.2%
3 years	76	9.4%	94	7.1%
2 years	65	8.5%	46	3.5%
1 year	56	6.9%	30	2.3%

Note. The data have been extracted with permission from two reports commissioned by ACC (Reid et al., 2018; Reid et al., 2019). For responses related to ethnicity, sports played, and highest level of participation, participants could select more than one response. *n* = number; SD = standard deviation.

confusion (76.0% 2017 vs 79.7% 2018), dizziness (81.8% 2017 vs 83.2% 2018), headache (83.6% 2017 vs 85.7% 2018), and loss of consciousness (64.7% 2017 vs 69.1% 2018). There was a reduction in concussion information sourced from medical professionals, such as doctors and physiotherapists (55.8% 2017 vs 43.8% 2018), and from teachers and coaches (54.4% 2017 vs 49.4% 2018), with sports clubs also slightly reduced (21.2% 2017 vs 17.3% 2018). ACC as a source of information on concussion remained low between both years (7% 2017 vs 10% 2018). Regarding decision-making related to returning to training and games after a concussion, a doctor was correctly identified by participants as the most competent person to judge when a player was ready to return to sport (87% 2017 vs 91% 2018).

Gaps identified in the students' knowledge of concussion included the ability to understand what amnesia was. Insomnia and nausea were less well-known persistent symptoms of concussion. Loss of consciousness was correctly identified as a key symptom by only 64.7% in 2017 vs 69.1% in 2018. There was a decrease in those who thought, incorrectly, that headgear would reduce concussion, with 55.6% suggesting this was correct in 2017 and 46.1% in 2018. There was a small increase in awareness that the use of blue screen devices, such as a phone to deliver text messages or similar activities requiring

Table 3

Knowledge of Concussion of the Students who Completed the Secondary School Students' Survey in 2017 and 2018

Knowledge items	Frequency (%) of correct answers	
	2017 (*n* = 807)	2018 (*n* = 1327)
Statements which students considered to be a sign or symptom of concussion		
Skin rash (false)	781 (96.7)	1262 (95.1)
Abnormal sense of smell (false)	755 (93.6)	1171 (88.2)
Abnormal sense of taste (false)	751 (93.1)	1174 (88.4)
Joint stiffness (false)	747 (92.6)	1167 (87.9)
Bleeding from the mouth (false)	731 (90.6)	1177 (88.6)
Fever (false)	725 (89.8)	1107 (83.4)
Black eye (false)	717 (88.8)	1127 (84.9)
Bleeding from the nose (false)	662 (82.0)	991 (74.6)
Sharp burning pain in the neck (false)	674 (83.5)	1027 (77.7)
Dizziness (true)	660 (81.8)	1104 (83.2)
Headache (true)	675 (83.6)	1137 (85.7)
Bleeding from the ear (false)	649 (80.4)	996 (75.1)
Blurred vision (true)	638 (79.1)	1127 (84.9)
Confusion (true)	613 (76.0)	1058 (79.7)
Weakness in neck movements (false)	547 (67.8)	824 (62.1)
Loss of consciousness (true)	522 (64.7)	917 (69.1)
Nausea (true)	388 (48.1)	767 (56.5)
Amnesia (true)	317 (39.3)	725 (54.6)
Numbness or tingling of the arms (false)	628 (77.8)	982 (74.0)
Insomnia (true)	108 (13.3)	249 (18.8)
Sources of information on concussion		
Teacher/coach	439 (54.4)	656 (49.4)
Other players	192(23.8)	358 (27)
Doctor/physiotherapist	450 (55.8)	581 (43.8)
Accident Compensation Corporation	58.0 (7.2)	139 (10.5)
Sport Clubs	171 (21.2)	230 (17.3)
Which of the following players would you say might be "concussed"?		
A player complains of stinging or burning in his calf muscles (false)	778 (96.4)	1261 (95.0)
After a big knock/fall/head clash the player starts making wrong decisions or actions during the game (true)	546 (67.7)	912 (68.7)
After a ruck/fall/head clash a player is left on the ground not moving (true)	534 (66.2)	1017 (76.6)
A teammate is complaining of headaches and blurred vision (true)	507 (62.8)	913 (68.8)
In the team room a couple of hours after the game a teammate complains of feeling sick with a headache (has not been drinking alcohol) (true)	392 (48.6)	631 (47.6)
General knowledge		
Concussion is an injury to the (correct answer brain or head)	771 (95.6)	1275 (96.1)
Concussion only occurs if you lose consciousness (false)	686 (85.0)	1139 (85.8)
If you are experiencing concussion signs and symptoms after a head knock or sudden movement to the body, you should not return to play (true)	680 (84.3)	1086 (81.8)
What are the possible complications of multiple concussions?		
No complications exist (false)	772 (95.7)	1256 (94.6)
Joint problems (false)	693 (85.9)	1236 (93.1)
Brain damage (true)	583 (72.2)	994 (74.9)
Memory problems (true)	499 (61.8)	882 (66.5)
Increased symptoms (true)	318 (39.4)	582 (43.9)
Increased risk of further injury (true)	306 (37.9)	640 (48.2)
Don't know	98 (12.1)	182 (13.7)

Knowledge items	Frequency (%) of correct answers	
	2017 (*n* = 807)	2018 (*n* = 1327)
What are the possible complications of returning to play too soon?		
No complications exist (false)	786 (97.4)	1265 (95.3)
Joint problems (false)	768 (95.2)	1192 (89.8)
Paralysis (false)	627 (77.7)	982 (74.0)
Brain damage (true)	517 (64.1)	878 (66.2)
Increased risk of further injury (true)	478 (59.2)	898 (67.7)
Reduced sports performance (true)	371 (46.0)	739 (55.7)
Unsure of answer	107 (13.3)	172 (13.0)
If a player gets concussed, how long should they wait before returning to training or games?		
Straight back on	14 (1.7)	29 (2.2)
1 week	11 (1.4)	69 (5.2)
2 weeks	64 (7.9)	155 (11.5)
3 weeks	74 (9.2)	276 (20.8)
4 weeks	74 (9.2)	224 (16.9)
When fully recovered	273 (33.8)	579 (43.6)
Don't know	193 (23.9)	170 (12.8)
What does headgear prevent?		
Neck injury (false)	767 (95.0)	1142 (86.1)
Skull fracture (false)	579 (71.7)	807 (60.8)
Concussion (false)	449 (55.6)	612 (46.1)
Cauliflower ears (true)	415 (51.4)	686 (51.7)
Cuts and grazes (true)	205 (25.4)	284 (21.4)
Don't know	83 (10.3)	118 (8.9)
Don't have contact with sports that use headgear	43 (5.3)	92 (6.9)
Which activities should be avoided following a concussion?		
Gym training (true)	545 (67.5)	958 (72.2)
Going to sleep (false)	511 (63.3)	820 (61.8)
TV (false)	453 (56.1)	613 (46.2)
Jogging (true)	446 (55.3)	847 (63.8)
Texting (true)	317 (39.3)	634 (47.8)
Facebook (true)	309 (38.3)	613 (46.2)
Long walks (true)	259 (32.1)	482 (36.3)
School work (true)	257 (31.8)	491 (37.0)
Who is the best person to decide return to train/play after a concussion?		
Parents/caregivers (false)	731 (90.6)	1202 (90.1)
Coach (false)	700 (86.7)	1188 (89.5)
Doctor (true)	702 (87.0)	1192 (89.8)
Self (false)	698 (86.5)	1161 (87.5)
Other (false)	12 (1.5)	40 (3.0)

Note. For some questions, more than one answer was possible, meaning the number of responses for some categories was more than the total number of participants. The data have been extracted with permission from two reports commissioned by ACC (Reid et al., 2018; Reid et al., 2019). *n* = number.

cognitive function, may need to be avoided until symptoms have settled (39.3% 2017 vs 47.8% 2018). There was a small increase in the number who indicated that it was safe to return to play only when symptoms have resolved (33.8% 2017 vs 43.6% 2018).

Attitudes towards concussion

Table 4 outlines the responses to the attitude items of the survey. These questions examined the current awareness of concussion and how effectively it is presently being managed. Participants tended to "strongly agree" and "agree" (80.2% 2017 vs 71.9% 2018) that guidelines should be followed at

school level, but there was no change in the view that there was a need to provide better education around concussion and improve reporting (73.5% "strongly agree" and "agree" in both 2017 vs 75.0% in 2018). There were no statistical differences in attitude responses between 2017 and 2018.

Behaviour items

Four additional questions in the 2018 survey asked about behaviours of players, coaches, and referees with respect to the on-field management of concussion. These questions asked participants if they had observed players being encouraged to play if a concussion had occurred. Items were rated from "very often" to "never" (Table 5).

With respect to the question "Have you seen players playing on with a suspected concussion when you thought they should not have?", the majority of respondents stated this "rarely" or "never" happened (48.2%), but 26.9% stated this "sometimes" happened. It "rarely" or "never" happened that coaches and referees encouraged players to keep playing (72.8% and 76.3% respectively). Approximately 75% of respondents stated that it "rarely" or "never" happened that players put pressure on other players to play on with concussion. Overall, these are positive behaviour responses.

Table 4

Attitudes Towards Concussion of the Students who Completed the Secondary School Students' Survey in 2017 and 2018

Attitudes towards concussion	Frequency (%)	
	2017 (*n* = 807)	2018 (*n* = 1,327)
Concussion guidelines should be followed at school		
Strongly agree	328 (43.1)	476 (35.9)
Agree	282 (37.1)	478 (36.0)
Not sure	79 (10.4)	245 (18.5)
Disagree	11 (1.4)	28 (2.1)
Strongly disagree	61 (8.0)	110 (8.3)
Concussions are often not reported		
Strongly agree	89 (11.7)	202 (15.2)
Agree	310 (40.8)	609 (45.9)
Not sure	227 (29.9)	390 (29.4)
Disagree	97 (12.8)	98 (7.4)
Strongly disagree	36 (4.7)	58 (4.4)
Perceived seriousness of headache and dizziness after head knock		
Not serious	33 (4.4)	50 (3.8)
Mildly serious	106 (14.4)	144 (10.9)
Moderately serious	244 (33.2)	405 (30.5)
Very serious	269 (36.6)	542 (40.8)
Extremely serious	102 (13.9)	248 (18.7)
Players should not participate in physical activity with concussion signs and symptoms		
Strongly agree	240 (31.9)	531 (40.0)
Agree	353 (46.9)	572 (43.1)
Not sure	91 (12.1)	153 (11.5)
Disagree	32 (4.2)	36 (2.7)
Strongly disagree	37 (4.9)	57 (4.3)
It is important to understand how concussion happens		
Strongly agree	337 (44.8)	676 (50.0)
Agree	325 (43.2)	504 (38.0)
Not sure	59 (7.8)	119 (9.0)
Disagree	9 (1.2)	10 (0.8)
Strongly disagree	23 (3.1)	32 (2.4)

Attitudes towards concussion	Frequency (%)	
	2017 (*n* = 807)	2018 (*n* = 1,327)
It is important to understand concussion prevention		
Strongly agree	373 (49.5)	647 (48.8)
Agree	293 (38.9)	514 (38.7)
Not sure	59 (7.8)	103 (7.8)
Disagree	8 (1.1)	20 (1.5)
Strongly disagree	20 (2.7)	32 (2.4)
It is important to understand what to do if you see a concussion		
Strongly agree	436 (58.2)	670 (50.5)
Agree	248 (33.1)	508 (38.3)
Not sure	41 (5.5)	85 (6.4)
Disagree	8 (1.1)	17 (1.3)
Strongly disagree	16 (2.1)	15 (1.1)
Possible concussion should be reported to medical professional		
Strongly agree	366 (49.0)	656 (49.4)
Agree	308 (41.2)	563 (42.4)
Not sure	52 (7.0)	100 (7.5)
Disagree	7 (0.9)	18 (1.4)
Strongly disagree	14 (1.9)	16(1.2)
Coaches and referees should be informed of concussion signs and symptoms		
Strongly agree	364 (48.6)	716 (54.0)
Agree	306 (40.9)	494 (37.2)
Not sure	55 (7.3)	90 (6.8)
Disagree	14 (1.9)	4 (0.3)
Strongly disagree	10 (1.3)	15 (1.1)
Players are not well educated about concussion		
Strongly agree	199 (26.6)	404 (30.4)
Agree	350 (46.9)	592 (44.6)
Not sure	146 (19.5)	246 (18.5)
Disagree	40 (5.4)	62 (4.7)
Strongly disagree	12 (1.6)	16 (1.2)

Note. The data have been extracted with permission from two reports commissioned by ACC (Reid et al., 2018; Reid et al., 2019). Not all students answered all questions, meaning the number of responses for some categories was less than the total number of participants; in others more than one answer was possible, meaning the number of responses for some categories was more than the total number of participants. *n* = number.

DISCUSSION

The main findings of this study suggest that the ACC social media campaign did not significantly alter the KAB of the survey participants. Students remain knowledgeable regarding concussion and show positive attitudes towards correct management of the injury. There are some specific knowledge gaps regarding onset of symptoms; activities to avoid post-concussion; the possible complications of multiple injuries; and recognition of less discernible symptoms of concussion, such as amnesia, nausea, and trouble sleeping. The results suggest that secondary school students would benefit from further education on the possible long-term effects of concussion and the importance of effective management once a concussion has occurred. Currently, most of the information students receive on the awareness and management of concussion comes from schools, teachers/coaches, and medical professionals, with very little from ACC. This suggests the channels used to distribute information to secondary school students need to be considered for future campaigns.

Knowledge of concussion

Participants demonstrated good knowledge regarding common signs and symptoms associated with SRC, most commonly identifying blurred vision, confusion, dizziness, headache, and loss of consciousness. However, less obvious symptoms such as amnesia, insomnia, and nausea, which receive less coverage by mainstream media (Sullivan, Pursell, & Molcho, 2018), were omitted by approximately 40-45%, 80-85%, and 45-50% of students in both cohorts, respectively. This is consistent with

Table 5

Behaviours Towards Concussion of the Students who Completed the Secondary School Students' Survey in 2018

Questions and responses [a]	Frequency (%) (*n* = 1327)
Have you seen players playing on with a suspected concussion when you thought they should not have?	
Very often	189 (14.4)
Often	195 (14.7)
Sometimes	357 (26.9)
Rarely	346 (26.1)
Never	293 (22.1)
Have you seen coaches allowing players to play on with a suspected concussion?	
Very often	40 (3.0)
Often	94 (7.1)
Sometimes	215 (16.2)
Rarely	340 (25.6)
Never	627 (47.2)
Have you seen referees/umpires allowing players to play on with a suspected concussion?	
Very often	38 (2.9)
Often	59 (4.4)
Sometimes	197 (14.8)
Rarely	334 (25.2)
Never	678 (51.1)
Have you seen players putting pressure on other players to play on with a suspected concussion?	
Very often	58 (4.4)
Often	85 (6.4)
Sometimes	180 (13.6)
Rarely	272 (20.5)
Never	732 (55.2)

Note. The data have been extracted with permission from two reports commissioned by ACC (Reid et al., 2018; Reid et al., 2019). Not all students answered all questions, meaning the number of responses for some categories was less than the total number of participants. *n* = number.

[a] Answers scored on a scale of 1 (very often) to 5 (never).

other studies which have found amnesia and nausea (Register-Mihalik et al., 2013; Wallace et al., 2017), and disturbed sleep (Hecimovich et al., 2016) are commonly unrecognised symptoms associated with SRC. It is unclear whether the lack of awareness of the less common symptoms is due to reduced knowledge or a misunderstanding of the terms used to describe the symptoms. Different terminology may need to be used with students, for example substituting "insomnia" with "problems sleeping". However, similar studies which used more basic terms found comparable results (Hecimovich et al., 2016; Register-Mihalik et al., 2013). Another potential explanation is that students may have been confused by this question, because some symptoms of SRC can be associated with other conditions, such as nausea with dehydration (Register-Mihalik et al., 2013). Bleeding from the mouth, nose, and ear was correctly identified as not being a symptom of concussion by many participants, with only between 20-25% selecting "bleeding from the ear" as correct. This indicates that participants had a good ability to isolate the brain injury from other facial trauma. Although these values had decreased slightly from the 2017 survey findings, when compared to high school athletes in the United States, the New Zealand sample demonstrated similar knowledge level in this area (Register-Mihalik et al., 2013).

The students showed a good level of awareness regarding the importance of avoiding physical activity following a concussion. However, less than half were able to correctly identify that cognitive exertion should also be avoided. Cognitive activities impose additional neurometabolic demand on the brain. Symptom exacerbations during cognitive tasks can indicate that the demands of the task are beyond the limits of the recovering brain (Valovich McLeod & Gioia, 2010). Between 2017 and 2018, there was a slight improvement in students' knowledge regarding the negative impact of cognitive overstimulation, such as texting, Facebook, and schoolwork. However, the data indicate that students are still unaware of the impact cognitive exertion can have on recovery after a concussion. Our findings are similar to those of the study by Sullivan et al. (2012), who investigated university students understanding of the term "rest" following a concussion. They found that the majority (74%) of students could correctly identify physical rest was

required, but only 25% correctly identified that cognitive rest is also required. Encouragingly, following a single education seminar, 96% of participants could identify the need for cognitive rest. This indicates that further information is necessary in this area.

Students were asked to apply their knowledge of concussion signs and symptoms to hypothetical practical scenarios. The concussion symptoms exhibited in these scenarios were impaired decision-making, headache, blurred vision, loss of consciousness, and nausea. These symptoms were correctly identified by approximately 60-70% of the 2018 participants, which was almost identical to the 2017 survey results. Students were less able to spot the possible impact of concussion in the scenario where there was a delayed onset of symptoms (48%). The awareness that concussion has a negative effect on performance increased slightly from 46.0% to 55.7%, but this message still requires further highlighting in education programmes.

The Concussion in Sport Group consensus statement recommends a graduated rehabilitation strategy, whereby after a brief period of initial rest, symptom-limited activity can begin. The athlete may proceed to the next level only when they meet all the performance criteria without a recurrence of concussion-related symptoms. It is recommended that an athlete may only be medically cleared to return to play once they are asymptomatic during simulated training (McCrory et al., 2017). Worryingly, less than half (43.6%) of the students in 2018 could identify that players should not return to play until all symptoms had resolved. Whilst this response rate has increased from 2017 (33.8%), this should be identified as a key area of further education for all sporting codes. These results are similar to a survey of New Zealand high school-aged rugby players which found that fewer than half of the players were aware of return-to-play guidelines and that after a concussion 52% of players made their own decision to return to play, with only 22% returning after medical clearance (Sye et al., 2006). A large percentage (approximately 45-55%) of respondents also believed, incorrectly, that headgear can prevent concussion. This is an area that requires significant education in the future.

Attitudes towards concussion

Overall the students had a very positive attitude to the management of concussion, and understood the importance of following the guidelines and recognising symptoms. Our results are similar to the findings of Register-Mihalik et al. (2013), who found that high school athletes had good attitudes towards recognising and managing concussion. An increasing number of students in this survey (61.1% in 2018) felt concussion was often not reported. These figures align with a recent survey which found similar numbers of secondary students hid or downplayed their sports injuries (Whatman et al., 2018). Our data may have been skewed by the high number of female respondents; despite having similar levels of knowledge, due to a variety of reasons, including not wanting to look weak or let the team down, males are between four and 11 times less likely to report suspected concussion than females (Wallace et al., 2017).

Behaviour items

In the 2018 survey, four additional questions were included that specifically asked about player, coach, and referee behaviours toward players who may have been concussed. The responses show that it was rare to see pressure being put on players to continue playing with concussion. Whilst this finding is encouraging, others have found evidence to the contrary. Kroshus et al. (2015) found that those who had a history of concussion felt significantly higher pressure from coaches and teammates to continue playing in the event of a suspected concussion. In the same study, a player's decision to not report concussion symptoms was influenced by pressure from teammates and parents, but not coaches. Studies investigating the effect of educational interventions on students' KAB found that although knowledge and intention to report concussion increases post intervention, the actual reporting behaviours remain the same (Sullivan et al., 2018). Wallace et al. (2017) found that rather than participating in specific SRC education programmes, the key factor that increased college athlete's knowledge around concussion was having access to an athletic trainer. However, reporting behaviour was not influenced by having increased SRC knowledge.

Strength and weaknesses

A large number of surveys were completed in both 2017 and 2018, with 520 more surveys being completed in 2018 compared to 2017, and the data were collected from a range of sports reflective of those played at secondary school level in New Zealand. Weaknesses of this study include a low survey response rate of 35% (in 2018). As participants were a self-selected sample of convenience, the sample may not have accurately represented the target population, and this may have biased responses towards those with an interest in or already established knowledge of SRC. Those with lower literacy may have been less inclined to participate due to the survey format. As there are known gender differences in attitudes towards concussion, the different proportions of male and female participants between 2017 and 2018 may have influenced the results.

Clinical implications

Considering the main findings of this report, we recommend that physiotherapists, medical doctors, sporting bodies, and ACC consider implementing the following practical considerations:

1. When either acting as the sideline physiotherapist or treating those with injuries secondary to SRC, physiotherapists are often the first-line treatment of SRC. Physiotherapists are therefore responsible for providing appropriate education and guidance regarding rest, recovery, and graduated return to sport following SRC. To improve student athletes' knowledge and management of SRC, physiotherapists should ensure they focus their education efforts on the common areas of confusion around SRC highlighted in this report, including the need for cognitive rest, medical clearance, and the need for a graded return to sport.
2. Medical doctors need to be communicating with athletes, coaches, parents, and sporting bodies so that without

medical clearance an athlete may not be able to return to play. It may be of benefit for medical doctors to provide stand-down notifications for those who have been diagnosed with SRC which can only be lifted with medical approval. There is currently no requirement for the doctor assessing an athlete to specialise in sport or concussion. In some cases, general practitioners with limited resources may be the person providing final clearance, highlighting the importance of having clear communication between medical doctors and the athletic support staff, who are perhaps more able to assess an athlete's readiness to return to play.

3. To ensure athletes receive consistent messaging about the recognition and appropriate treatment of SRC, it is important that guidelines are clear and consistent between national sporting bodies and ACC. There are currently conflicting concussion management strategies between sporting codes regarding return-to-play timeframes and criteria. Rugby has implemented a mandatory 23-day stand-down period for players under 19 years of age, whereas athletes in other sports who follow the ACC graded return to play guidelines could theoretically return to play within 7 days. Providing consistency between sporting bodies will reduce any confusion for both athletes and the medical professionals supporting their recovery and return to play. Regarding recognising symptoms and removing players from play, it may be beneficial for other sporting codes to take the lead from rugby union where the "blue card" initiative is used. By showing a blue card, the referee is empowered to remove a player if they believe or suspect a concussion has been sustained.

As ACC provide the guidelines and recommendations regarding concussion management and return-to-play protocols, it is surprising that ACC was not identified as a key resource for concussion information. Currently most of the information students receive on the awareness and management of concussion comes from schools, teachers/coaches, and medical professionals. This suggests the channels used to distribute information to secondary school students need to be considered for future campaigns. It may be beneficial to focus future campaigns at the groups listed above with the aim of having information passed on to students through these channels. It would be of benefit for ACC to focus education programmes on the areas identified in this report, such as recognition of less common symptoms, treatment, and return to play/school.

CONCLUSION

This report shows that the 2018 ACC social media campaign had very little effect on New Zealand secondary student athletes' KAB towards SRC. Our results highlight that students are knowledgeable about the common signs and symptoms of SRC. However, they lack knowledge concerning effective management of SRC, specifically regarding activities to avoid during recovery and the processes for return to play. Reassuringly, secondary school students exhibited positive attitudes and behaviours towards appropriate management of SRC, with it being rare to observe pressure to return to sport following a suspected SRC.

KEY POINTS

1. Secondary school students have good knowledge, attitudes and behaviours of SRC.
2. School students' knowledge of SRC has come from medical professionals, coaches and teachers.
3. Other than the current guidelines and the recent social media campaign, ACC should consider other avenues to increase knowledge and awareness of SRC in this population.

DISCLOSURES

This study was funded by ACC. ACC provided permission for the data to be re-presented from reports commissioned as part of a series of studies funded to gain knowledge of, and attitudes and behaviours towards SRC across a range of populations. There are no other conflicts of interest which may be perceived to interfere with or bias this study.

PERMISSIONS

Ethical approval was obtained from the Auckland University of Technology Ethics Committee (reference number 16/187) and the ACC Ethics Committee.

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Knowledge, Attitudes, and Behaviours of New Zealand Physiotherapists to Sports-Related Concussion

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ABSTRACT

Sports-related concussion (SRC) is a risk across all sports. New Zealand physiotherapists are more frequently in attendance at sporting events than medical doctors. The aim of this study was to determine the knowledge, attitudes, and behaviours of physiotherapists potentially working with SRC, using a 35-item, multi-choice questionnaire. The survey was completed by 122 physiotherapists (response rate 10%). Physiotherapists were knowledgeable regarding SRC and showed positive attitudes towards correct management of the injury. Of the respondents, 98% recognised the key signs and symptoms of SRC, and 88% would refer to a medical practitioner for further assessment of SRC. Physiotherapists indicated a strong desire to be more involved in sideline management and testing, and would like to see a more multidisciplinary approach to return-to-play decision-making after SRC. Given that the knowledge, attitudes, and behaviours of New Zealand physiotherapists to SRC were very good, it is suggested that the processes in New Zealand be reviewed to enable physiotherapists to be more involved in the assessment and management of concussion.

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Key Words: Concussion, Sports, Physiotherapy

INTRODUCTION

Sports-related concussion (SRC) is a significant problem in New Zealand (Theadom et al., 2014; Theadom et al., 2018). Feigin et al. (2013) found that approximately 36,000 people in New Zealand acquire a traumatic brain injury annually. SRC is a subset of those people, with the traumatic brain injury occurring specifically in a sports-related environment. Individuals may or may not suffer from persistent post-concussion symptoms but will often require further evaluation if symptoms do persist. Those with SRC account for 21% of all traumatic brain injuries sustained (Theadom et al., 2014), equating to approximately 8,000 New Zealanders per year. The sports disciplines with the highest occurrence of SRC were rugby, cycling and equestrian (Theadom et al., 2014). In the 2017 financial year, there were 6,339 new SRC claims accepted by the New Zealand public accident insurer, the Accident Compensation Corporation (ACC) (ACC, 2019), with a cost to manage these claims of NZ$16 million. This places a significant burden on the New Zealand healthcare system (ACC, 2019). It is also possible that these figures are an underestimation of the financial burden, as only those people who seek medical attention have the injury registered with ACC.

In 2016, ACC updated its guidelines on the management of SRC (ACC, 2016). The purpose of these guidelines was to provide information and tools to assist and educate those involved in the management of SRC based on the Concussion in Sport Group consensus statement (McCrory et al., 2017). The consensus statement was published to assist health professionals involved with assessment and management of SRC. The guidelines recommend using the Sport Concussion Assessment Tool 5th edition (SCAT5) and the "11 Rs": recognise, remove, re-evaluate, rest, rehabilitation, refer, recover, return to sport,

reconsider, residual effects and sequelae, and risk reduction) (Echemendia et al., 2017).

One of the key aspects of all these guidelines is the recommendation that the suspected concussed sportsperson is assessed by a medical doctor who is trained to assess concussion and that clearance to return to play (RTP) must be signed off by a medical doctor. Recent surveys of New Zealand general practitioners and emergency care doctors (Reid et al., 2018), and Canadian family physicians, emergency doctors, and paediatricians (Stoller et al., 2014) raised several issues in relation to SRC management in keeping with the above guidelines. Firstly, few general practitioners in Canada and New Zealand are using the SCAT5 in their clinical practice as part of their assessment; secondly, the numbers being assessed by New Zealand doctors were low; and thirdly, the participants in the surveys were not confident making RTP decisions. It is not currently known if physiotherapists are routinely using the SCAT5 as part of their sideline assessment.

On the other hand, physiotherapists may play a key role in the management of people who sustain SRC. They may often be the only health professional available at the sports field to potentially assess and manage acute SRC episodes and the sequelae. Research by Yorke et al. (2016) showed that American physiotherapists had very good knowledge and attitudes to SRC but were less confident in their knowledge of certain areas, such as decisions related to RTP. To date, the current knowledge, attitudes, and behaviours (KAB) of New Zealand physiotherapists to SRC is unknown, and therefore, the aim of this research was to explore this topic by way of a survey. Given the rise in SRC, this study seemed timely as the findings could help influence potential practice and policy changes within ACC to both enhance the future management of people sustaining SRC and physiotherapy's role in treating this type of injury.

METHODS

The study design was a descriptive questionnaire survey. The 35-item, multi-choice questionnaire was used to ascertain the KAB of physiotherapists based on previous studies of this nature (Murphy, 2015; Sye et al., 2006; Register-Mihalik et al., 2013). This study was part of a suite of surveys on SRC funded by ACC. Physiotherapists were one of the groups of interest, along with secondary school students and their parents, coaches, and referees. The main questions in the surveys were consistent across all groups. However, in this survey, 10 additional questions on behaviours towards SRC were included alongside the knowledge and attitude items to gain more physiotherapy-specific replies to certain behaviours. These additional questions were added following consultation between the authors and the ACC Sports Consultancy Group. Ethical approval for this study was obtained from the Auckland University of Technology Ethics Committee (reference number 16/187) and the ACC Ethics Committee.

Participants and data collection

The survey was undertaken from December 2018 to February 2019, with data collected using SurveyMonkey®, an online survey platform. The survey was initially sent to members of two special interest groups of Physiotherapy New Zealand that were deemed to have good engagement with SRC: the New Zealand Manipulative Physiotherapists Association (NZMPA; 383 members) and Sports & Exercise Physiotherapy New Zealand (SEPNZ; 796 members). A small number of physiotherapists with a special interest in SRC and who mostly worked in designated clinics were identified at a national physiotherapy conference (approximately 20) and were also invited to participate. Physiotherapy students and non-practising physiotherapists were not invited to participate. The survey link was sent from the office staff of the two special interest groups and the convenor of the meeting at the national conference. As the survey was anonymous, consent was gained when the participant agreed to undertake the survey. The participants received two email reminders over the time period that the survey was open.

Data analysis

All data were analysed descriptively using SPSS v25 (BM Corp, Chicago, Illinois, USA). Means, standard deviations, and frequency of responses are reported as appropriate for the data collected.

RESULTS

Participants

Of the approximately 1,199 potential New Zealand registered physiotherapists who could have participated, 158 started the survey, with 122 completing it (a response rate of approximately 10%).

Table 1 details the demographic characteristics of the participants who completed the survey. The mean (± standard deviation) age of the participants was 40.4 ± 11 years, with the majority being female (60%). The dominant ethnicity was New Zealand European (79%). The majority worked in sports private practice (74%) and most had been working in practice for between 10 and 30 years (69%). The main area of sports engagement was rugby union (45%).

Table 1

Demographics of the Physiotherapists who Completed the Survey (n = 122)

Demographic characteristics	Percentage *(n)*
Age (years)	40.4 ± 11.7 [a]
Gender	
Female	61.5 (75)
Male	38.5 (47)
Ethnicity	
New Zealand European	79.1 (95)
Māori	4.1 (5)
Pacific Peoples	0.8 (1)
Asian	3 (4)
Other	16 (20)
Type of practice	
Private practice/sports	74.3 (87)
Public hospital, outpatients	1.7 (2)
Public hospital, inpatients	4.2 (5)
Designated concussion clinic	5.1 (6)
Non-government provider	4.2 (5)
Other	10.6 (12)

Demographic characteristics	Percentage *(n)*
Main sport engaged with	
Rugby union	45 (49)
Rugby league	2.7 (3)
Netball	6.4 (7)
Football	14.7 (16)
Other [b]	31.2 (34)
Number of years in practice	
1-5	17.3 (21)
6-10	12.4 (15)
11-20	32.3 (39)
21-30	24.7 (30)
More than 30	13.2 (16)

Note. The data have been extracted with permission from a report commissioned by ACC (Reid et al., 2019). For responses related to ethnicity, participants could select more than one answer. Not all participants answered all other questions, meaning the number of responses for some categories was less than the total number of participants. *n* = number.

[a] Mean ± standard deviation.
[b] Other sports included hockey, athletics, mountain biking, snow sports.

Knowledge items

Table 2 contains the responses to the 20 knowledge items in the survey. Participants were able to choose more than one answer in this section of the questionnaire. Of the participants, 98% recognised concussion as an injury to the brain. With respect to symptoms, almost all the participants identified the key concussion symptoms of blurred vision (99%), confusion (99%), dizziness (98%), headache (99%), insomnia (80%), nausea (94%), and loss of consciousness (97%). They also correctly recognised who would possibly present with concussion in the short scenarios described in the questionnaire (99-100%). The responses to the question regarding who the best person is to make the RTP decision were varied. Whilst 58% said this should be a doctor, 33% stated "other". In reading the free text answers, the "other" response was a multidisciplinary team approach. Sources of information on concussion management were identified as the medical profession or other physiotherapists (88%), and ACC (84%).

Participants correctly identified that headgear was only useful in preventing cuts and grazes (85%), with 98% recognising that headgear does not prevent SRC. Most participants stated that someone who has sustained SRC should only RTP once symptoms have resolved (81%) or following medical clearance (85%). There was awareness of the need for cognitive rest and the need to avoid blue screen devices whilst recovering (Facebook 81%, texting 79%).

Attitudes towards sports-related concussion

Table 3 outlines the responses to the 10 attitude items of the survey, which examined current awareness of SRC. Participants tended to "strongly agree" and "agree" (98%) that guidelines should be followed in sports, and that concussion is often not reported (71%). When asked if physical activity should be avoided while symptoms are still present, 91% said they either "strongly agree" or "agree" with the statement. Almost all participants (99%) felt strongly that it was important to report signs and symptoms to a medical professional. In regards to SRC education, 83% said they "strongly agree" or "agree" that players are not well educated.

Behaviour items

There were 10 questions in the survey about the behaviours of sportspeople with respect to the management of SRC. Participants were asked if they had observed players with SRC being encouraged to play and, if so, by whom. Answers ranged from "very often" to "never".

With respect to the question, "Have you seen players playing on with a suspected concussion when you thought they should not have?", many participants (65%) stated this "sometimes" or "often" happened. Nearly 60% had also "sometimes" or "often" seen coaches allowing players to continue playing with suspected concussion, and 65% stated they had "often" or "sometimes" seen players putting pressure on other players to play on with concussion. A moderate percentage of participants felt that in their capacity as physiotherapists they were being asked to make decisions about RTP "very often" (14%) or "often" (34%), and that they were the key medical person to manage SRC ("often" 33%; "very often" 16%). A large percentage (89%) referred players for a medical review before players could RTP. Participants felt they should be involved in several stages of SRC management, including sideline recognition and player removal (98%), and RTP decisions (91%).

DISCUSSION

The main findings of the current survey indicate that this group of physiotherapists are very knowledgeable regarding SRC and have positive attitudes and behaviours towards the correct management of the injury in keeping with current guidelines. Participants indicated a strong desire to be more involved in sideline management and testing. The results support the potential to enable physiotherapists to be more involved in the assessment and management of SRC in addition to medical physicians to facilitate identification and management of this condition.

Knowledge of SRC

Participants demonstrated an ability to identify all key signs and symptoms after an SRC to a very high level. These results compared well with the study of American physiotherapists by Yorke et al. (2016), with more than 94% of participants correctly identifying the key symptoms of SRC.

The participants in this survey were experienced physiotherapists with nearly 40% having worked for 11-20 years in practice. This was comparable with the study by Yorke et al. (2016) where respondents had a similar number of years working in the profession.

There were good levels of awareness when participants were asked about which activities should be avoided following SRC with regards to physical exertion and the impact of using technology, such as texting and Facebook (95% and 98% respectively), which can over-stimulate a recovering brain. With respect to the questions relating to avoidance of physical exertion, 90% indicated this should be avoided while symptoms persist. However recent studies question this approach (Schneider et al., 2017). A study by Leddy et al. (2016)

Table 2
Physiotherapists' Knowledge of Concussion

Knowledge items	Percentage *(n)* of correct answers
Statements which participants considered to be a sign or symptom of concussion	
Abnormal sense of smell (false)	65.3 (80)
Abnormal sense of taste (false)	67.7 (83)
Amnesia (true)	96.6 (117)
Joint stiffness (false)	85.2 (104)
Blurred vision (true)	99.1 (120)
Black eye (false)	81.0 (99)
Bleeding from the ear (false)	65.0 (80)
Bleeding from the mouth (false)	81.2 (100)
Bleeding from the nose (false)	77.7 (95)
Confusion (true)	99.0 (120)
Fever (false)	96.7 (118)
Dizziness (true)	98.3 (119)
Headache (true)	99.0 (120)
Insomnia (true)	80.1 (97)
Loss of consciousness (true)	97.0 (117)
Nausea (true)	94.2 (114)
Numbness or tingling in the arms (false)	71.9 (88)
Skin rash (false)	97.6 (121)
Sharp burning pain in neck (false)	80.7 (98)
Weakness in neck movements (false)	75.3 (92)
Which of the following players would you say might be "concussed"?	
After a big knock/fall/head clash, the player starts making wrong decisions or actions during the game (true)	100 (121)
A teammate is complaining of headaches and blurred vision (true)	95.0 (115)
After a ruck/fall/head clash, a player is left on the ground not moving (true)	99.1 (120)
A player complains of stinging or burning in his calf muscles (false)	99.2 (121)
In the team room a couple of hours after the game a teammate complains of feeling sick with a headache (has not been drinking alcohol) (true)	98.3 (119)
If you are experiencing any signs and symptoms of concussion after a blow to the head or sudden movement of the body, you should not return to play (true)	97.5 (115)
If a player gets concussed, how long should they have to stay away for before practicing fully or playing again?	
Get straight back on	
1 week (false)	99.2 (121)
2 weeks (false)	95.9 (119)
3 weeks (false)	87.6 (107)
4 weeks (false)	97.6 (119)
When symptoms have fully resolved (true)	81.8 (99)
Only with medical clearance (true)	85.9 (104)
Depends on the rules of the sport (true)	24.7 (30)
What are the possible complications of returning to play too soon?	
No complications exist (false)	99.2 (121)
Increased symptoms (true)	94.2 (114)
Increased risk of future injury (true)	96.7 (117)
Brain damage (true)	74.3 (90)
Memory problems (true)	79.3 (96)
Joint problems (false)	93.0 (113)

Knowledge items	Percentage *(n)* of correct answers
What are the complications of multiple concussions?	
No complications exist (false)	98.5 (120)
Increased risk of further injury (true)	90.0 (109)
Paralysis (false)	86.0 (105)
Brain damage (true)	89.2 (108)
Reduced sports performance (true)	85.1 (103)
Joint problems (false)	92.6 (113)
If a player has suffered a concussion, who is the best person to decide if you were able to train/play again?	
Self	0 (0)
Coach	0 (0)
Doctor	57.8 (70)
Parents/caregiver	0 (0)
Other	33.0 (41)
Have you ever had any information about concussion from any of the following?	
Teacher/coach	12.9 (15)
Other players	6.0 (7)
Doctor/physiotherapist	88.7 (103)
School nurse	0.8 (1)
Other medical staff	31.0 (36)
Accident Compensation Corporation	84.4 (98)
Your sports club	16.3 (19)
Seen on TV	19.8 (23)
What does headgear prevent?	
Cuts and grazes (true)	85.9 (104)
Cauliflower ears (true)	85.1 (103)
Concussion (false)	91.0 (111)
Neck injury (false)	98.4 (120)
Skull fracture (false)	80.9 (99)
Unsure of answer (false/not selected)	96.7 (118)
Don't have contact with any sports that use headgear	95.7 (117)
Which activities should be avoided following concussion?	
Texting (true)	79.1 (95)
Facebook (true)	81.6 (98)
TV (false)	82.5 (99)
Long walks (true)	17.5 (21)
Jogging (true)	76.6 (92)
Gym training (true)	80.8 (97)
Schoolwork (true)	65.8 (79)
Going to sleep (false)	81.7 (100)

Note. The data have been extracted with permission from a report commissioned by ACC (Reid et al., 2019). Not all participants answered all questions, meaning the number of responses for some categories was less than the total number of participants. *n* = number.

suggests that complete rest beyond the first few days post-concussion may be detrimental to recovery and a more active approach using submaximal exercise is beneficial to recovery. As physiotherapists are skilled in exercise prescription, this is an area of potential future growth, requiring increased levels of engagement in the assessment of exercise as part of the management of SRC.

SRC symptoms were correctly identified by 95-100% of participants in each hypothetical situation presented, demonstrating a good level of practical knowledge application to identify players with SRC. These responses most likely reflect that respondents frequently deal with similar situations and recognise the key signs and symptoms of those who sustain SRC.

The RTP decision questions provided varied responses. Most participants indicated a player should RTP once the symptoms had fully resolved (81%) or when cleared by a medical professional (85%). The participants did not select the time

Table 3
Physiotherapists' Attitudes Towards Concussion [a]

Attitudes towards concussion	Responses	Percentage *(n)*
Concussion guidelines should be followed in sports	Strongly agree	85.7 (102)
	Agree	12.2 (17)
Concussions are not often reported	Strongly agree	10.9 (13)
	Agree	61.3 (73)
	Not sure	9.2 (11)
	Disagree	5.8 (7)
	Strongly disagree	12.6 (15)
Seriousness of headache and dizziness after a head knock	Mildly serious	9.0 (11)
	Moderately serious	34.7 (42)
	Very serious	39.6 (48)
	Extremely serious	16.5 (20)
It is important to avoid physical activity when signs and symptoms of concussion are present	Strongly agree	71.9 (87)
	Agree	21.5 (26)
	Not sure	2.4 (3)
	Disagree	4.1 (5)
Is it important to understand how concussions occur	Strongly agree	87.6 (106)
	Agree	12.4 (15)
Is it important to be informed of how concussion can be prevented	Strongly agree	46.2 (56)
	Agree	38.8 (47)
	Not sure	13.2 (16)
	Disagree	0.8 (1)
	Strongly disagree	0.8 (1)
It is important to understand to be informed of what to do if you have a concussion	Strongly agree	87.6 (106)
	Agree	12.4 (15)
Is it important to report signs and symptoms of concussion to a medical professional	Strongly agree	89.2 (108)
	Agree	10.7 (13)
Is it important that coaches are informed of possible concussion	Strongly agree	84.3 (102)
	Agree	15 .7 (19)
Players are not well educated about concussion	Strongly agree	30.5 (37)
	Agree	52.9 (64)
	Not sure	10 (12)
	Disagree	6.6 (8)

Note. The data have been extracted with permission from a report commissioned by ACC (Reid et al., 2019). Not all participants answered all questions, meaning the number of responses for some categories was less than the total number of participants. *n* = number.

[a] Answers scored on a scale of 1 (strongly agree) to 5 (strongly disagree).

frames set by sporting bodies as a good indicator of when it is safe to RTP, for example the three weeks stand-down required by New Zealand Rugby (New Zealand Rugby, 2018). However, 30% indicated that the RTP decisions depended on the sport. This may suggest a lack of awareness or an area of confusion as each major sporting code in New Zealand has differing RTP criteria. Just over half of participants indicated that a doctor alone was the best person to decide whether a player was ready to return to sport. It is important to note that physiotherapists can be part of the decision-making team in the return to the training phase as per the ACC guidelines (ACC, 2016), but the final decision for RTP still rests with a qualified medical practitioner. This desire to be involved with the final RTP decision is consistent with the beliefs of physiotherapists in North America (Yorke et al., 2016) who indicated they should be part of a multidisciplinary team management approach related to RTP (98% "strongly agree" or "agree"). Physiotherapists often bring other skills to concussion management, such as assessment and treatment of the cervical spine and vestibulo-ocular system. These skills have been shown to be clinically effective and could contribute well in a multidisciplinary team (Schneider et al., 2018). This is a key area of further research

Table 4
Physiotherapists' Behaviours Towards Concussion [a]

Questions	Responses	Percentage *(n)*
Have you seen players playing on with a suspected concussion when you thought they should not have?	Very often	5.0 (6)
	Often	24.5 (29)
	Sometimes	41.5 (49)
	Rarely	20.3 (24)
	Never	8.4 (10)
Have you seen coaches allowing players to play on with a suspected concussion?	Very often	5.0 (6)
	Often	11.9 (14)
	Sometimes	48.3 (57)
	Rarely	20.3(24)
	Never	14.4 (17)
Have you seen referees/umpires allowing players to play on with a suspected concussion?	Very often	1.7 (2)
	Often	6.8 (8)
	Sometimes	29.0 (34)
	Rarely	42.7 (50)
	Never	19.6 (23)
Have you seen players putting pressure on other players to play on with a suspected concussion?	Very often	5.0 (6)
	Often	24.5 (29)
	Sometimes	41.5 (49)
	Rarely	20.3 (24)
	Never	8.4 (10)
As a physiotherapist are you being called upon to make decision about return to play after concussion?	Very often	14.4 (17)
	Often	34.7 (41)
	Sometimes	25.5 (29)
	Rarely	10.1 (12)
	Never	16.1 (19)
As a physiotherapist do you feel you are in a position of being the key medical person to manage concussion?	Very often	16.4 (19)
	Often	33.3 (39)
	Sometimes	21.3 (25)
	Rarely	17.0 (20)
	Never	12.0 (14)
As a physiotherapist do you feel you are making decisions about the level and seriousness of concussion?	Very often	11.0 (13)
	Often	30.25 (36)
	Sometimes	33.6 (40)
	Rarely	13.4 (16)
	Never	11.7 (14)
How important do you think it is that a player you think has concussion is seen by a doctor on the day of injury?	Very important	36.6 (44)
	Somewhat Important	33.3 (40)
	Neutral	27.5 (33)
	Somewhat unimportant	2.5 (3)
Do you refer all players for a medical review with regards to return to sport?	Always	59.5 (69)
	Often	28.45 (33)
	Sometimes	6.0 (7)
	Rarely	4.3 (5)
	Never	1.7 (2)

Questions		Responses Percentage *(n)*
As a physiotherapist what stages of concussion management do you feel you should be part of?	Sideline recognition and removal	98.2 (110)
	Sideline testing	83.0 (93)
	Clinical assessment and evaluation	74.1 (83)
	Clinical diagnosis	48.2 (54)
	Administration of treatment modalities	78.5 (88)
	Return to play decisions	68.7 (77)
	Return to play integration	91.6 (103)

Note. The data have been extracted with permission from a report commissioned by ACC (Reid et al., 2019). Not all participants answered all questions, meaning the number of responses for some categories was less than the total number of participants. *n* = number.

[a] Answers scored on a scale of 1 (very often) to 5 (never).

given the limited capacity of medical doctors in current clinics in New Zealand with long waiting times for appointments for SRC assessments. This is also important given that many athletes have limited knowledge of RTP time frames and frequently do not report SRC (Sye et al., 2006). Data from the United States demonstrated that when college athletes have greater contact with athletic trainers (who have a mix of strength and conditioning, and physiotherapy training), they are more likely to report SRC than those without access to athletic trainers (Wallace et al., 2017). This is a useful area of further investigation given that physiotherapists are often at the forefront of sideline SRC management.

Attitudes towards concussion

Overall, physiotherapists have very positive attitudes to the management of SRC, and recognise the importance of following the guidelines (98%) and recognising symptoms. However, it was interesting to note that sports players are often not following the existing guidelines. The survey participants had strong views that symptoms are often not reported (72%), and there was also a widespread belief that players are not well educated about SRC (83% "agree" or "strongly agree"). These findings are in keeping with previous studies undertaken with secondary school rugby players (Sye et al., 2006). Given this survey was undertaken over 10 years ago, it is disappointing to see these attitudes still persist. As physiotherapists often work very closely with teams, there is definite scope to take a greater educative role in a similar fashion to Wallace et al. (2017).

Behaviour items

The survey specifically asked about player, coach, and referee behaviours when dealing with players who might have been concussed during sport, and the physiotherapists' role in current SRC management. Overall, the participants in this study reported that there was sometimes pressure for players to continue with suspected SRC, and this pressure came from coaches (48%) and players (41%). As participants in this survey have demonstrated good recognition of key signs and symptoms of SRC, physiotherapists may be in a better position to make key decisions about RTP at sporting events than the coach or player. This may also reflect the close contact physiotherapists have with sports teams consistent with Wallace et al. (2017), and their ability to observe and identify potential SRC, highlighting another opportunity for greater education around these matters.

With respect to questions about SRC decision-making, a majority of participants (66%) stated they were "sometimes" or "often" making decisions about the level and seriousness of concussion. This may reflect the more frequent contact they have had at a team and sports level where medical practitioners are less available. However, there were also high numbers of participants (88%) referring players for a medical review about RTP, indicating a desire for further medical oversight and in keeping with the ACC guidelines (ACC, 2016).

The area that drew very strong responses was the stages of management physiotherapists want to be part of. There was a strong desire to be involved in sideline recognition of concussion and player removal (98%), sideline testing (83%), and RTP integration (91%). Further development of a triage-type role for sideline physiotherapists could be useful given the limited availability of medical practitioners, particularly at lower sporting levels. In keeping with the previous comments relating to a multidisciplinary team management approach, physiotherapists can add value to the medical team, particularly in the assessment of the cervical spine and vestibulo-ocular systems (Schneider et al., 2018). A recent study by Schneider et al. (2018) demonstrated that those players with SRC who received a multimodal approach to treatment returned to play sooner than those in the control group. In this instance, the multimodal treatment included cervico-vestibular rehabilitation and graded exertion via treadmill training.

It is interesting to note that, as included in a National Collegiate Athletic Association consensus document (National Collegiate Athletic Association Sport Science Institute, 2017), athletic trainers in the United States can now legally sign a player for RTP as well as a medical professional (Robinson, 2016). Given that athletic trainers have different training to physiotherapists, this is an area requiring review. In New Zealand, we do not have athletic trainers per se, so physiotherapists are the next most likely profession to take on this role. It must be noted that medical practitioners have the skills to assess other more difficult aspects of SRC, especially when a player has not spontaneously recovered. Therefore, players who are suspected of being concussed should still be referred for a physician medical review.

Limitations

There are a number of limitations in this study. Firstly, it is noted that those physiotherapists with good SRC knowledge and attitudes may have been more likely to participate in this study. Secondly, only certain physiotherapy groups were targeted to answer the survey. A wider distribution of all registered physiotherapists and, potentially, physiotherapy students may have yielded different results. Thirdly, the survey was mostly taken from a study in the United States and was not altered greatly for the New Zealand setting. Fourthly, the survey was used across a range of populations and, for consistency, was not modified to each population. Fifthly, the questionnaire was developed before the latest concussion statement was released, and so some questions may have been dated. Finally, due to the low response rate, the findings are not necessarily generalisable to the wider physiotherapy profession.

CONCLUSION

The findings of this study suggest physiotherapists are very knowledgeable regarding SRC and have positive attitudes towards correct management of this injury. They recognise the key signs and symptoms, and refer regularly to medical practitioners. Participants indicated a desire to be more involved in sideline management and testing of SRC, and would like to see a more multidisciplinary approach to RTP decision-making. Further work should look at this area as well as the potential for physiotherapists to make decisions around RTP alongside medical practitioners, as is currently possible in other countries.

KEY POINTS

1. Physiotherapists have good KAB with respect to SRC.
2. Physiotherapists can take a greater role in the education of players to improve symptom recognition and management of SRC.
3. Discussions are recommended with the variety of practitioners involved with SRC athletes without prolonged concussive symptoms, with respect to improving strategies to manage RTP in a more multidisciplinary manner.
4. It would be timely for the processes in New Zealand be reviewed to allow physiotherapists to be more involved in the initial assessment and ongoing management of SRC.

DISCLOSURES

The study was funded by ACC. ACC provided permission for the data to be represented from reports commissioned as part of a series of studies funded to explore KAB to SRC across a range of populations. There are no other conflicts of interest which may be perceived to interfere with or bias this study.

PERMISSIONS

Ethical approval was obtained from the Auckland University of Technology Ethics Committee (reference number 16/187) and the ACC Ethics Committee.

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The Tipping Point for Engagement in Professional Supervision by Physiotherapy Private Practitioners

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ABSTRACT

The aim of this study was to explore the experience and perspectives of physiotherapists working in private practice in New Zealand regarding their decision to engage (or not) in professional supervision (PS). There is a scarcity of research on PS in the physiotherapy profession, despite recommendations by Physiotherapy New Zealand that all physiotherapists should engage in this professional development activity. Using a qualitative descriptive methodology, eight participants were interviewed who identified as either (1) having never experienced PS, or (2) previously but no longer engaged in PS, or (3) currently engaged in PS. Thematic analysis was used to analyse the data. Four themes were constructed: (1) PS and the capitalistic lens, (2) PS is not normal, (3) professional identity and vulnerability, and (4) the relationship in the supervisory context. The drive for increased productivity, cost-effectiveness, and, ultimately, profit continues to dictate practice habits. PS can require the practitioner to share uncertainties about practice, creating a tension in maintaining one's professional identity and credibility which can deter engagement. Balancing professional identity and vulnerability requires the supervisor to create a safe space for recipients to navigate these tensions and sustain their engagement in the process. A significant shift in practice habits and the value ascribed to PS would be required before PS is likely to be normalised as part of physiotherapy private practice culture.

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Key Words: Professional Supervision, Private Practice, Thematic Analysis, Physiotherapy, New Zealand, Vulnerability, Professional Identity, Support

INTRODUCTION

Professional supervision (PS) is extensively used by those in the helping professions (Davys & Beddoe, 2010; Ducat & Kumar, 2015; Hawkins et al., 2012). PS is a collaborative process undertaken with a trusted colleague which uses protected time for the practitioner to explore their work reflectively, resulting in professional growth while ensuring consistency, quality, and safety of the service they provide to their patients (Physiotherapy New Zealand, 2012; Proctor, 2001). It has been shown to reduce workplace stress, increase job satisfaction, and assist work performance (Carroll & Gilbert, 2011; Erera & Lazar, 1995). For many health professions (i.e., occupational therapists, psychologists, and social workers), PS is mandatory, but this does not apply to physiotherapists. Nonetheless, Physiotherapy New Zealand (PNZ) recommends that all physiotherapists engage in PS regardless of their experience or work setting (Physiotherapy New Zealand, 2012), albeit on a voluntary basis.

Whilst PS is more commonly used by physiotherapists in a hospital-based setting (Wepa, 2007), the uptake by physiotherapists who work in private practice is less prevalent. It is thought that less than one-third of private practitioners engage in PS (Holder, 2014). Furthermore, there is an absence of literature focusing on PS in physiotherapy, with the exception of literature investigating clinical supervision with references to PS (Hall & Cox, 2009). This could in part be due to terminology and conflation of PS with clinical supervision. Butler and Thornley (2014) clearly identified the critical difference between clinical supervision and PS, and the need to separate these activities. Clinical supervision focuses on the needs of clients (not the physiotherapist) and is frequently delivered by a senior colleague associated with the supervisee's daily work (therefore not a neutral perspective) by teaching physical (not emotional) skills about client management. With a dearth of literature on PS, we have limited understanding of factors influencing the decision to take up PS by physiotherapy private practitioners in New Zealand.

The aim of this research was, therefore, to address this gap by exploring the experiences and perspectives of physiotherapists working in private practice in New Zealand regarding their decision to engage (or not) in PS.

METHODS

Design

We drew on qualitative descriptive methodology (Sandelowski, 2010). This is a naturalistic approach to inquiry, which aims to develop insights into a phenomenon of interest (in this case, the decision to engage in PS) through seeking a rich description of events and accessing the meanings participants ascribe to those events. Three distinct groups of physiotherapists who worked in private practice were interviewed: (1) those who had never experienced PS; (2) those who had previously but are no longer engaged in PS, and (3) those who were currently engaged in PS. Data interpretation was underpinned by social constructionist epistemological assumptions (i.e., that people construct meaning through their interactions with the world and therefore that realities are multiple and varied, and both researchers and participants play a critical role in data construction and interpretation). The primary researcher (LH) is a physiotherapist with over 20 years of experience in private practice. LH is trained in and provides PS to physiotherapists in New Zealand. She believes in the inherent value of PS for physiotherapists, and this perspective was fundamental to her interest in this research topic. Ethics approval was gained through the Auckland University of Technology Ethics Committee (reference number 16/161) prior to commencement of the study.

Recruitment and sampling

Physiotherapists were eligible to take part if they self-identified as fitting into one of the three categories described above and were working in a private practice setting. Purposeful sampling was used to ensure the inclusion of people across all three categories and to capture diversity on key characteristics, such as gender, work experience, and cultural background. Participants were recruited using online platforms (e.g., LinkedIn and PNZ branch Facebook pages) and through professional networks (e.g., managers of physiotherapy practices and PNZ branch meetings). Advertisements invited people to participate in a study exploring views on PS from the perspective of physiotherapists working in private practice. Those interested in taking part were invited to contact the research team directly or provide their contact details to receive a full participant information sheet via email. They were then contacted to arrange a time for them to take part in an individual or focus group interview, depending on what was most logistically viable and the availability of others in the same category to make up a group.

Data collection

Data were collected using individual or focus group interviews held on the Auckland University of Technology North campus. The location was selected as it was convenient and regarded as a neutral location, independent from participant workplaces. Focus groups were used when a number of people in that same PS category were available. Focus groups are a useful method of data collection to explore collective perspectives of participants and illuminate agreement and inconsistencies among the group members (Gerrish & Lacey, 2010). Where a focus group was not viable, individual interviews were undertaken depending on participant availability.

Focus group and interviews were led by the third author (NK, who has extensive experience in qualitative and rehabilitation research, including skills in individual and focus group interviewing) following a semi-structured guide. As LH had a pre-existing supervisory relationship with some participants, it was thought that her involvement might influence their responses. A second independent person with experience in focus groups and PS with physiotherapists, provided support as co-facilitator, including taking note of any relevant group dynamics and non-verbal communication. The semi-structured guide helped to keep discussion focused on the phenomenon of interest, while being open enough to be responsive to discussion threads raised by participants. Discussion topics included clarifying understanding of what PS entails, its perceived value (or not), what helps or hinders engagement in PS, and reasons for taking up or withdrawing from PS. Example questions are included in Table 1. To generate a richer understanding of the research question, further questions were used to explore the answers given. The sessions were audio recorded and transcribed verbatim.

Table 1
Example Interview Questions

Topic	Interview questions/guideline
Understanding of PS	What do you understand by the term PS? What do you understand as to the purpose of PS? What is your understanding of how you would access PS? What kinds of topics could you imagine you would discuss in PS?
The value of PS	Who can benefit most from PS? What do you consider to be of value from engaging in PS? Can you think of some examples of how PS may impact your practice? What would help increase uptake of PS?
Barriers to PS	What are the reasons/barriers as to why physiotherapists maybe reluctant to engage in PS? What has stopped or prevented you from using PS currently?
Other	Is there anything else that you wanted to explore?

Note. PS = professional supervision.

Analysis

Data were analysed thematically, drawing on Braun and Clarke's (2006) six-stage process. This process of analysis included familiarisation of the transcripts and audio recordings, coding at a semantic (descriptive) and latent (interpretive) level, identifying key ideas, creating candidate themes, refining candidate themes, and naming and defining final themes (Braun & Clarke, 2006). Theme construction and refinement was undertaken as a team (primarily by LH and KW). This was not designed to seek congruence or agreement of themes, given this would be inconsistent with Braun and Clarke's process. Rather, the diversity of perspectives across the team supported theme construction by helping to crystallise thinking, identifying patterned meanings in the data and ensuring the themes told a story of the data with reference back to the research question. The first and second author (who were trained in thematic analysis, involved in PS, and who have a background in physiotherapy private practice and counselling respectively) began by familiarising themselves with the data. This involved reading notes from the co-facilitator, listening to audio recordings, reading and re-reading the transcripts, and noting down first impressions of the data. Hard copies of transcripts were then coded manually, with LH and KW coming together regularly to discuss preliminary interpretations and construct initial candidate themes. Candidate themes were shared with NK to further develop and refine candidate themes, returning to the data and coding in a recursive manner before settling on final theme names and definitions. Quotes considered to best communicate the story of the data and final themes were identified to support reporting. Where text has been removed either to reduce the length of a quote or to enhance readability, we have inserted a bracketed ellipsis (i.e., […]). No text has been removed that would alter meaning of the comment.

RESULTS

A total of nine Auckland-based physiotherapy private practitioners initially volunteered for the research, with eight ultimately consenting to take part, as one volunteer decided they were unable to commit the time needed to participate.

Participants were urban-based and had 2 to 20 years of experience in private practice. Most were contractors and female, with an ethnicity mix of New Zealand European, Māori, and Pacifica. More details are provided in Table 2.

Our findings showed a distinct difference in the understanding of PS between the three groups interviewed. The degree of engagement in PS was determined by the perceived value of PS and how it contributed to practice enhancement, along with how the participants felt about asking for help within a supervisory relationship.

The four key themes generated were: (1) PS and the capitalistic lens, (2) PS is not "normal", (3) professional identity and vulnerability, and (4) the relationship in a supervisory context. Each theme is discussed below with supporting data extract examples. All participants have been given pseudonyms.

Theme 1: Professional supervision and the capitalistic lens

The degree to which participants viewed PS through a capitalistic lens appeared to influence its perceived value, with financial cost balanced against the perceived benefit of PS as a continuous professional development (CPD) activity. The choice of language here is deliberate, with a more capitalistic lens referring to a focus on generation of wealth, competition, and productivity of business.

PS competes with other forms of professional development when educational funds were allotted. When time and money were finite, choices needed to be rationalised. In addition to the direct cost of PS, participants referred to the hidden costs, viewing the time invested in PS as a loss of revenue-generating time.

> Yeah, I think time is money and if you work like a certain amount of hours that you get paid for all those patients that you see, people just don't have any extra time to build into their week, to do something that's unpaid. (Angela)

Another participant referred to the number of other costs associated with maintaining professional status in the context of limited resources:

Table 2
Participant demographics

Pseudonym	Gender	Age (years)	Ethnicity	Year qualified (years in private practice)	Experience of PS	Method of data collection	Location of work (employment status)
Angela	Female	35	NZ European	2003 (11)	Never	Focus group	Auckland (contractor)
Adam	Male	43	NZ European	1995 (20)	Never	Focus group	Auckland (contractor)
Alison	Female	45	NZ European	1992 (15)	Never	Focus group	Auckland (contractor)
Anne	Female	42	Māori/Samoan	2013 (4)	Never	Focus group	Auckland (practice owner)
Belinda	Female	41	Māori	2011 (6)	Previously	Interview 1	Auckland (contractor)
Bonny	Female	55	American	2013 (4)	Previously	Interview 1	Auckland (contractor)
Bea	Female	40	NZ European	1999 (15)	Previously	Interview 2	Auckland (contractor)
Caroline	Female	32	NZ European	2009 (2)	Currently	Interview 3	Auckland (contractor)

Note. NZ = New Zealand; PS = professional supervision.

> We have to pay so much for PNZ and so much for registration (a load of money) and then you have got to do CPD (a load of money) and at the end of the day we just don't make enough in private practice. (Bonny)

Furthermore, the costs are balanced with the perceived financial benefits of PS as a CPD activity. The benefits of CPD when viewed through a more capitalistic lens could entail gaining new technical skills to assist existing clients, attract new ones, or enhance business management and strategy, which were perceived to have immediate and direct financial return. The participants who had never engaged in PS appeared to have a more capitalistic view, valuing and prioritising professional development that supports technical skill development.

> The money that they have invested in that (PS) a few times a year could be potentially the same as a course or a seminar or something like that, so I think with people's limited budget or time you would weigh it up, it is seen more of a luxury than a necessity. (Caroline)

Angela, who had never engaged in PS, commented:

> [In] a musculoskeletal sports physiotherapy setting… it's probably not as necessary [to do PS] because you would be going to maybe conferences […] so you are always learning but you don't necessarily have to engage with [….] feelings which are evoked.

In contrast, the participant who remained actively engaged in PS still had a desire to develop marketable technical skill and knowledge, but it was not their only focus: "I break up my supervision in different categories so I have got a clinical question, I have got challenging situations, and then I do professional development" (Caroline).

When PS was valued as a long-term investment, the financial gain was in keeping the practitioner working effectively and efficiently to earn a living. The focus was on supporting self-development through maintaining the practitioner's mental well-being, addressing stress in the workplace, processing the emotional aspects of practice, and/or as a method of quality control: "I think it's vital to my development as a person but also as a therapist and it gives me perspective and clarity in situations that I cannot go through myself" (Caroline).

Another capitalistic view of PS was accountability and its ability to advance a career pathway. All participants appreciated how the accountability of PS had tangible and potentially immediate benefits. Belinda commented in the sense of accountability derived through the supervision process: "It can hold you accountable to goals that you might have or decisions that you are making or […] someone to talk to if you have got issues particularly in moving forward in your own clinical practice."

For those participants who had previously engaged in but not sustained PS, commencement coincided with a critical point in their career and was seen as a remedial service to help keep accountability to the profession.

> Yeah, my main (reason) was career direction. You know I have been doing it a long time and my littlest had just gone off to school and I was at that road of, do I want to keep doing physiotherapy? (Bea)

Despite PS being seen by all participants as a mechanism for providing accountability, the benefits of this appeared to be insufficient to initiate or sustain engagement in PS in the context of competing priorities where there existed more tangible, immediate gratification. In contrast, PS was more likely and sustainable when recognised as a long-term investment in self.

Theme 2: Professional supervision is not "normal"

It was clear that all participants viewed PS as neither "normal" nor a routine part of practice. This appeared to be influenced by past practice experiences and current workplace behaviour, which was formative to their knowledge and understanding regarding the place of PS in physiotherapy.

Past experience, mainly undergraduate clinical training, strongly influenced their understanding of PS, even though some of the participants qualified 20 years ago. The experience of clinical supervision as a physiotherapy student usually carried negative feelings, and this was then generalised to any form of supervision and reflective practice thereafter:

> Being supervised as a student always made me feel really nervous and like, on edge, as if I was always being watched and I was going to be judged on whatever I did, I really hated it. […] So just like, even just the word PS makes me feel a bit nervous. (Anne)

Participants who had never received PS frequently blurred the lines between clinical supervision and PS. This highlighted a confusion in their understanding regarding the unique and specific characteristics and purpose of PS, and the value it could hold, compared to clinical supervision.

Once participants had commenced working as a physiotherapist, practice habits appeared to be influenced by those around them. It was recognised that physiotherapists working for a District Health Board (DHB) participate in PS because it is expected in that setting. However, that was not the case in private practice, and in that context, engagement was more likely when it was normalised by the employer. Caroline, who was receiving ongoing PS, negotiated this arrangement directly with her manager, who was fully supportive of the process. Bea, however, had two contrasting experiences across work settings: "I went back to my boss and said, 'I want someone to talk to for my own reason', and he was really supportive which was good".

In contrast to:

> My new boss, I did tell him when I took on the new job. I said, 'Look, I have found this really valuable', and at the time [he] went, 'Oh, I should look into this for the staff', but that's as far as it went.

Bea also referred to the impact of unsupportive colleagues:

> I had conversations with some physios that I'd worked with when I was doing professional supervision and they were like, 'Oh, I would never do that, why would you do that?' You know they just thought that was such a ridiculous thing to do.

What was considered "normal" by all participants were the informal corridor conversations, although the degree to which they were seen as a form of support or supervision

was interpreted differently. Those participants with no prior experience of PS viewed these meetings as an adequate substitution for formal supervision.

> We do a lot of informal supervision. Like this week, I had a 15-year-old that tried to kill himself and so there's another physio who is going to work with him and a personal trainer. So, you go and talk to them about suicide. (Anne)

In this instance, the absence of PS has the potential for both the physiotherapist's and client's personal or emotional needs being left unaddressed.

In contrast, those participants with experience of PS all engaged in informal discussions with colleagues, but viewed the value of these opportunistic conversations as different to PS:

> I have got lots of physio friends and colleagues and you can talk about things with them, but then it feels like a moan session. Whereas with someone who is just there to be very objective and does actually throws [*sic*] back questions at you, [it] was quite useful. (Bea)

Similarly:

> You are sitting there finishing notes and you are having a conversation with a colleague going, 'Hey, I have got this issue' and often they are more emotional conversations because you are really fired up about something. They are quite biased conversations. Whereas when I sit with my supervisor, they are often unbiased. (Caroline)

Theme 3: Professional identity and vulnerability

Participants perceived PS to have the potential to expose their vulnerabilities, potentially threatening their professional identity as being a rehabilitation expert. The medical model tends to position practitioners as experts, that is, as someone possessing a great amount of knowledge and skill. However, it was recognised that PS would be most authentic and effective when the supervisees discuss their uncertainties and concerns relevant to their practice. Being both vulnerable and an expert created tensions for some, and there was concern that seeking PS may infer self-doubt or incompetence.

All participants acknowledged the need to be honest and open in PS, and that vulnerability could be threatening. Additionally, it was recognised that physiotherapists working in private practice were cautious about being vulnerable (or being perceived that way) and valued self-sufficiency. As such, acknowledging weaknesses or asking for help was seen in a negative light, especially by participants who had never used PS:

> Physios generally have to come across as quite confident. They have to be confident in front of their clients so they do build up a bit of a wall. And so when you go to a course for the weekend you are learning your moves you have got to be confident too and you have got to kind of, you know you are with your peers, there's no safe area. (Adam)

In contrast, those who had experienced PS viewed it as a relief to "open-up" or "get it off their chest", and saw being vulnerable as an important part of the process:

> One thing that you realise is that it's OK for me to look like I don't look perfect and I think that's OK, so I don't have to hide myself or put up a wall. And I go, I have done this, I can actually just be honest, and I think because I am honest, I get more out of it. (Caroline)

Theme 4: The relationship in a supervisory context

Participants placed paramount importance on the skills and characteristics of the supervisor, in particular the extent to which they created a trusting and safe relationship. This was perceived as particularly important given the vulnerability inherent in PS, as described above. Participants expressed the need to feel confident to negotiate the supervisory process and, where necessary and timely, to cease the supervisory relationship if expectations were not met.

Participants outlined the desirable attributes of a professional supervisor as trustworthy, impartial, non-judgemental, a good listener, neutral, and empowering. A supervisor with these attributes appeared to reduce the perceived risk of feeling vulnerable or being seen as incompetent. Those with experience of PS felt the relationship worked well when the power imbalance was minimal, mutual respect existed, and when they could relate to their supervisor both personally and professionally. Bea commented:

> I felt quite comfortable because I thought we were of [a] similar age, we had kids, I looked up to her from a career perspective because she had done a lot of study and that, I saw that as a real value for me to talk about the things I wanted to talk about […] I don't think I felt like I was a junior versus a senior, I felt quite at ease.

Similarly, Alison noted: "I would choose someone that I respected and someone that I felt comfortable chatting with who I knew would give me honest feedback".

In contrast, all participants appreciated that an undesirable relationship with a supervisor could be detrimental. For example, "If you did get someone who was judgmental and said. 'Oh I wouldn't have done that', or you know, something like that. So, I think there would be skills that would help supervisors be better supervisors" (Alison).

While issues could arise around having an undesirable supervisor, it was also problematic if the supervisor had a dual role (i.e., was an existing work colleague). While it may be more convenient to use someone at work, the participants were cognisant of the potential conflict and tensions that could arise if being supervised by someone who was involved in their daily practice. For example, Bea provided supervision to a work colleague and commented:

> We were colleagues so I don't know if our relationship worked so well […] it just felt it wasn't as objective. It was harder to be objective possibly, from my point of view, and I did struggle sometimes not to give solutions.

Similarly, Caroline noted: "When I was doing supervision at the hospital it would never be with my direct boss so it was always someone who was slightly sideways because that would have a direct impact in terms of my employment".

Furthermore, the ability to influence the supervisory process formed a key point of difference between those who are currently or have had PS compared to those who had never taken it up. Those who had never experienced PS were clear on how they would like sessions to be structured, such as being supervisee led. However, they appeared to not know that this was within their control. Knowing how to discontinue the relationship if it was not meeting the needs of the supervisee was also a key concern.

> You have to really invite that person in quite deeply to what it is you are doing, so once they become entrenched, then how do you un-trench them without, I don't know, upsetting their feelings? […] I think it's the downside […] It is such a personal relationship. (Belinda)

In contrast, those with experience of PS felt fully empowered to determine the terms and conditions of PS, and choose their own supervisor.

DISCUSSION

Engagement in PS appeared to be influenced by a complex set of interacting factors related to the perceived value of PS in the context of capitalistic values, what constitutes "normal" practice by peers and employers, the importance of sustaining one's professional identity as an expert, and the need to be confident in developing a supervisory relationship tailored to individual needs and preferences. This is the first study that we are aware of to examine experiences and perspectives of PS in the physiotherapy profession, and specifically for those working in a private practice setting.

The themes identified in this research are consistent with what is already recognised about some of the practice habits of physiotherapists. There is acknowledgement that the majority of physiotherapists have less focus on the development of interpersonal skills and self, and preferentially invest in the advancement of technical skills for the improved management of conditions (Williams, 2018). However, there is a growing body of evidence that emphasises the importance of a humanistic, client-centred approach to care, and the necessity of being a reflexive practitioner (Kayes & McPherson, 2012; Potter et al., 2003; Resnik & Jensen, 2003). Furthermore, from a client-centred perspective, the important skills a physiotherapist needs include effective communication (Potter et al., 2003), being a collaborative problem solver, empowering clients through education, cultivating a trusting client-practitioner relationship, and possessing good self-reflection skills (Kayes & McPherson, 2012; Resnik & Jensen, 2003). While PS aims to develop some of these skills through reflective practice, engagement in PS by physiotherapy private practitioners remains limited. The drive for increased productivity, cost-effectiveness, and, ultimately, profit continues to dictate practice habits (Brun-Cottan et al., 2018).

Low uptake of PS by physiotherapists may be explained by the profession evolving from the biomedical model of health care, where there is a depersonalising approach to care, giving little attention to the social determinants of health and well-being (Nicholls & Gibson, 2010; Stewart & Haswell, 2007). As a result, physiotherapists' own feelings for, and recognising the feelings of, their clients is unacknowledged and deemed inconsequential (Nicholls & Gibson, 2010).

The biomedical paradigm used by physiotherapists may also help to explain why participants who had never engaged in PS expressed hesitancy or felt no need to seek support. How practitioners support their clients may well be reflected in how they wish to support themselves. Norris and Kilbride (2014) highlighted how practitioners work with a paternalistic view and feel they possess the solutions to all client issues. It has also been highlighted how physiotherapists struggle with the tension of moving from being the biomedical expert to working wholeheartedly collaboratively (Mudge et al., 2014). The core principle of PS focusses on the supervisee's desire to learn how to do their work better (Carroll & Gilbert, 2011), which implies that their work was not already perfect. Therefore, PS could be perceived as a threat to the professional identity of the supervisee, which may deter people from entering into it.

A dearth of research on nonmandatory PS for health workers means a comparison is not possible. However, it is widely acknowledged that when a supervisee feels threatened in PS (normally through a misuse of power), learning ceases and PS has negative connotations (Hawkins et al., 2012; Sparks, 2014).

Another significant barrier to engagement in PS was the extent to which uptake of PS was normalised (or not) in the workplace culture. All the participants highlighted PS as not "normal" in private practice. Other research examining engagement in work-based learning has found that the culture of learning comes from the leadership within an organisation (Attenborough et al., 2019; Thurgate, 2018) and that good leadership can transform the workplace culture around seeking support and further education. This may explain the apparent and striking difference in engagement in PS between physiotherapists who have the support of their employer (and view PS as "normal") compared to those that do not. For sustained engagement in learning, it has also been argued that leaders in the organisation need to model behaviour, not just provide consent for others to participate (Attenborough et al., 2019; Thurgate, 2018).

Another tipping point for engagement in PS relates to the supervisory relationship itself. It is almost unanimously agreed within PS literature that the supervisory relationship is a critical component for optimal PS (Beddoe, 2012; Carroll & Gilbert, 2011). Arguably, vulnerability may create the context for reflexivity, thereby supporting personal growth and development. However, this is complex, sitting alongside a co-existing need to sustain one's professional identity and credibility as an expert. Given this complexity, it is clear the supervisory relationship needs to create a safe space for recipients to navigate this tension and sustain their engagement in the process. Molloy and Bearman (2019) describe balancing vulnerability and credibility as intellectual candour and a transformative practice to allow the practitioner to access different ways of knowing.

This study has provided a first look at experiences and perspectives regarding the tipping point for engagement in PS for physiotherapists working in private practice. In order to

further understand the use of PS by physiotherapists, future research should aim to capture the opinion of physiotherapists who work in an environment where PS is mandated and is part of the workplace culture, such as in a DHB setting. This would deepen current understanding. Capturing the opinion of stakeholders (clients, funders, and professional bodies) would also be worthwhile to understand the role PS could have within the physiotherapy profession in New Zealand.

Although this study has provided some insight into the tipping points for engagement in PS by physiotherapy private practitioners, there were limitations. In particular, the diversity of our sample was limited. For example, there was only one male and only one person who had sustained engagement in PS. Further, all participants were exclusively from urban practices and are likely to have different experiences and perspectives compared to those working in rural and remote locations. Future work exploring perspectives not already captured in the current study would further enhance the understanding of factors that help or hinder uptake of PS in private practice.

CONCLUSION

The use of PS by physiotherapists in private practice appears to be unusual despite PS being strongly recommended as a "core component of physiotherapy practice" (Physiotherapy New Zealand, 2012). There is minimal focus on the development of interpersonal skills and self, where investment in the advancement of technical skills dominates. While a lack of understanding of what PS can offer limits engagement, the perceived threat it poses to self and professional identity also appear to be a key factor limiting uptake. When PS is seen as a long-term investment in self-care, engagement appears more likely to be sustained.

KEY POINTS

1. There is a dearth of literature on the use of PS in the physiotherapy profession, particularly in the private practice setting in New Zealand.
2. The drive for increased productivity, cost-effectiveness, and, ultimately, profit continues to dictate practice habits.
3. PS is not seen as a normal part of physiotherapy private practice culture.
4. To engage in PS, the practitioner needs to balance the tension between professional identity and credibility with being able to be vulnerable about practice deficiencies.
5. The supervisory relationship needs to create a safe space for recipients to sustain engagement in the process of PS.
6. When PS is seen as a long-term investment in self-care, engagement is more likely to be sustained.

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DISCLOSURES

There are no conflicts of interest which may be perceived to interfere with or bias this study.

PERMISSIONS

Ethical approval was obtained from the Auckland University of Technology Ethics Committee (reference number 16/161). Written, informed consent was obtained from all participants.

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Māori Pain Experiences and Culturally Valid Pain Assessment Tools for Māori: A Systematic Narrative Review

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ABSTRACT

Physiotherapists in Aotearoa New Zealand use various models and tools for assessing pain, many of which have been developed and validated in other ethnic populations outside Aotearoa New Zealand. In particular, assessing pain within the Māori population should be culturally appropriate and capture Māori realities associated with pain experience. The purpose of this systematic review was three-fold: to explore evidence of pain experiences among Māori, to identify any pain assessment questionnaires that capture Māori experiences of pain, and to propose a framework to evaluate the adherence to kaupapa Māori research guidelines. Due to the gap in the literature, only two studies were eligible. Based on these two studies, *whānau*, *Māori holistic views of health*, *whakapapa*, and *spirituality* were identified as key themes associated with Māori pain experiences. The quality of included studies was "medium-high" and "high". The overall evaluation based on the Confidence in the Evidence from Reviews of Qualitative research demonstrated "high-moderate" confidence in the findings. Evaluation of adherence to a kaupapa Māori theory framework of the included studies found these to be limited. This review could not identify culturally valid tools to capture Māori experiences of pain, and established the need to develop tools encompassing themes associated with Māori experiences of pain.

Hoeta, T. J., Baxter, G. D., Pōtiki Bryant, K. A., & Mani, R. (2020). Māori pain experiences and culturally valid pain assessment tools for Māori: A systematic narrative review. *New Zealand Journal of Physiotherapy, 48*(1), 37–50. https://doi.org/10.15619/NZJP/48.1.05

Key Words: Pain Experience, Māori, Indigenous, Pain Perception, Pain Assessment

INTRODUCTION

Chronic pain among general populations is a major burden on individuals, the healthcare system, and society (Briggs et al., 2016; Smith et al., 2014). In Aotearoa New Zealand one in five adults (21%) is reported to be living with chronic pain, the rate rising steeply with an ageing population (Ministry of Health, 2015). Of note, the rate of chronic pain within the Māori population, the indigenous peoples of Aotearoa New Zealand, is higher than that of non-Māori (statistically significant adjusted ratio of 1.2) (Ministry of Health, 2015). This may be due to a number of complexities, such as access to health care, quality of health care and racial discrimination (Harris et al., 2006).

Pain experience can be affected by multiple different factors, such as psychological (e.g., attitude and beliefs, and mood disorders), social, cultural, spiritual factors, and early life stress events (Linton, 2011). Ethnicity and/or race have also been reported as an influencing factor on the pain experience (Green et al., 2003). Many Māori view health holistically, connecting physical, mental, social, and spiritual health dimensions together (Rochford, 2004); when one of these domains is affected, so are the rest (e.g., when feeling mentally strong, you are able to support others who are less so through social support and interaction). Understanding the lived experiences of pain among Māori is an important aspect to consider and to address in clinical practice (Pitama et al., 2011; Shipton, 2013). Understanding the kaupapa Māori theory (KMT) would also help enrich such an understanding, and help to develop culturally appropriate physiotherapy practice when assisting Māori living with pain. As the KMT is underpinned by Māori worldviews, it would be helpful using this framework to understand how these contexts are affected during pain experiences and provide effective care for Māori.

Currently, physiotherapists in Aotearoa New Zealand and the Accident Compensation Corporation (ACC), as a primary services funder, use various models and tools for measuring pain. Many of these models have been developed and tested for cultural appropriateness (evidenced-based) in countries other than Aotearoa New Zealand (Brady et al., 2016). To effectively manage chronic pain, assessment tools need to be relevant for the population being assessed (Breivik et al., 2008). Given that Māori are indigenous to Aotearoa New Zealand, it is pertinent that assessment measures used in Aotearoa New Zealand accordingly capture Māori realities, reflect Māori models of

health and well-being, and are culturally appropriate (Cram, 2003; Katoa Ltd, n.d.). Usage of pain measurement tools which disregard Māori perspectives may lead to discriminatory practice in Aotearoa New Zealand and further act as a barrier for Māori receiving adequate pain management services. However, there is no body of evidence summarising the key driving factors associated with pain experience for Māori. To address these gaps in the evidence, this systematic review had three objectives. Firstly, to assess studies that have used qualitative research methodologies to understand Māori experiences of pain (objective 1). Secondly, to assess the current evidence of pain assessment tools/questionnaires that have been validated for Māori, capturing their lived pain experiences (objective 2). And thirdly, to propose a framework for evaluating the adherence to kaupapa Māori research (KMR) guidelines (objective 3).

METHODS

This systematic review was conducted and reported using Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines (Moher et al., 2009).

Search strategy

A comprehensive electronic literature search strategy was developed in consultation with a senior medical librarian at the University of Otago. Keywords and relevant MeSH headings for objectives 1 and 2 are shown in Tables 1 and 2, respectively. Several exploratory trial searches were carried out to identify relevant search terms. Electronic databases (PubMed, Medline, Scopus, Clinical Key, Web of Science, Embase) were used; supplementary searches were conducted in Google Scholar, and relevant national and international journals (Table 3). Reference lists of the included studies and other grey literature (i.e., materials not published commercially or indexed by electronic databases) were also searched (e.g., nzresearch.org.nz and Te Puna) (University of Otago, 2017).

The original search was performed from inception of the database (search undertaken on 22 December 2017). Auto-alerts were created to identify any articles published following the initial search. Other sources were searched that had recommendations on pain assessment procedures endorsed by health professional associations or government agencies (e.g., Physiotherapy New Zealand, New Zealand Pain Society, Faculty of Australasian Pain Medicine, and ACC). A follow-up search was conducted on 24 February 2019 to identify any studies published during the interim period.

Please refer to Appendix A for a glossary of Māori terms that are referred to in this paper.

Table 1
Key Words and Mesh Terms for Qualitative Studies (Objective 1)

Population	AND	Methodology	AND	Topic/focus
Māori	OR	Interview Focus group Qualitative design Qualitative method Consultation Qualitative research	OR	Pain

Table 2
Key Words and MeSH terms for Quantitative Studies (Objective 2)

Population	AND	Cross cultural validity	AND	Tools	AND	Pain
Māori Aotearoa New Zealand	OR	Translation Culturally adapted Culturally sensitive Cross cultural validity	OR	Self-reported measure Questionnaire Checklist Screening tool Tool Assessment	OR	Chronic pain Acute pain Pain perception Pain experience Pain

Table 3
Relevant National and International Journals/Pain Educational Resources Searched

Australasian Medical Journals (e.g., New Zealand Medical Journal, The Medical Journal of Australia)
International Journal of Indigenous Health
International Journal of Indigenous Peoples
International Journal of Cultural Studies
Clinical Journal of Pain
Pain
European Journal of Pain
The Journal of Pain
Pain practice
Pain Physician
Journal of Pain and Palliative Care Pharmacotherapy
Journal of Pain and Symptom Management
Journal of Pain Research
Pain Reports
British Journal of Pain
Journal of Aboriginal Health
Pain–ED
Māori Health Review
Social science online publications such as Kōtuitui: New Zealand Journal of Social Sciences Online

Inclusion criteria

Inclusion criteria for objective 1 were studies that investigated Māori experiences of pain. Such studies must have developed themes on pain experience among Māori using qualitative methodologies. For objective 2, studies were included that investigated cross-cultural validity (CCV) of pain assessment questionnaires assessing pain experience (pain severity/interference or disability, pain self-efficacy, pain-related cognitions, and affective components). This included questionnaires currently recommended for use in clinical practice in Aotearoa New Zealand (Nationwide Service Framework Library, 2015). Included studies could be peer-reviewed publications or unpublished work (e.g., dissertations and theses, literature reviews, or reports) and be written in English or te reo Māori. Two reviewers evaluated all retrieved citations for inclusion in the study.

Data extraction

The following were extracted from included studies: author and year, questionnaire investigated, population/participants' characteristics, CCV/qualitative research process, and the findings (including key themes and categories generated from qualitative studies).

Assessment of study quality (risk of bias)

To assess qualitative studies, an adaptation of the Critical Appraisal Skills Programme (CASP) assessment tool for qualitative studies was used (Critical Appraisal Skills Programme, 2017). CASP applies 10 questions asked systematically, and determines whether the results of the study are valid, what they consist of, and if the results will help for the population of interest (i.e., Māori population).

The COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) checklist (Terwee et al., 2012) was used to evaluate the methodological quality of those studies that assessed CCV of pain questionnaires. The COSMIN checklist contains standards for design requirements and preferred statistical methods of studies on the measurement properties of health measurement tools. Utilising the CCV section (box G) of the checklist (which evaluates the studies against 15 criteria, graded as "excellent", "good", "fair", or "poor"), we were able to determine the overall quality of CCV of the included studies. A methodological score for CCV was obtained by taking the lowest score of any item in the box (i.e., "worse score counts" algorithm, described by the COSMIN checklist).

Level of adherence to KMR

KMR is a recognised methodology for conducting culturally appropriate research with Māori (Walker et al, 2006). Firstly, we searched the literature to identify whether there were any existing tools to appraise the level of adherence to KMR in the included studies. No evidence of validated tools was found. Therefore, we adapted the Te Ara Tika ethical research guidelines developed by the Health and Research Council (HRC) (Hudson et al., 2010) (Appendix B). Te Ara Tika is a framework used to address Māori ethical issues within the context of decision-making by ethics committee members about proposed research involving Māori. The progressive framework outlines minimum standard, good practice, and best practice for conducting research with Māori. Each standard evaluates elements of *whakapapa, tika, manaakitanga*, and *mana*. The "minimum standard" should be met for the research to be approved; "best practice" is the gold standard, in which the values and expectations of the research align with te ao Māori. Te Ara Tika was chosen to be adapted as these guidelines are well referenced and designed, and incorporate key questions which determined how information was gathered with Māori. The guidelines were adapted by changing questions from present to past tense and excluding the "minimum standard", as it was assumed the research project must have met "minimum standard" in order to be undertaken. The

remaining questions were crossed-checked with the validated Māori research resource Nga Ara Tohutohu Rangahau Māori to ensure relevant concepts were included (Ministry of Social Development, 2004). The level of adherence to KMR was determined by the lowest grade obtained for each principle.

Synthesis of results

We utilised the Confidence in the Evidence from Reviews of Qualitative research (CERQual) approach to summarise our confidence in the findings across the filtered studies (Glenton et al., 2018). CERQual assesses the confidence in the evidence based on four key components: the methodological limitations of included studies ("the extent to which there are concerns about the design or conduction of the primary studies"), the relevance of the included studies to the review question ("the extent to which the data from the primary studies supporting a review finding is applicable to the context specified in the review question"), the coherence of the review finding ("how clear and cogent the fit is between the data from the primary studies and a review finding that synthesizes that data"), and the adequacy of the data contributing to a review finding ("overall determination of the degree of richness as well as the quantity of data supporting a review finding").

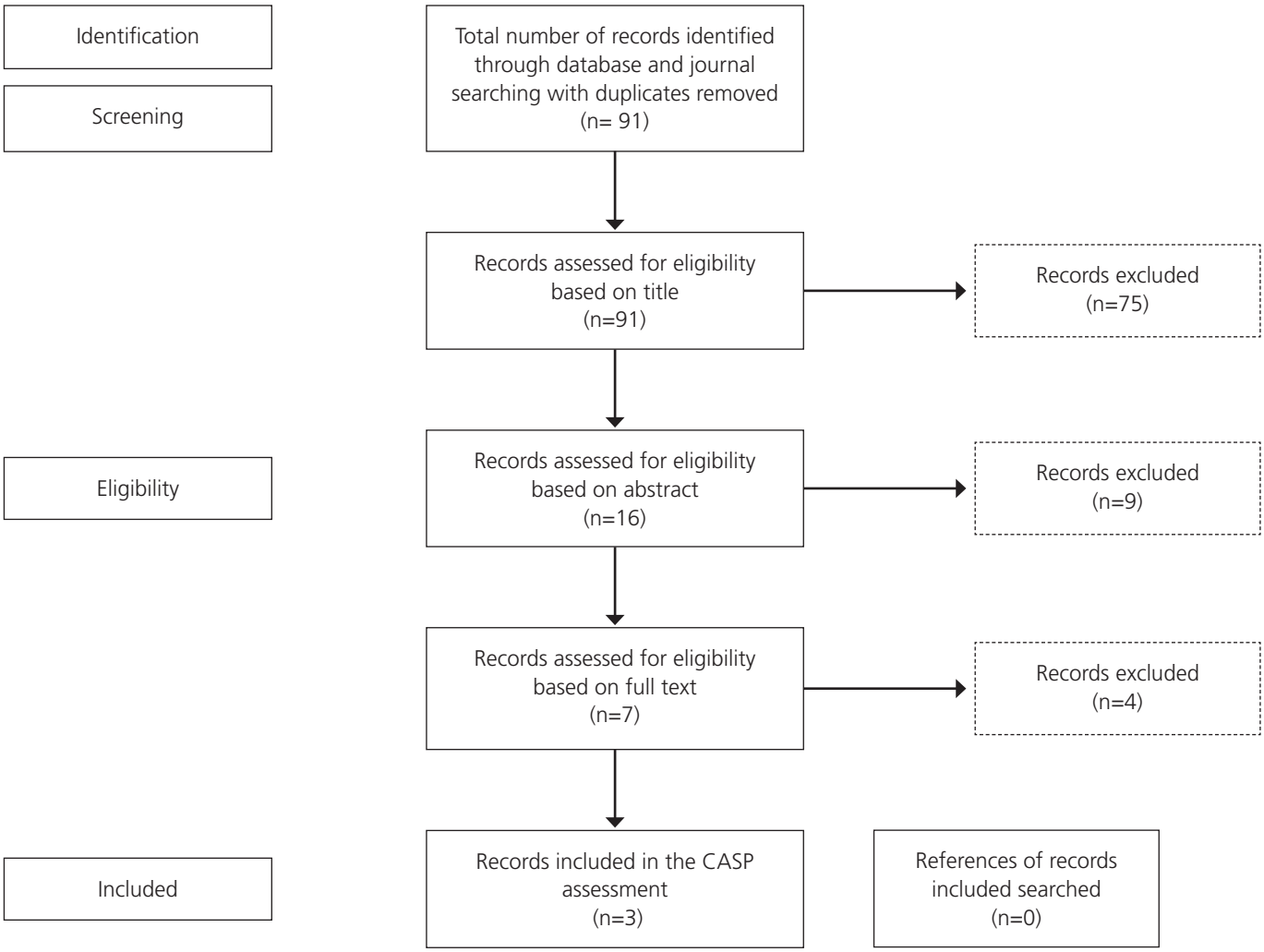
Confidence was judged as "high", "moderate", "low", or "very low". The starting point of "high confidence" suggests that each review finding should be perceived as a reasonable representation of the phenomenon of interest unless there are factors that would weaken this assumption. Finally, the review synthesised both qualitative and quantitative processes, and identified gaps for further development of relevant pain tools for clinical use.

RESULTS

Following the comprehensive search process, three studies were found to be eligible for inclusion in the review for objective 1 (Fig. 1) (Magnusson & Fennell, 2011a, 2011b; McGavock, 2011). Key characteristics of these studies are displayed within Table 4. Two publications arose from one study, but were reported as two separate studies (Magnusson & Fennell, 2011a, 2011b). The age of participants ranged from 32 to 81 years in a sample size of 15 and 33 respectively for each paper (Magnusson & Fennell, 2011a, 2011b). Pain experiences (e.g., physical pain, emotional

Figure 1

Flowchart of Article Screening Process – Objective 1



Note. CASP = Critical Appraisal Skills Programme.

Table 4
Characteristics of Included Studies

Author (year) Study aims	Participant characteristics	Data collection procedures	Results/findings
McGavock (2011) To conduct an in-depth exploration of the lived experiences of Māori who are currently experiencing chronic pain or a painful chronic health condition	7 adult Māori 5 female 2 male Age: 26-52 years 3-25 years+ of chronic pain Varying types of non-cancer pain	Face-to-face interview Adapted interpretative phenomenological analysis (IPA)	Four superordinate themes identified 1. A life transformed by the experience of chronic pain 2. Experiences of chronic pain as Māori 3. Evaluating treatment experiences 4. Negative perceptions, negative experiences Māori identity and culture The whānau as a whole was described as a priority over individual health. Tolerating or pushing through pain for the sake of others. Able to deal with experiences of chronic pain and mental illness better if engaged in the process of whakapapa. Important concepts related to Māori culture, such as a holistic view of the person and of well-being, and the influence of spirituality and religion.
Magnusson & Fennell (2011a) To better assess and treat pain in different cultures, the perspectives and experiences of that culture must be taken into consideration. Therefore, the study was undertaken to better understand Māori perspectives of pain	15 adult Māori 12 female 3 male (12 Māori healthcare workers, 3 kaumātua) Age: 32-81 years 15 participants indicated their fluency in te reo Māori 10 basic 3 conversational 2 fluent Purposeful sampling technique	Adapted versions of the McGill Pain Questionnaire and Headache Disability Inventory Discussed pain experience of patients, rather than own pain experience	Descriptive phrases of the experience of pain 56 (92%) were endorsed by 65% or more of the participants. Participants provided 158 alternatives, using either alternative wording or phrases. Pain descriptors 123 (100%) were endorsed by 65% or more of the participants, with 77 descriptors (63%) being endorsed by 100% of the participants. 8 alternative descriptors and 58 additional descriptors were provided by participants, 97% were supplied by healthcare providers. No alternative or additional descriptors were provided in te reo Māori. Terms and phrases of measures commonly used to assess pain appropriately capture Māori pain experiences. However, it may be beneficial to confirm the descriptors used accurately capture experiences being measured.

Author (year) Study aims	Participant characteristics	Data collection procedures	Results/findings
Magnusson & Fennell (2011b) To better assess and treat pain in different cultures, the perspectives and experiences of that culture must be taken into consideration. Therefore, the study was undertaken to better understand Māori perspectives of pain	33 participants 23 female 10 male Mean age: Kaumātua 72 years Māori healthcare workers 38 years 65% of kaumātua were fluent in te reo Māori 86% Māori healthcare providers indicated basic te reo Māori Purposeful sampling technique	In-depth "semi-structured" interview-guide format. 20 kaumātua were interviewed in a group 6 kaumātua and 7 Māori healthcare providers were interviewed individually	Emerging themes Experiences of pain. Pain as multidimensional. Pain as a private experience. Spiritual dimension. Coping strategies, including the complex role of whānau. Specific recommendations for assessment and treatment of pain. Experiences of pain Both groups recounted experiences of supporting or caring for people with pain. Pain is private Explanations for delayed health-seeking behaviour included childhood memories and family stories of culturally insensitive health care, of perceived medical mismanagement, and of not wanting to be a burden. Shame (whakamā) associated with speaking of pain with outsiders. Elderly Māori were reportedly less likely to report pain or to seek medical attention for their pain. Role of whānau (extended family) Not accessing whānau support or of feeling guilty about seeking whānau support was regarded as selfish.

pain, and psychological pain) were reported differently between the papers, including different ways of qualitatively assessing the participants, and therefore, the study results are discussed individually in our research. An adapted pain questionnaire to gather data for appropriateness on pain descriptors (Magnusson & Fennell, 2011a) and semi-structured focus group interviews (Magnusson & Fennell, 2011b) were used as well as a face-to-face interview method (McGavock, 2011). No studies were identified for inclusion in the review for objective 2 (Fig. 2). Therefore, further COSMIN-based analysis was not carried out. Neither auto-alerts nor follow-up searches produced any studies eligible to be included in this review.

Quality assessment and evidence synthesis

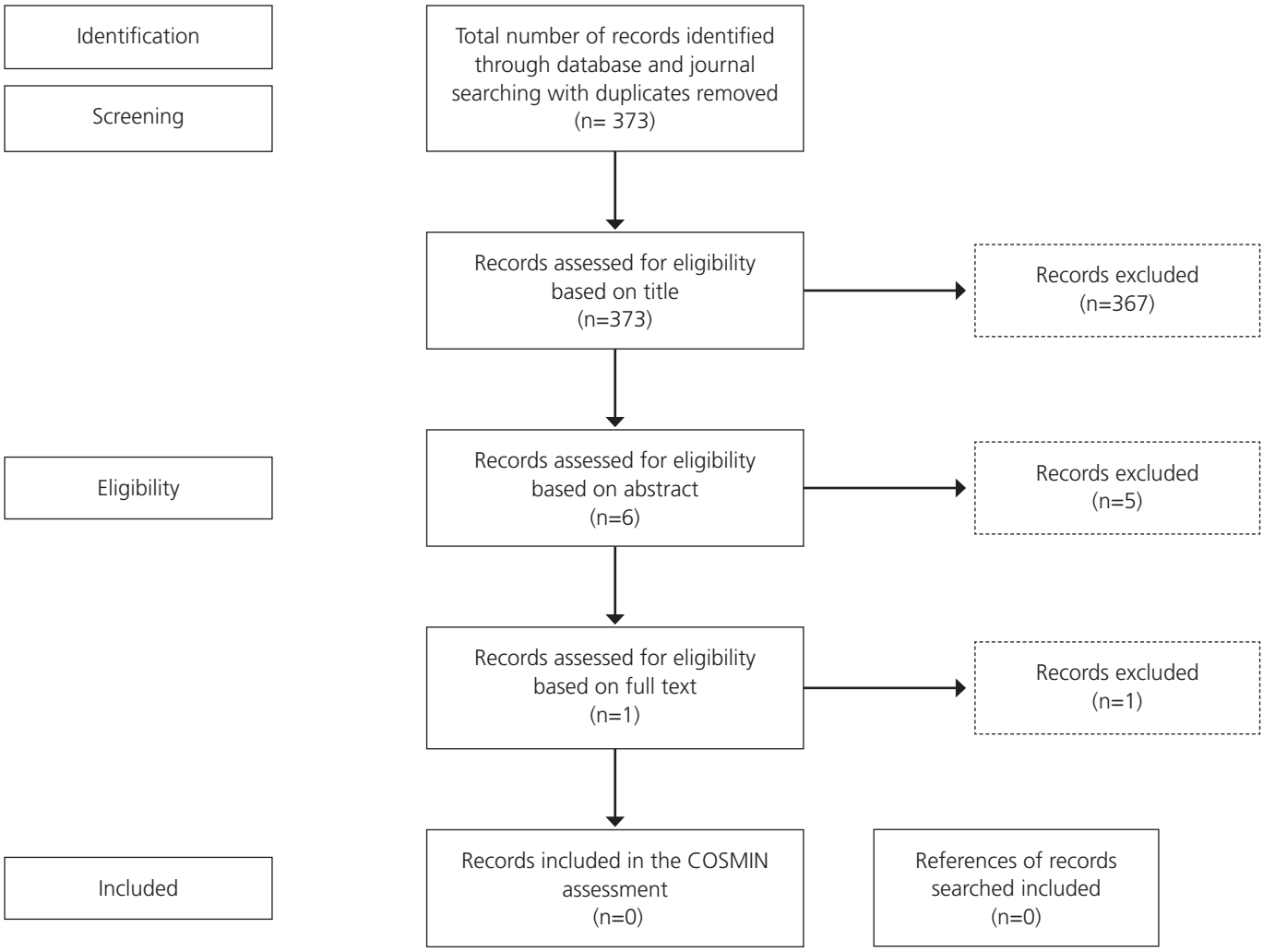
CASP

The CASP evaluation determined McGavock's (2011) study on Māori lived experiences of chronic pain as "high quality", scoring 10/10. The paper by Magnusson & Fennell (2011a) was not appraised using the CASP tool as the data were collected using a self-administered questionnaire rather than an interview-based approach. However, the study details were included for descriptive analysis. The study of Magnusson & Fennell (2011b) was determined as "medium-high quality", scoring 7/10, due to missing information from questions 6, 8 and 9 (Table 5).

CERQual

Based on CERQual evaluation, the overall evaluation demonstrated "high-moderate" confidence in the findings from the included studies. CERQual graded the studies as high-moderate quality due to very minor concerns for methodological limitations, minor concerns for relevance, and very minor concerns for adequacy. Coherence was not discussed, as neither study discussed the same type of pain and limited literature was found.

Figure 2
Flowchart of Article Screening Process – Objective 2



Note. COSMIN = COnsensus-based Standards for the selection of health Measurement INstruments (Terwee et al., 2012).

Table 5
Critical Appraisal Skills Programme Evaluation

	Questions and their respective grade (respective page number within text)									
Citation	1	2	3	4	5	6	7	8	9	10
McGavock (2011)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Magnusson & Fennell (2011a)	YES	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnusson & Fennell (2011b)	Yes	Yes	Yes	Yes	Yes	NA	Yes	NA	NA	Yes

Note. NA = not applicable.

Adherence to KMR

Based on evaluation using the adapted guidelines, the overall assessment for both studies was of "minimal standard" (Table 6).

DISCUSSION

This systematic review has not identified any pain assessment tools that have been specifically developed for capturing Māori experiences of pain in Aotearoa New Zealand or cross-culturally validated with Māori. However, two studies were found that used qualitative research methodologies to understand Māori experiences of pain. Themes and meta-themes from both studies discuss whānau, Māori holistic views of health, spirituality, and whakapapa as being associated with pain experience.

Whānau play an important role when Māori are experiencing pain (McGavock, 2011; Magnusson & Fennell, 2011b). McGavock (2011) noted from participants: "Tolerating pain and push through for the sake of others" (p. 79) and "Individuals would rather spend money and time on healthcare for whānau rather than for themselves" (p. 79). These points showcase how many Māori are very relationship orientated and view themselves as part of a larger community. The needs of others are often more important than their own, emphasising that rather than an individualised approach to pain management for Māori, whānau are often an important aspect and, therefore, may need to be included in the physiotherapy treatment process. Magnusson & Fennell (2011b) also noted that if whānau were not involved during pain experiences, Māori were regarded as being "selfish" (p. 47), both personally and in relation to others in their whānau. Whānau involvement was viewed as a way of promoting motivation for adherence to treatment interventions, which is a large issue in physiotherapy management. Whānau were also seen as health advocates for Māori who felt less comfortable discussing their pain with healthcare providers, as the healthcare provider was often found to be "insensitive of cultural practises" (Magnusson & Fennell, 2011b, p. 47). Other studies have shown similar results, discussing the importance of family and its effect on pain experience (Cram, 2003; Hughes et al., 2014; Hung et al., 2017; Richmond et al., 2007). On this basis, it is clear that the individual's relationship with whānau can impact on their experience of pain, and therefore, should be an essential consideration of pain assessment within physiotherapy clinical practice.

Magnusson & Fennell (2011b) and McGavock (2011) discuss Māori experiences of pain as being multidimensional with physical, mental, spiritual, and social aspects of health all being affected. Differing ethnic and cultural groups often have their own ways of describing, experiencing, and managing pain (Peacock & Patel, 2008). Based on Māori clinicians and whānau perspectives of health, McGavock (2011) discusses how initially the effects of pain may be seen in physical health but are also seen to affect spiritual and mental health, and relationships with whānau. This may be due to physical health being the most noticeable and often the first aspect assessed in a physiotherapy assessment. Other studies also discuss these Māori holistic views of health (Cram, 2003; Mark & Lyons, 2010) and its importance for many Māori when it comes to understanding how health can be affected during illness. This illustrates the importance within physiotherapy in Aotearoa New Zealand to incorporate conversations around a Māori holistic view of health during clinical pain assessments. This may help to better capture the effects of pain for Māori as a whole and provide specific treatment in these areas. Addressing aspects included within Māori models of health, such as Te Whare Tapa Whā (Durie, 1985), may be an option to ensure Māori holistic views of health are explored during pain assessment.

Spirituality is an important concept of health within Māori (Durie, 1994; McGavock, 2011). Having a sense of spirituality and religion have also been shown to affect psychological well-being, including reducing pain and fatigue among various pain conditions (Dedeli & Kaptan, 2013). Multiple participants acknowledged spirituality in McGavock's (2011) study, discussing its importance and how it led them to utilise traditional methods of healing. Some participants also discussed how modern healthcare providers do not believe in traditional ways of healing, which made them feel as though the healthcare provider "didn't care" and, therefore, impacted negatively on their rapport with the doctor: "She's (Doctor) not open to alternative medicine, anything even the name Arnica [homeopathic remedy for muscle aches and bruises] she'll probably just sort of raise an eyebrow you know" (p. 82). As a physiotherapist, it is important to seriously acknowledge Māori views of spirituality as a management and coping strategy of pain. Ignoring patient beliefs may only prolong recovery and reduce the success of pain management strategies (Hansson, 2011). In order to deliver physiotherapy services with the appropriate level of understanding of spiritual needs for Māori,

Table 6

Adherence to Kaupapa Māori Research Methodology

	Tikanga principle and level of engagement (minimal, good or best practice) [a]				
Author (year)	Whakapapa	Tika	Manaakitanga	Mana	Overall impression
McGavock (2011)	Best	Good	Good	Minimal	Minimal
Magnusson & Fennell (2011a, 2011b)	Minimal	Minimal	Good	Minimal	Minimal

[a] Refer to Appendix B for full definitions and the criteria for grading – "best", "good", and "minimal".

it also requires the health professions and health "system" to upskill in their understanding of Māori perspectives of hauora Māori.

Whakapapa is discussed by McGavock (2011), as it is an important concept of health within Māori worldviews. One participant said, "She may have been able to deal with chronic pain better if she engaged in the process of Whakapapa" (p. 80). Understanding one's culturally specific beliefs, attitudes, and knowledge of pain has been shown to affect people's experience of pain (Shipton, 2013). From a Māori perspective, understanding one's whakapapa or ancestry may be important for pain assessment questionnaires being purposefully developed for Māori. For an individual managing their own experience of pain, having a sense of belonging may be empowering, giving them mana to manage their chronic pain.

This review failed to identify any pain assessment questionnaires that have been developed purposefully for Māori, and/or questionnaires that have undergone CCV assessment in this population. People who experience chronic pain in Aotearoa New Zealand are often asked to complete the electronic Persistent Pain Outcomes Collaboration (ePPOC) questionnaires at the start of assessment and during follow-up periods of receiving health services to manage their pain (Lovibond et al., 1995; Nicholas, 1989; Reilly et al., 1993; Sullivan, 1995). The lack of evidence of culturally valid pain tools indicates that pain assessment frameworks used in Aotearoa New Zealand may not be capturing Māori perspectives of pain. Similarly, a previous study challenged the CCV of the SF-36 questionnaire, in particular, the ability of SF-36 to differentiate mental and physical component scores in older Māori (i.e., > 45 years) (Scott et al., 2000). The current findings suggest a need for a culturally sensitive pain assessment framework to be developed for measuring pain in the Māori population.

There are limitations in the included qualitative studies which impact the validity of the results of this study. For example, discussion of the authors' role within the research, potential bias, influence on the study, and arguments against the results were not discussed. Adherence was determined to be of a minimal standard for both studies. However, the results of this evaluation should be interpreted with caution, as the tool adapted for the purpose of this review needs to be further validated. The included studies were determined to be of high-moderate confidence due to minor concerns with methodological limitations (reflexivity was not discussed by Magnusson & Fennell 2011a, 2011b). There were also minor concerns about relevance, as participants from McGavock's (2011) study were recruited from one iwi, and very minor concerns with adequacy due to all three studies having limited quantities of data, yet the data were rich. Coherence was not evaluated as studies discussed different pain types. Magnusson & Fennell (2011a) suggest that current pain measuring tools are sufficient in capturing Māori experiences of pain, but we propose that themes associated with Māori lived experiences of pain need to be integrated for a more effective and holistic approach to pain assessment which is culturally responsive.

Reflexivity allows the reader to gain insight into how the researcher impacted the study from their existing knowledge and perception. For McGavock (2011), the following is unclear: whether she is of Māori descent (she stated that she had an *"…insider status as a Māori…"* [p. 108]), the nature of her affiliation with the iwi/hapū or area, and the extent of her knowledge regarding tikanga Māori. This information is required to determine the quality of KMR, and without this, it is hard to ascertain the validity of the data collected. For example, would Māori who were interviewed feel confident enough to share personal information regarding their experiences of pain with someone of non-Māori descent? Magnusson and Fennell (2011a) did not report on reflexivity within the study, and the sample size was small, consisting of only kaumātua and Māori healthcare providers. Themes developed from a small sample size study and from one iwi within Aotearoa New Zealand may not accurately represent the wide diversity of Māori within Aotearoa New Zealand (McGavock, 2011).

The evaluation of the studies using the adapted kaupapa Māori tool rated the acceptability of both studies as "minimal". This means that the research conducted with Māori did not follow tikanga Māori for conducting research. It is important that research conducted with Māori follows tikanga Māori, so Māori feel comfortable and safe to share their experiences with the researcher. Otherwise, information collected may lack depth and validity, and inaccurately represent Māori interviewed. Although the tool we developed needs to be validated, it does provide a starting point for assessment of the external validity of research undertaken with Māori. There are guidelines on how research should be conducted with Māori; however, there is no tool to determine how well research was conducted in regard to tikanga Māori.

As there are no culturally valid pain questionnaires for Māori, it is important to approach assessment with an holistic view of health. It is essential that concepts of whānau, whakapapa, and spirituality are incorporated for better understanding and the ability to respond more appropriately to the wider context of chronic pain in Māori populations. Clinically, ACC as a funder of pain services, requires patients with pain to undergo initial assessment using the ePPOC questionnaires, which include the Depression Anxiety Stress Scale, Pain Self-Efficacy Questionnaire, and the Pain Catastrophizing Scale. None of the three questionnaires specifically incorporate questions addressing whānau, spirituality, whakapapa, or other Māori holistic views of health. Items in the questionnaires reflecting these themes should be included within ePPOC to better assess Māori experiences of pain and, therefore, provide more effective care for Māori. However, further research is required to develop or adapt a pain questionnaire that is culturally valid for Māori. It is important that the key themes identified here are explored further using kaupapa Māori qualitative research, and the outcomes incorporated within future development and validation of pain assessment tools. These aspects are shown to be an integral part of Māori culture, which provide insight into how pain experience is multidimensional. Aspects of the COSMIN checklist should be used when creating these pain assessment tools and questions that are specific to the themes above. Examples of this might include describing how the translation from Māori to English was achieved, including expertise within Māori communities (i.e., kaumātua);

formulating questions based on Māori experiences of pain; and having multiple reviews of the questionnaire with Māori to ensure relevance. The assessment tools should also be tested and validated with Māori from throughout Aotearoa New Zealand and reviewed iteratively due to the wide diversity of Māori.

This systematic review included a small number of papers, which is consistent with the proposed narrow research question. This allowed for an arguably meaningful outcome. Furthermore, specificity of the search terms was used to highlight the gap in the literature and the need for culturally valid pain questionnaires, while also trying to capture valid Māori experiences of chronic pain. An implication of this is that literature may have been missed which could have provided further insight into the experiences of Māori with chronic pain.

CONCLUSION

With no questionnaire or assessment tool that is culturally sensitive for capturing Māori experiences of pain, a validated measurement tools encompassing the themes identified needs to be developed in order to accurately capture themes which better reflect Māori experiences of pain. A culturally valid pain measurement tool would provide a holistic view and the ability to identify areas affected by pain which cannot be captured in a westernised pain measurement tool. It would, therefore, allow physiotherapists to offer specific support and care in these areas previously overlooked, may allow better use of resources for Māori, and may also provide a talking point for physiotherapists less comfortable or knowledgeable about the KMT.

KEY POINTS

1. There are no culturally valid pain questionnaires for the Māori population.
2. The key themes of whānau, Māori holistic views of health, whakapapa, and spirituality need to be incorporated within pain assessment.
3. More qualitative research using KMR guidelines is required to discover other key themes which may capture Māori experiences of pain.

DISCLOSURES

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PERMISSIONS

None.

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Appendix A

Glossary of Māori Terms

Hapū = sub-tribe

Hauora Māori = Māori view of health

Iwi = tribe

Kaupapa Māori = the Māori way of doing things

Kaumātua = respected Māori elder (male or female)

Manaakitanga = the process of showing respect, generosity, and care for others. *Cultural and social responsibilities* [a]

Mana = prestige/power/influential qualities. *Justice and equity* [a]

Mana whakahaere = governance/ authority/power

Māori = the indigenous people of Aotearoa New Zealand

Matāwaka = Māori living within the area who are not related to the local iwi

Māturanga = knowledge/ education

Nga Ara Tohutohu Rangahau Māori = Guidelines for research and evaluation with Māori

Te Ara Tika = guidelines for Māori research ethics

Te ao Māori = the Māori world

Te reo Māori = the Māori language

Te Whare Tapa Whā = the four-sided house (Durie's model of health)

Tika = right/appropriate. *Research design* [a]

Tikanga Māori = Māori customs

Whānau = family

Whakapapa = genealogy. *Relationships* [a]

Whenua = land/ placenta

[a] How the standard is translated in the Te Ara Tika framework.

Appendix B

Kaupapa Māori Research Grading Tool [a]

Principle/question	Assessment outcome [b]
1. Whakapapa	
Good practice	
1a. What is the evidence for engagement with Māori and what was the shape, time scale, and extent of this?	
1b. How has the consent issue been dealt with, and is the mode of informed consent suggested appropriate?	
Best Practice	
1c Is the use of kaupapa Māori research approach evidenced right through the research?	
1d What degree of meaningful input have Māori had in influencing the shape of the research?	
1e Are Māori participants and their iwi, hapū, and whānau the prime recipients or contributors of results?	
1f What mechanisms are in place to optimise benefits to participants?	
1g Is there an adequate monitoring mechanism?	
2. Tika	
Good practice	
2a How were Māori involved in this project? As researchers, participants, advisors?	
2b How did this research project benefit Māori in all of the above?	
Best practice	
2c Was there adequate participation of Māori in different stages of the research project, including research design, analysis, and dissemination of the results?	
2d Who defined the research problem?	
2e For whom was the study worthy and relevant, and who said so?	
2f What knowledge has the community gained from this study?	
2g What were the positive outcomes from this study?	
2h To whom is the researcher accountable?	
2i What processes were in place to support the research, the researched, and the researcher?	
3. Manaakitanga	
Good practice	
3a Were Māori values or concepts used within this research project?	
3b How were Māori protocols observed as part of the research project?	
3c Were whānau able to support participants within this project?	
Best practice	
3d Were kaumātua required to guide the research team?	
3e How did researchers ensure the safe application of protocols?	
4. Mana	
Good practice	
4a Who benefited from the research, and how was this evidenced?	
4b Were the contributions of mana whenua acknowledged?	
4c Was there evidence of mana whenua goals, aspirations, development, or expectations? How were these measured and by whom?	
4d Where was the research developed and undertaken, and with whom?	
4e Has there been engagement with mana whenua, and in what capacity?	
4f To whom must the researchers report back to besides funders/institutions?	
4g What and where is the relevance to/for Māori in their ongoing development in this research?	
4h Does the research include the achievement of Māori goals as an outcome?	

Principle/question	Assessment outcome [b]
Best practice	
4i Was there evidence of engagement in a meaningful relationship with mana whenua, or iwi researchers?	
4j How does this application protect Māori intellectual property?	
4k Was consent gained to access/use mātauranga Māori?	
4l How was data ownership guaranteed under mana whakahaere?	
4m Whose intellectual property did this research become?	
4n Has mātauranga Māori contributed to the research, and how was this evidenced?	
4o Who owns the data produced/collected/generated during the research?	

Note. Adapted this tool for the purpose of this research.

[a] Refer to methodological section for discussion of adherence to KMR.

[b] Each principle has an associated grade: either "good" or "best" or "minimal". If the principle did not meet either the "good" or "best" grade, it was regarded as "minimal".