

NEW ZEALAND JOURNAL OF PHYSIOTHERAPY

- Physiotherapists in cardiac and pulmonary rehabilitation
- Health care access for hauā Māori
- Reliability of scapular and shoulder EMG measurements
- Using or prescribing mHealth apps in practice
- An online fitness to practise module for physiotherapy students



PHYSIOTHERAPY NEW ZEALAND
Kōmiri Aotearoa

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Physiotherapists in cardiac and pulmonary rehabilitation – sharing the rehabilitation space with clinical exercise physiologists?

EXERCISE AS CORE BUSINESS

Exercise has been central to physiotherapy, providing one of the most effective therapeutic interventions used by physiotherapists to improve the health and function of people with conditions ranging from acute musculoskeletal injury to chronic illness (e.g. cardiopulmonary diseases). As physiotherapists, we aim to maximise the potential of movement, function and quality of life of individuals across the age continuum, regardless of their health condition and complexity, and environment (World Confederation for Physical Therapy, 2015); exercise is therefore core business.

More recently in New Zealand (NZ), there has been a growth in the number and services provided by clinical exercise physiologists whose business is also exercise. Described as individuals who provide ‘specialised’ exercise and lifestyle education to people across the health continuum including people diagnosed with cardiovascular and respiratory disease (Clinical Exercise Physiology New Zealand, a, n.d.), clinical exercise physiologists have begun to share the rehabilitation space in areas such as cardiac and pulmonary rehabilitation.

VACUUM

Current international guidelines for cardiac and pulmonary rehabilitation programmes include a significant exercise component (Alison et al., 2017; Association of Chartered Physiotherapists in Cardiac Rehabilitation, 2015); historically exercise has traditionally been prescribed by cardiorespiratory physiotherapists (Association of Chartered Physiotherapists in Cardiac Rehabilitation, 2018; Best Practice Advocacy Centre New Zealand, 2017). These roles, and by association sustainability of services, are challenged by a decline in the number of cardiorespiratory physiotherapists despite an increasing prevalence of individuals with cardiac and respiratory conditions. Concerns have previously been raised regarding the future of cardiorespiratory physiotherapy in NZ and Australia due to issues with recruitment and retention, compounded by reduced student interest in specialising in cardiorespiratory physiotherapy (Reeve, Skinner, Lee, Wilson, & Alison, 2012). Such concerns continue as demonstrated with less than five per cent of respondents to the Physiotherapy Board of NZ annual 2013/2014 workforce survey indicating they worked full-time in in-patient and less than two per cent in out-patient cardiorespiratory physiotherapy in District Health Boards (DHBs) throughout NZ (Physiotherapy Board of New Zealand, 2016a). Job vacancies in DHBs for experienced physiotherapists also remain vacant, with many DHBs attempting to recruit from overseas (McLean, Valentine, & Shaw, 2017). Challenges relating to present and future numbers of cardiorespiratory physiotherapists, in a context of growing service demands for exercise-based cardiac and pulmonary rehabilitation, have therefore created a vacuum for other exercise-based professionals to fill. This was recently highlighted when, in

February, a NZ District Health Board advertised opportunities for clinical exercise physiologists to provide exercise programmes for people with chronic and complex conditions including cardiac and respiratory (Clinical Exercise Physiology New Zealand b, n.d.). The question raised is, can the rehabilitation space be shared or do we care enough to protect our role?

CREEP

While clinical exercise physiology as a profession is well established in Australia and other countries such as the United States, Canada and South Africa, the profession is just emerging in NZ. In Australia, the growth of the profession has been exponential in terms of graduates and schools; already this trend is apparent in the increased number of universities and institutes providing exercise physiology courses in NZ. This is evident in a report published for Health Workforce New Zealand advocating for the growth of clinical exercise physiologists in NZ with a focus on developing health career pathways (Rankin, 2014). Already privately-owned clinical exercise physiology services are being marketed to cardiac and pulmonary populations, targeting physicians, general practitioners and consumers.

While the opportunity exists for clinical exercise physiologists to extend into the ‘market’ of people with cardiac and pulmonary conditions, the future role and visibility of cardiorespiratory physiotherapists in exercise-based cardiac and pulmonary rehabilitation in NZ already seems less secure. The impact extends beyond current and traditionally held roles but has the potential to impact on undergraduate student placements in cardiac and pulmonary rehabilitation, particularly if physiotherapy and clinical exercise physiology students compete for placement hours. Of note, a minimum of 180 and 120 clinical hours in cardiovascular and respiratory conditions respectively are required as clinical experience for clinical exercise physiology training (Rankin, 2014). While Reeve, Skinner, Lee, Wilson and Alison (2011) have highlighted the need for increased quality clinical placements and educational opportunities to entice more potential graduates into the area of cardiorespiratory physiotherapy, the potential lack of placement availability in areas of cardiac and pulmonary rehabilitation may further negatively impact on recruitment and retention. Consequently, the vacuum may increase and with it the possibility of physiotherapy becoming less visible, to referrers and consumers alike.

INVISIBILITY

There is evidence that the visibility of physiotherapy in current NZ cardiac and pulmonary rehabilitation guidelines and literature has begun to fade, with increased involvement of other professions in exercise-based rehabilitation. Benatar, Doolan-Noble and McLachlan (2016), for example, describe many NZ based cardiac rehabilitation exercise programmes as “generally run by physiotherapists or clinical exercise physiologists who

are qualified to prescribe exercise after a functional test" (p. 69). They also refer to staff qualified to prescribe exercise and provide advice as an "exercise specialist (Physio or clinical exercise physiologist)" (p.69). Of note, this represents a paradox given that as physiotherapists, we can only be called specialists under the specialist scope of practice (Physiotherapy Board of New Zealand, 2016b) yet clinical exercise physiologists are marketed as individuals who both specialise in the delivery of exercise, and also that the exercise is specialised (Clinical Exercise Physiology New Zealand a. n.d.). Further evidence is found in a survey of cardiac rehabilitation in NZ by Kira et al. (2016), who noted that patients were referred to discuss exercise/activity with "a physiotherapist/exercise professional" (p.55). Similarly, some of the literature providing clinical guidelines for Australian and NZ pulmonary rehabilitation make reference to "a physiotherapist or accredited exercise physiologist who is experienced in prescribing exercise-based rehabilitation" (Allison et al., 2017, p. 808).

Yet international best practice guidelines informing Standards for Physical Activity and Exercise in the Cardiovascular Population (Association of Chartered Physiotherapists in Cardiac Rehabilitation, 2015) and Clinical Guidelines for Pulmonary Rehabilitation in Australia and New Zealand (Allison et al., 2017) are written almost exclusively by physiotherapists. This highlights the valuable role of physiotherapists in shaping practice and programmes for cardiac and pulmonary populations. So while physiotherapists may be becoming less visible in some rehabilitation programmes and literature, particularly in prescribing exercise, they remain present in shaping practice at an international level. What is not known is who is currently responsible for exercise components of cardiac and pulmonary rehabilitation in NZ? An area that also requires further investigation is the evolution of roles and responsibility within cardiac and pulmonary rehabilitation in NZ.

THE FUTURE

As physiotherapists, we have tended to 'rest on our laurels' and assume that traditional roles and responsibilities in cardiac and pulmonary rehabilitation will continue. Nicholls (2017) describes the critical point that now challenges physiotherapy and the threat to the long-held status of our profession, and by association, our core business of exercise. The increasing involvement of clinical exercise physiologists in cardiac and pulmonary rehabilitation, particularly with the growing population needs of people with cardiac and pulmonary conditions is one example. The question we must ask ourselves is what are we prepared to do as a profession to remain leaders and exercise prescribers in the areas of cardiac and pulmonary rehabilitation? This may involve rethinking our treatment approach of these populations, promoting and developing physiotherapy expertise in the areas of cardiorespiratory physiotherapy and exercise rehabilitation, and providing quality student placements. If nothing is done, the risk is that exercise as core physiotherapy business, will become the business of others in this valuable rehabilitation space.

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REFERENCES

- Allison, J., McKeogh, Z., Johnson, K., Johnson, K., McNamara, R., Spencer, L., ... Holland, A. (2017). Australian and New Zealand pulmonary rehabilitation guidelines. *Respirology*, (22), 800-819. Doi: 10.1111/resp.13025.
- Association of Chartered Physiotherapists in Cardiac Rehabilitation. (2015). *ACPICR Standards: Standards for physical activity and exercise in the cardiovascular population*. (3rd Ed.). *ACPICR*: London.
- Association of Chartered Physiotherapists in Cardiac Rehabilitation. (2018). *Role of the physiotherapist in cardiac rehabilitation* (2nd Ed.). *ACPICR*: London.
- Benatar, J., Doolan-Noble, F. & McLachlan, A. (2016). Cardiac rehabilitation in New Zealand - moving forward. *New Zealand Medical Journal*. 129(1435), 68-74.
- Best Practice Advocacy Centre New Zealand (2017). *Pulmonary rehabilitation for people with COPD*. Retrieved from: <https://bpac.org.nz/2017/copd.aspx>.
- Clinical Exercise Physiology New Zealand a. Retrieved from <https://www.cepnz.org.nz/>.
- Clinical Exercise Physiology New Zealand b. Retrieved from <https://www.cepnz.org.nz/news>
- Kira, G., Doolan-Noble, F., Humphreys, G., Williams, G., O'Shaughnessy, H. & Devlin, G. (2016). A national survey of cardiac rehabilitation services in New Zealand: 2015. *New Zealand Medical Journal*. 129(1435), 50-58.
- McLean, S., Valentine, S. & Shaw, D. (2017). *Strategic Workforce Services. DHB physiotherapy workforce April 2017*. Retrieved from <https://tas.health.nz/assets/SWS/Workforce/WFA-Reports/DHB-Physiotherapy-Workforce-Assessment-Final-April-2017.pdf>.
- Nicholls, D.A. (2017). *The End of Physiotherapy*. Abingdon, England: Routledge
- Physiotherapy Board of New Zealand. (2016a). *Annual Report 1 April 2015 to 31 March 2016*. Retrieved from: https://www.physioboard.org.nz/sites/default/files/Physiotherapy%20Board%20annual%20report%202015-16%20FINAL_0.pdf.
- Physiotherapy Board of New Zealand. (2016b). *Decision report changes to the specialist scope of practice: physiotherapy specialist*. Retrieved from <https://www.physioboard.org.nz/sites/default/files/Specialist%20decision%20CORRECTED.pdf>.
- Rankin (2014). *University College of Learning Final Evaluation Report – Establishment of Clinical Exercise Physiologist in New Zealand/Developing Health Career Pathways*. Wellington: Ministry of Health. Retrieved from <https://www.health.govt.nz/publication/evaluation-establishment-clinical-exercise-physiologist-role-new-zealand>.
- Reeve, J., Skinner, M., Lee, A., Wilson, L., & Alison, J. (2012). Investigating factors influencing 4th-year physiotherapy students' opinions of cardiorespiratory as a career pathway. *Physiotherapy Theory and Practice*, 28(5), 391-401.
- World Confederation for Physical Therapy. (2015). Retrieved from <https://www.wcpt.org/what-is-physical-therapy>.

Organisational views on health care access for hauā (disabled) Māori in Murihiku (Southland), Aotearoa New Zealand: A mixed methods approach

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ABSTRACT

We report and discuss the findings of a survey of a range of health care providers serving hauā (disabled) Māori in the Murihiku (Southland) region of Aotearoa New Zealand. To explore hauā Māori access to health services, we used a mixed methods approach beginning with a quantitative survey and followed by qualitative interviews. Twenty-nine (58%) completed surveys were returned and we interviewed representatives from 15 organisations. We found all organisations were disability accessible in the physical sense, but were less accessible from a cultural perspective. There appeared a misunderstanding between what could be deemed a non-racial, human rights approach of respect for all people, no matter the ethnicity (“We treat everyone who walks through the door the same”) and the importance of tikaka (customary Māori practice), for services provided for Māori. The most significant proposal resulting from this research was for organisations to have a local, trusted, cultural advisor to regularly discuss and review Māori clients. Individually, health facilities that provide services to Māori should evaluate their cultural awareness, service access and promotion, health information, and service effectiveness. This paper provides insights and suggestions to health organisations, such as physiotherapy services, on how they can improve their service accessibility to hauā Māori.

Hale, L., Bryant, K., Ward, A., Falloon, A., Montgomery, A., Mirfin-Veitch, B., Tikao, K., & Milosavljevic, S. (2018). Organisational views on health care access for hauā (disabled) Māori in Murihiku (Southland), Aotearoa New Zealand: A mixed methods approach. *New Zealand Journal of Physiotherapy* 46(2): 51-66. doi:10.15619/NZJP/46.2.03

Key Words: Disability, Māori, Accessibility, Health Service, Indigenous

INTRODUCTION

Both Article 25 (Health) of the Convention on the Rights of Persons with Disabilities (United Nations, 2006) and the Aotearoa/New Zealand Disability Strategy (2016-2026) (Office for Disability Issues, 2016) explicitly state the right of persons with disabilities to the highest attainable standard of health without discrimination on the basis of disability. One action detailed in the Aotearoa/New Zealand Disability Strategy’s

Action Plan (2014-2018) to achieve this right is to “increase access to health services and improve health outcomes for disabled people” (p.14). In Aotearoa New Zealand it is also an inherent right of an individual to receive culturally appropriate assessment, care and service; this holistic approach meets the Treaty of Waitangi principles of partnership, participation, and protection (Kingi, 2007; Wyeth, Derrett, Hokowhitu, Hall & Langley, 2010). This right extends to hauā Māori (Māori experiencing disability), and their whānau (family). Despite these

fundamental principles, in Aotearoa/New Zealand we continue to be presented with data that identifies that hauā Māori access and utilisation of rehabilitation and disability support services is disparately poor compared to Pākehā (New Zealanders of European descent) (Hickey & Wilson, 2017; Ministry of Health, 2012; Robson & Harris, 2007). This is despite hauā Māori being more likely than disabled non-Māori to have a functional disability requiring assistance (Harwood, 2010). Although there are likely numerous and complex reasons for these disparities, one important influence may be how health and disability services are offered and whether they are appropriately accessible for hauā Māori.

This collaborative project was based in Murihiku/Southland, in the Southern region of Aotearoa New Zealand, and explored hauā Māori access to health services from two perspectives, that of hauā Māori themselves, and that of the services and organisations that support them. The latter perspective is the focus of this paper, where we explicitly wished to investigate how accessible to hauā Māori health services and organisations considered themselves to be. This paper's primary aim is to report and discuss the findings of a mixed methods study with health care organisations serving hauā Māori in the Murihiku/Southland region.

A second aim of this paper is to disseminate our findings to the New Zealand physiotherapy profession. As very little has been published on Māori access to physiotherapy we consider the findings of this study pertinent and informative to physiotherapy practice, even though the research focused on health and disability services in general. We could only find one study that has explored Māori perception of physiotherapy. In 1999, White, Mavoā, and Bassett reported on a mixed methods study exploring the perceptions of physiotherapy of 19 people identifying with the Ngati Tama iwi. Most participants had relatively good understanding of physiotherapy and were of the opinion that it could be delivered in a more culturally appropriate manner. The new Physiotherapy Practice Thresholds in Australia and Aotearoa New Zealand (Physiotherapy Board of New Zealand, 2015) explicitly state that "to practise effectively in Aotearoa New Zealand, a physiotherapist therefore needs, in addition to meeting cultural competence, to understand the relevance and be able to demonstrate contemporary application of Te Tiriti o Waitangi / the Treaty of Waitangi's three principles of partnership, participation and protection and incorporate the four cornerstones of Māori health, which are whānau (family health), tinana (physical health), hinengaro (mental health) and wairua (spiritual health)" (p.10).

As no appropriate questionnaire addressing accessibility of health and disability services in terms of both cultural responsiveness for indigenous peoples and disability could be sourced, we had to develop our own survey questionnaire. We did this by reviewing local and international literature on disability and indigenous populations' health service access experiences. Our survey (available on request) contained five sections, specifically identified by our funding partners as important, related to workforce competencies, quality standards, service effectiveness, access and promotion of services, and health literacy/information needs (The Centre for Health, Activity and Rehabilitation Research (CHARR), 2014).

Recently a new Māori glossary called Te Reo Hapai (The Language of Enrichment) was released for mental and disability services and the word for disability, attained from the Māori disability community, is now whaikaha or tangata whaikaha. Whaikaha means "to have strength, to have ability, otherly abled, enabled" (New Zealand Doctor, 2017). Also recently Hickey and Wilson (2017) have argued for the term "whānau hauā" to be used as an alternative indigenous approach to disability. As our project from inception used the term hauā Māori, we have kept to this language for this paper, whilst acknowledging the new terminology. In Māori concepts of health, the distinction between health and disability is blurred. The notion of "wellness", as opposed to disability, is embraced more as it better encapsulates an individual's ability to contribute to their iwi (tribe) and whānau, reflecting the collective orientation of the Māori worldview (Ministry of Health, 2012, 2011). Harwood (2010) contends that it is up to each whānau to define for themselves who their whānau are. Therefore, our research viewed both Māori experiencing disability and their whānau as entwined and not separate entities, thus a broad perspective was taken within our research, and the terms "disability" or "whānau" were not predetermined.

METHOD

Literature review protocol

A comprehensive international review of the published literature in CINAHL, Medline, Embase, Pubmed, Google Scholar, Web of Science, and Scopus electronic databases was conducted to ask the following questions: With regards to the five identified sections (workforce competencies, quality standards, service effectiveness, access and promotion of services, and health literacy/information needs), what questions have previously been used to investigate the accessibility of disabled / indigenous disabled people to health services? Why is it important to ask these questions? The search strategy involved using the keywords *questionnaire* or *survey* and *indigenous in combination with disability, Māori, health literacy, service effectiveness, quality standards, workforce competence, health promotion, and accessibility*. The terms were truncated where possible. Inclusion criteria required articles to be published between 1 January 2000 and 31 October 2011, to have an indigenous or disability element, to be written in English or Te Reo Māori (Māori language), to have a qualitative aspect or questionnaire included in the study, and to meet the appraisal requirements of the Critical Appraisal Skills Programme (CASP), a tool including ten questions designed to appraise qualitative reports (CASP, 2017). Opinion pieces and quantitative studies were excluded. Titles and abstracts were independently screened by the two researchers (AR, AM) according to above criteria, and full text articles of the studies that met the inclusion criteria were appraised by these researchers using the CASP qualitative research assessment tool (CASP, 2017). Relevant data were extracted by three investigators (AR, AM, KB) and used to form the final questionnaire.

The search resulted in 763 articles, 234 of which were duplicates, and 442 of which were deemed irrelevant after screening the titles and abstracts. The remaining 87 articles were assessed using the inclusion and exclusion criteria, as well as the CASP tool criteria. Twelve studies met all criteria (Bolitho

& Huntington, 2006; Casamassimo, Seale, & Ruehs 2004; Cram, Smith & Johnstone, 2003; Crengle, 2000; Edwards & Merry, 2002; Edwards, Merry & Pealing, 2002; Mead, Bower & Roland, 2008; Ministry of Health, 2004, 2010; Nikora, Karapu, Hickey & Te Awekotuku, 2004; Wiley, 2009; Wilson, 2008) (see Table 1). From these 12 studies we extracted data relating to the questions asked that spoke to their importance related to our project and the reasons the questions were asked. To ensure reliable data extraction, two researchers extracted data independently and then compared (AR, AM), discrepancies and relevance of these data were then discussed and debated with other research team members (KB, LH, SM). Table 1 reports these data as well as the relevance the questions had for our study. Based on review findings of important and relevant questions to ask, our questionnaire was developed. The final questionnaire contained a total of 20 questions (14 closed questions, 6 open ended questions), with several questions on each of the pre-nominated categories (workforce competencies, quality standards, service effectiveness, access and promotion of services, and health literacy and information needs). The questionnaire was discussed at length with our community research partner (Ngā Kete Mātauranga Pounamu Charitable Trust) and our study's Rōpu Kaiarahi (Māori Research Advisory Group), then refined based on their feedback and previous work with hauā Māori in Murihiku/Southland (CHARR, 2014).

Design and procedures

Ethical approval was gained from the University of Otago Human Ethics Committee (Ethics Committee's reference codes 12/028 and 12/175). We utilised a mixed methods explanatory sequential approach (Creswell & Plano Clark, 2011), beginning with the quantitative survey described above, followed by concomitant qualitative interviews among health providers and organisations offering services to hauā Māori in the Murihiku/Southland region. This dual approach was chosen to allow for a more insightful understanding of how organisations perceived their accessibility for hauā Māori and their whānau. Organisations were free to consent to participating in both the survey and the interview, or just in the survey.

We used a broad definition of "organisations" for our survey, namely, any organisation in the Murihiku/Southland region that provided a health or disability service of any nature for disabled people. As no database listing such a broad spectrum of organisations existed, we consulted with our above-mentioned Murihiku research partners and appropriate local stakeholders (such as the Southland district and city councils, known health and disability services, appropriate websites, Māori networks, and local people by "word of mouth") to identify organisations. We identified 66 organisations.

To ensure an adequate response rate to our survey we followed the strategies described in the modified Dillman approach (Dillman, 2007). One author (KB) telephoned all potential providers and organisations explaining the survey and obtaining their consent to mail the survey to them. The survey was posted to 50 organisations, along with an information sheet, a consent form, and a stamped, addressed envelope for return of the

completed survey. Follow-up telephone calls were made one week after the deadline had expired. If organisations so wished, one researcher (KB) completed the survey during these calls.

The survey was followed by on-site face-to-face semi-structured interviews with representatives from consenting organisations. Two researchers (KB, LH) undertook these interviews with the person, nominated by the organisation, who had completed the survey. Using the organisation's completed survey as a prompt, the interviews probed the survey answers in more depth, asking respondents to clarify and expand on their answers. Interviews, approximately an hour in duration, were audio-recorded and fully transcribed.

Data analyses

Survey responses were analysed descriptively in terms of frequency and responses to the open-ended questions were collated. Interview data were analysed thematically guided by the process described by Braun and Clarke (2006). This data-driven process semantically identified patterns within the entire data set. Initial data coding, based on data familiarisation and multiple readings, was driven by the survey questions but subsequent categorisation across all codes allowed for the generation of broader themes. Adhering to our explanatory sequential approach, these broader themes were then consolidated with the quantitatively derived data to identify themes of key importance to the research aim. One researcher (LH) undertook the preliminary analysis. To ensure robustness and trustworthiness of this process and to finalise the thematic analysis and integration with the quantitative findings, findings were discussed and debated multiple times by research team members (KB, KT, BVM), with re-coding and reliability coding checking undertaken. Time constraints however precluded member checking by participating organisations.

RESULTS

Of the 50 surveys distributed, 29 (58%) completed surveys were returned, from medical centres (n=7), community workers (n=1), district nurse or nursing service (n=3), physiotherapists (n=4), Māori health providers (n=4), special needs school (n=1), and other rural (n=3) or town-based services (n=6). Representatives from 15 (30%) organisations were interviewed onsite.

Apart from the specific Māori health providers, most organisations had less than 5% clients and staff that identified as Māori. Over half (n=16) indicated they offered same-day service, and 22 organisations said they worked with disabled people "very often" or "often". All organisations responded that their organisation was physically accessible. Thirteen organisations rated their access as "excellent", ten as "very good", and four as "good".

Table 2 shows the answers to the "yes/no" questions asked in the survey and a collation of the comments written in relation to these questions, and Table 3 indicates answers to open-ended questions. From the survey responses small "good practice" strategies were identified and these are listed in Table 4.

Table 1: Summary of studies included in the literature review

Author, date, article title, methodology	Area explored	Study population	Main findings	Relevance to present study survey questionnaire
Wiley (2009): <i>At a cultural crossroads: Lessons on culture and policy from the New Zealand Disability Strategy.</i>	Analysis of workforce competencies.	Mainstream health services. Four key areas: interviews conducted on Ministry officials, service providers, consumers and caregivers of health care.	<ul style="list-style-type: none"> Discrepancies between staff and consumer perceptions on the quality of culturally appropriate health care given. Inter-service collaboration could aid in the distribution of knowledge about agency activities which could improve consumers' access to health services. Financial concerns as families with disability often have higher health and living expenses. Not one Māori consumer felt that their cultural needs were addressed 	<ul style="list-style-type: none"> Are client satisfaction surveys encouraged to gauge whether the staff cultural training that has been put in place is having a satisfactory and effective outcome on the recipients of the health care?
Qualitative				
Cram et al. (2003): <i>Mapping the themes of Māori talk about health</i>	Analysis of workforce competencies.	Māori consumers of health care.	<ul style="list-style-type: none"> <i>Wairua</i> (spiritual aspect) is the most widely mentioned aspect of Māori Health. Patients view <i>wairua</i> as the key to understanding health and illness as it gives access to the whole person. Important to integrate Māori beliefs into the treatment. 	<ul style="list-style-type: none"> Importance of Māori Health models such as Te Whare Tapa Wha and the influence it can have on patient-provider interaction and treatment.
Qualitative				
Nikora et al. (2004): <i>Disabled Māori and disability supports</i>	Analysis of workforce competencies.	Māori experiencing disability and/or their whānau carers.	<ul style="list-style-type: none"> Māori with a disability and their carers express a desire for Māori health providers. More culturally sensitive staff. Needing financial support as well as increased emotional support when very stressed. 	<ul style="list-style-type: none"> Need to identify percentage of Māori health providers. Identify staff training.
Qualitative				
Bolitho & Huntington (2006): <i>Experiences of Māori families accessing healthcare for their unwell children: a pilot study</i>	Analysis of workforce competencies. Health literacy and information needs.	Māori consumers of health care.	<ul style="list-style-type: none"> Limited research exploring individual experiences of Māori when accessing health care. Financial barriers, doctor's fees and cost of medications. Families feeling vulnerable, 'you don't want to question anything for fear that you may be waiting longer in the queue'. Families did not know whether they should be accessing health services - feel that they are a hassle, or over reacting. 'Is she sick enough to be admitted?' Hesitated to access health services because of previous experiences that made them vulnerable. 	<ul style="list-style-type: none"> Maori are influenced by previous visits to the GP. Unsure of whether 'child is sick enough' to take them to health services; issue of health literacy. Knowing what needs to be seen to. Financial barriers.
Qualitative	Service Effectiveness.			

Wilson (2008): <i>The significance of appropriate health services for Indigenous Māori women.</i>	Analysis of workforce competencies. Service effectiveness.	Māori Women.	<ul style="list-style-type: none"> Whānau, spirituality, traditional and contemporary knowledge is important for health and wellbeing. Nurses must engage in self-reflection on their own practice to increase their effectiveness. Need to include the consumers of health care when measuring cultural competence. Integrate culture into clinical practice. 	Key questions to optimise culturally competent practice include: <ul style="list-style-type: none"> How key beliefs of Māori women are determined. How trust is promoted in the service and building on existing strengths of the patient.
Mead et al. (2008): <i>The General Practice Assessment Questionnaire (GPAQ) – development and psychometric characteristics.</i>	Quality standards.	Data from GP practices throughout United Kingdom.	<ul style="list-style-type: none"> Scales of the GPAQ are internally reliable and that the items demonstrate an interpretable factor structure. 	Key questions asked: <ul style="list-style-type: none"> Ability to get an urgent (same day) appointment with a GP. Ability to get a referral to a specialist when the patient felt it was necessary.
Quantitative (postal questionnaire)				
Crengle (2001): <i>The development of Māori primary care services.</i>	Access and promotion of services.	Report on development of Māori primary care services over past decade.	<ul style="list-style-type: none"> Barriers to care in Māori care services: financial, geographical, transport, lack of knowledge of health issues and how to access information, barriers within the health care system and cultural barriers. 	<ul style="list-style-type: none"> Supports previous findings on barriers to access including inability to receive care at the time needed, limited follow-up and failure to provide information in a way that is appropriate for Māori.
Qualitative				
Ministry of Health (2004): <i>Māori Providers: Primary health care delivered by doctors and nurses: the National Primary Medical Care Survey (NatMedCa):2001/2002 Report 3.</i>	Access and promotion of services. Service effectiveness.	Nationally representative, multi-stage sample of private GP's in New Zealand (28 practitioners at 14 Māori provider practices).	<ul style="list-style-type: none"> Percentage of Māori patients was substantially higher in Māori providers (59%) compared with private GP's (12%) community governed non-profit (19%). Two thirds of patients possessed a Community Services card (CSC). 60% of visits involved writing of a prescription. Three-month follow-up was recommended in 62% of visits, referrals made in 18% of visits and nearly two percent in an emergency referral. Several key questions in the 'Practice Questionnaire' 	Key questions: <ul style="list-style-type: none"> Percentage of Māori staff and patients. Identifying health services provided. Site information: geographical location, including if located in rural area. Financial: standard charge for patient including with CSC.
Quantitative (survey)				

Edwards & Merry (2002): <i>Disability Part 2: Access to dental services for disabled people: a questionnaire survey of dental practices in Merseyside.</i>	Access and promotion of services.	157 general dentist practices in Merseyside, England (response rate 81%).	<ul style="list-style-type: none"> • Although dentists were willing to treat disabled patients, few dental practices were accessible at the time of the survey - only one third of practices reported having a fully accessible surgery. • Key issues: physical barriers, lack of time and lack of domiciliary equipment. 	<ul style="list-style-type: none"> • Physical accessibility of the health care facility.
Quantitative: Two-page postal questionnaire				
Edwards et al. (2002): <i>Disability Part 3: Improving access to dental practices in Merseyside.</i>	Access and promotion of services.	Follow-up to the previous postal survey – audit of 27 general dentist practices in Merseyside, England.	<ul style="list-style-type: none"> • Disability awareness training can help in understanding of disabled people's needs and break down some barriers. • Attitudes are just as important as physical premises in improving access. • Provided simple changes for practices to improve access regarding attitudes of staff, health and safety issues, parking, ramps and handrails, reception, seating in the waiting room, hearing and visual impairment. 	<ul style="list-style-type: none"> • Attitudes of practitioners. • Physical barriers: many practices had designated parking but did not have a disabled space, lack of ramps and handrails.
Qualitative (audit)				
Casamassimo et al. (2004): <i>General dentists' perceptions of educational and treatment issues affecting access to care for children with special health care needs.</i>	Access and promotion of services. Service effectiveness.	National survey in America of general dentists to determine overall care of children with special health care needs (CSHCN) (n=1251, response rate 24%).	<ul style="list-style-type: none"> • Dentists with hands-on educational experiences in dental schools with CSHCN were less likely to consider such factors as level of disability and patient behaviour as obstacles to care and were more likely to desire additional education in general practice or advanced general dentistry residency had no effect on willingness to care for CSHCN. 	<ul style="list-style-type: none"> • Need to ask providers if they provide care for disabled and if so, how often. • Barriers to willingness to treat also identified, e.g. level of disability, patient behaviour, funding.
Qualitative (survey)				
Ministry of Health (2010): <i>Kōrero Mārama: Health Literacy and Māori – Results from the 2006 Adult Literacy and Life Skills Survey</i>	Health literacy and information needs.	Māori consumers of health care.	<ul style="list-style-type: none"> • 4/5 Māori males and 3/4 Māori females have poor health literacy skills. • People with poor health literacy are less likely to access health services and more likely to be hospitalised or attain chronic conditions. • Building health literacy can be achieved through clearer communication from health professionals, providing plain language health information. 	<ul style="list-style-type: none"> • How do you ensure that the information you provide to patients is clear and easy for patients with poor health literacy skills to understand?
Ministry of Health research report				

Table 2: Responses to “yes/no” questions (n=29)

Questions	Yes	No	No Response
Does your organisation make home visits?	26 (90%)	3 (10%)	0 (0%)
Has your organisation ever included Māori in the development of services and/or policy review regarding Maori with disabilities?	11 (38%)	14 (48%)	4 (14%)
Amalgamated specific comments made:			
<ul style="list-style-type: none"> • Not specifically at this level, as this is done at a national / central level. • Have attempted to attract Māori on to the organisation’s Trust but with little success. • Our founding nurse specialist was Māori. • I receive cultural supervision regularly whereby I discuss all Māori clients and the work I do with them. • Have had advisory group in the past and a presently have a board member who is Māori. • Room for improvement, pockets of resistance / lack of understanding, stigma of institutional racism. • Intend to. Have been thinking about it; it has been mentioned to the new Board. • Doing "cornerstones accreditation" therefore will have to. • Not to a great extent. The rural education process is co-ordinated with the Māori warden process. 			
Do you ask clients to provide feedback regarding the services you provide?	17 (59%)	8 (27%)	4 (14%)
Amalgamated specific comments made:			
<ul style="list-style-type: none"> • Comments/complaints form available, online and hard copy. • All seem to be happy with level of service. • Not specifically at this level, as this is done at a national / central level. • Complaints mostly a lack of understanding from patients, worries around privacy. • Asked about transport vouchers. • Difficulty with whānau acceptance, gaining trust, letting Māori clients know that you care. • Thinking of developing Māori specific survey. • General comments via reception. 			
Does your organisation have someone who specifically addresses issues regarding Māori?	12 (41%)	13 (45%)	4 (14%)
Amalgamated specific comments made:			
<ul style="list-style-type: none"> • Not specifically at this level, as this is done at a national / central level. • We have a Māori representative who we can consult with. • Māori health service. • Number of Māori advocates. • We ask someone external to our organisation to come in. • A staff member whose husband is Māori. • A cultural supervisor. 			
Does your organisation provide education to build understanding, awareness, Tikanga Māori and cultural sensitivity among staff to improve services to Māori with disabilities?	15 (52%)	9 (31%)	5 (17%)
Specific comments made:			
<ul style="list-style-type: none"> • Cultural study days a requirement. • Organisation does not provide but encourage staff to attend training sessions organised by others. • I receive training in cultural awareness periodically when it is available. • Part of training - all new workers. • Bring in Maori liaison officer - about once a year or as required. 			
Does your organisation know how to access expertise to provide education to staff on Tikanga Māori / things Māori relevant to your service?	23 (79%)	2 (7%)	4 (14%)
Are you a "Māori provider"? (i.e. eligible for Māori provider funding)	5 (17%)	1 (3%)	No response = 3 (10%) Not Sure = 8 (28%)

Table 3: Collated answers to survey open ended questions

Please describe what is done well (No responses=3)	Please describe what needs improvement (No responses=6)
<p>Service accessible to all (n=12).</p> <p>Good relationship with local Māori health providers (n=5).</p> <p>Employment of Māori in service (n=2).</p> <p>Engagement with whānau, making sure that they are seen and their wishes respected.</p> <p>Governed by tikaka, Māori values of Te Ao Māori manakitanga whanaungatanga aroha.</p> <p>Accept texting, offer text reminders, difficulties getting secondary disability, do not charge for 'no shows', try to see people quickly, aware of shearing work.</p> <p>Time, flexible, communication styles, good at building relations.</p> <p>Well educated cultural competencies, know community well, they know us, especially shearing community, medical Māori wardens available.</p> <p>Open door policy, Māori support person, onsite services, whānau orientated, talk "parent talk", plain language. Teach haka, Karanga, weaving, poi making, kapa haka, PolyFest, visit to Maraes, include Māori culture in staff development.</p> <p>See very few Māori.</p>	<p>Getting out to community and get to know Māori whānau (n=9).</p> <p>Get government departments to travel out to our area.</p> <p>Better systems of identifying Māori.</p> <p>Workload does not support extended hours. Community needs assessment could identify if further services are required.</p> <p>Home visits would not be usual practice - only under special circumstances</p> <p>Improve patient access to transport.</p> <p>Improve communicate with clients.</p> <p>Improve education of clients.</p> <p>Having flexible hours for working e.g. hours suiting dairy, shearers and other rural workers.</p> <p>Improve follow-up of 'no shows' or instigate a drop-in service, better referral to Māori health providers, flexible time, set up Maori specific services.</p>
What does "Whānau Ora" mean to your organisation?	When treating Māori clients, how do you integrate their cultural beliefs and whānau into the treatment?
<p>Integrated approach to health and social services empowering whānau to work together (n=3).</p> <p>Vague, something to do with - whānau / family / togetherness approach (n=14).</p> <p>Not sure at all (n=3).</p>	<p>Acknowledgement and referral to te Korowai Hou Ora service at Southland Hospital.</p> <p>We deal with each client on a personal level.</p> <p>Non- specific, respect their wishes.</p> <p>Asking - what / how they want treatment done, do they want a support person (n=8).</p> <p>Form a relationship, find common ground, courtesy, different pillows for head/feet, comfortable with practice.</p> <p>Reminders, contracting, dialogue, opportunistic communication with whānau.</p> <p>Areas of improvement, understanding Wairua and whānau/iwi/tribal.</p> <p>Respect cultural differences, consent to touch head/face, different pillows for heads.</p> <p>Māori elder will be contacted around death.</p> <p>Would engage the Te whare tapa wha model.</p> <p>Ensure you pronounce a client's name correctly.</p>

Table 4: Identified small “good” practices or strategies known to enhance accessibility reported by organisations

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| <ul style="list-style-type: none">• “no hesitation in referring client on”• “very accessible during clinic hours”• “offer a range of services”• “within walking distance of bus routes”• “easy parking; no steps”• “use texting messaging to communication”• “fax through scripts if client cannot get here”• “discuss payment of account if problematic” | <ul style="list-style-type: none">• “don't charge for 'no' shows”• “try to see people quickly”• “onsite services”• “advertising / communicating / networking”• “open door policy”• “time, flexible, communication styles, good at building relations” |
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Consistent with our mixed methods approach, the integrated survey and onsite interview findings are presented below as a thematic analytic narrative, illustrated by quotes from the interviews. To preserve the anonymity of our participant organisations, we have not identified the interviewee's name, position or health provider worked for. The integrated analysis resulted in four key themes: (1) general insights, (2) what organisations are doing well, (3) what some of the “issues” were, and (4) methods suggested by organisations for improving access.

General insights

Some organisations focused more on the ‘Māori accessibility’ perspective of the questions, as opposed to ‘disability accessibility’. A frequent first response to our question was that the organisation did not specifically do much for Māori as they “treated everyone equally” and “did not discriminate”; they were “colour blind” “Um, well I mean I guess that they are treated like every other patient.” So then, when asked how accessible they thought their service was for hauā Māori, the general response was: “I’d probably say good or very good because I don’t think we discriminate.”

When asked if someone in the organisation specifically addressed issues regarding Māori, unless they were a Māori health provider or were part of a Ministry of Health related department, the answer was usually negative. One common response from providers was that they sensed that local Māori were not particularly involved in their culture: “...so although I may see you know Māori, in terms of how they live, they’re probably not very Māori and they don’t tend to have, you know they’re not strongly involved in marae or any of that ...”

Whānau involvement was considered, and some organisations had pamphlets that advocated for and invited whānau to accompany the person receiving the service. Providers stated this offer was largely taken up by whānau accompanying young people.

The process of going through the survey with organisations in an interview format did make some people actually think more about ways in which accessibility could be improved for hauā Māori, with responses such as “You’re right, it is thought provoking” and “Yes well, look, it’s certainly awakened my ideas to actually go out there seeking ...”

Generally, unless the organisation was specifically a Māori health provider, the percentage of Māori clients seen was low (about 5%), as were the number of Māori staff employed (0 - 2 staff members). This said, a number of organisations only had one or two staff in total. The reasons why so few Māori accessed their service had either not been thought about by the organisation or was unknown: “Well I don’t think they access as much as, as the general population.” For example, one reason for why it was thought the shearing gangs were not accessing health services was their ‘tough’ nature, their resilience:

I know there’s a lot of percentage of Māoris down here ... I don’t know the [reason], it’s a real community and a lot of the Māoris that work in rural communities, just tough shearers and tough people that don’t, don’t wanna to come to treatment I suppose.

What were organisations doing well?

All organisations had adequate to good physical access; their premises were wheelchair accessible and disabled toilets were available. Most organisations were on the ground floor with good parking facilities and access via ramps. Those on the first or second floor had accessible lifts or facilities they could use on the ground floor for disabled clients. Signage, for some organisations, could be improved to promote accessibility, in that it was not easily seen and/or was only in English.

All organisations said that they did, or could, provide home visits as they considered that home visits increased accessibility, albeit frequently from the perspective that the person was too ill or incapacitated to come in, as opposed to the person’s cultural choice to be seen in their home environment. For some organisations, providing home visits was not considered to be cost effective.

Most people who required a health professional were seen quickly, within a day or two, but it depended on the nature of their complaint or their location. Rurally-based people were likely to wait longer to see a health professional.

Most organisations said they collected ethnicity data. Some organisations asked clients on their first visit about their ethnicity: “They are generally asked, you know how they identify, you know whether they identify as Māori or not, and we don’t, you know, like, presume”. Some organisations felt

awkward asking this question and so assumed ethnicity based on appearance or name: *"I don't always, um simply because it just doesn't feel right to ask I just see people as people..."*

"The Issues"

Lack of funding to provide a good accessible service was raised on a number of occasions: *"a lot of things that we could do, we can't 'cos we haven't got the resources, the people working on it."* Services said they were underfunded and this made them feel undervalued, and yet they were expected to do things differently, and have training to do this, with no extra financial compensation. The expectation was that they would *"work smarter"* and reduce duplication of services.

Access to funding for transport for disabled people to access service providers was problematic, especially in the rural areas, even though some funding, in the form of taxi vouchers was available via Accident Compensation Corporation and Primary Health Organisations: *"you know, like the transport, which has been an issue for like 30 years that I've been around, anyway."* In one rural area, St John's Ambulance service provided transport for a donation, mostly funded by a charitable organisation. Although considered a valuable service, the financial model was felt to be not really viable in the long-term.

One issue raised in small-town Murihiku/Southland, was the over-familiarity of people in the community with each other, and that this could result in people not thinking about accessing services when they probably should:

... it is a fairly tolerant community with all the disabilities which can be good and bad at the same time, good in fact that you know everybody can just sort of get around their business no matter what sort of disability now but um, being in the way that it can take quite a while for somebody to notify services if they sort of see something, because it is just like, "oh that is so and so .. they have always been like that."

A disability advocate also referred to the *"over-familiarity"* issue:

.... particularly with those that are, have been, their whole lives have been managed by others and they haven't had much say in their own life and what's going on, it's an empowerment thing for them too to be able to actually say "hey I don't want to be doing this anymore, I would like to be doing this instead"

Some organisations were doing an excellent job of being accessible for Māori and whānau, but had not really considered their accessibility (other than physical factors) for those experiencing disability, or even considered that they served people who had a disability:

Definitely our ability to articulate disability issues more fluidly. We never know whether we're talking with a person who has a disability or a disabled person who's blind, or, so our language needs to improve and probably the scope of the services.

Suggested ways to improve accessibility

One provider summarised eloquently what was important to make their service accessible for Māori:

Well bricks and mortar aside, I think it's time, I think it's about having the time and taking the time. I think it's also about being flexible and nimble in your approach. I think it's about having very strong communication skills orally. Written and perhaps in a non-audio way as well But I think overall it's about taking time to build relationships.

To many Māori, whānau is all-important, and for a service to be accessible it was considered fundamental that this be acknowledged: *"It is, it's just whānau always comes first."* Being *"whānau-centred"* and *"whānau-led"* ensures good accessibility.

Because a lot of whānau would say that they've never had an opportunity to do that necessarily in other agencies. We're very committed to taking our whānau with us. They help shape our services. For example, we would not be extending Mirimiri massage services, without whānau having told us that's what they wanted.

Further, to enhance accessibility, knowing how to contact whānau was important: *"The thing that could help you provide, be more accessible to Māori experiencing disability would be to know where and how to contact Māori whānau?"* However, some providers expressed frustration with misunderstandings with the Privacy Act and accessing patients and whānau. Some organisations said that contacting whānau can be an issue in Murihiku/Southland, where due to the past itinerant-nature of many Māori living in Murihiku/Southland, there is often a lack of whānau for the older generation.

According to the organisations interviewed, a good place to start improving access for Māori was to build relationships with the Māori community: *"She told us that we need to form a relationship first, and she said you know find out about the person and get them to, tell them a little bit about themselves then tell them about yourself..."*

Interviewees felt it was difficult to maintain relationships with communities if you were not directly in them; a physical presence was considered important. Living in a small rural community was considered advantageous to building relationships: *"I think probably our best asset is that we know our community really well, and we know our Māori patients and they know us, so that they're accepting of us as treatment providers."*

Developing links with the local rūnaka (Māori sub-tribal council) was also thought to be a good practice: *"We have got the local rūnaka that we sort of link in with and the team long ago were welcomed on to the marae so we were considered family if you want to sort of call it that."*

Some interviewees said that to inclusively improve accessibility for hauā Māori and their whānau, an important strategy would be to ask the hauā Māori what they wanted and saw as important: *"Yeah...asking the community what do they want... or need."* It was felt that consultation hui to get feedback from disabled whānau as to what they see should be happening; having consumer advisory groups and gaining direct feedback from stakeholders was the best way to get information to improve access: *"Heard excellent things from whānau – as it is what they want – solution and responses are often a lot simpler than what the organisations think they should be."*

The most frequently cited suggestion by people interviewed was that service organisations should market what they offered to both the Māori community and Māori health providers:

I don't know whether it would be um, more awareness around our services. Because a lot of people think you know if you go to any of the societies not just [Name] but all those ones that it is all about support groups and we need to get away from the image because that is just, you know a sideline of what we do.

Interviewees felt that networking between organisations should be improved so that clients were appropriately referred and resources shared, especially in rural areas where resources were limited. Some providers had developed memoranda of understanding with each other to facilitate this process. Although many organisations did this, it was felt by some of those interviewed that improved communication would further assist the process:

Communication is always one that can be better, I mean um, we have these memorandums of understanding and we do liaise quite a lot but of course being rural services too we are short in resources and you know it [communication] is the last thing down on the priority list until it, something happens so to speak.

Some interviewees stated that fundamental to ensuring accessibility was to provide clients with choice, in particular choice about where they would like to be seen:

All about connecting whānau to resources, ideas, energy, the energy being staff, for wellbeing and independence, and with a philosophy like that, it's presumptuous to think that people then would have to come into your agency to do that. It's more about, for Māori, kaupapa driven Māori, is being where our people are, or where they say that they would like to receive the support we can do service in a home environment, or a community setting of a person's choice.

There were ambiguous responses to providing services on local marae (Māori meeting houses) in Murihiku/Southland. One provider said that:

We find that probably about 95% of our clients would prefer either to come here or we go to them, to their home, which shows that there is a lot of disconnect between Māori and marae based service delivery. And that's for lots of reasons. People have come here, moved to Invercargill, they're disconnected from their own manawhenua, or you know, grass roots if you like, flax roots. And so urban Māori are less likely, particularly if they're not from here, to be involved with a marae.

However, another Māori service provider thought that the marae was important to Māori; this provider suggested that although Māori in Murihiku/Southland had come from diverse areas and iwi, and although there might be slight differences, many of the processes, the tikaka (customary Māori practice), were similar on most marae and this made whānau feel at home. The marae can be a central point of wellness, even though the

person may not come from the area. This organisation was keen to encourage more activities at the marae, for example, health clinics and programmes for young people, and this may be more optimal than a home visit for some. This provider did acknowledge that it depended on individual preference, and that some Māori did not want to go to the marae.

According to many of those interviewed, the key to working with disabled Māori and whānau was flexibility, especially with regards to time:

.....but I think there are some things about accessibility that are for some um, that are around time and concepts of time...." "Yes I think you're right and so the way that we run our schedules, which is important because we need to, but unfortunately that doesn't work within a different cultural value...

An important cultural value was given to time: "Cultural aspect of time which is a gift, when you're here gifting your time so time is about quality of time rather than being on time, yeah." Cultural concepts of time led to a discussion around being flexible / tolerant with regards to appointment times: "I mean sometimes people have difficulty coming because of their disability.....or their life is sort of in chaos..." The provider with whom this discussion was held said that she used a number of strategies in an attempt to be flexible, for example, being understanding, using texting to confirm appointments, not charging for 'no shows', and trying to see people after hours if necessary. As another provider summarised:

I think it's more important for our Māori whānau that we can be where they want us to be Because a number of our whānau who say they have a disability usually want more of our time than, I mean there is no way we would do 15 minute time slots on anything they require more of our time and listening ear which is fine. It's absolutely fine.

Organisations said that important to improving accessibility is showing that the service really cares for their clients. One respondent told the following story to illustrate this point:

I think another thing that I, and I should've perhaps become more aware earlier, is that I think that sometimes I really need to show those Māori clients that I do care and I want them to come I had one woman I was actually talking with someone and waiting for her to come and I didn't realise she'd come and she could hear that I was talking with someone, well she just left. Now this is a woman, was in her 50s, you know she was really just struck with her worthlessness and she left and said oh that's alright you know, and I think that sort of, I learnt from that that perhaps with those Māori clients, I have to go a little bit further so that perhaps if they don't turn up, then I do, I follow them up because otherwise they think they're just not important enough and they will just sign themselves out.

Some organisations talked of the unfortunate home environments, linked with racism, that some of their disabled Māori clients had experienced and had left these clients feeling disempowered. This was elaborated at length by one interviewee:

But I guess when you're abused and as children, you just grow up believing, and but absolutely they'll say, you know I'm nobody, I'm worthless, I'm not important ... and that really gets in the way of them accessing services for them and that's where they need to, I think if they're treated by someone who says, well I think you're important, I don't care what you think but I think you're important and I think you should be here... cos I don't think people necessarily expect you to care and in a way you have to really go, you have to go the extra mile to let them know that you do actually care... and if you care, you will hang in there or you will continue to make a follow-up And if you don't do that, then you're just another Pākehā who doesn't care about me or about Māori.

The above quote also highlights the importance of following up Māori whānau, especially if they “no show”, a strategy considered important to Māori in terms of accessibility and responsiveness to their concerns.

Many interviewees felt that the provision of information to clients could be improved. Whilst brochures were readily available in most services, and often in a number of languages, most of the information was provided in a written format. Most organisations however said they would prefer to use the brochures in a one-to-one session with the client, rather than just let the client take the brochure home to read, as this allowed the opportunity for questions to be asked and to ensure understanding of information provided. There appeared to be a need for more diverse forms of information, other than written forms. Some of the ways suggested by interviewees can be seen in Table 5. Although having brochures in different languages was considered a good idea, it was problematic when the person providing the information could not read the language of the brochure: *“I think we have brochures in about 25 different languages in a folder that we can access, I mean we can't read them but we can access them.”*

Table 5: Interviewee suggestions of diverse ways to provide information

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- Demonstrating information (e.g. teaching of exercises).
 - Ask clients to repeat the information provided to check understanding.
 - Having large print brochures available.
 - Use of interpreters. Most organisations had access to a list of interpreters or would contact the citizen's advice bureau or the local hospital for more information.
 - Contact other services organisations, such as the Blind Foundation or Deaf Aotearoa as necessary.
 - Asking the caregiver or their family member to be an advocate.
 - In-house training on sign language and interactive drawing techniques (“so people can draw their thoughts down if they can't talk them out loud”).
 - Ensure information is provided in plain language.
 - Web-based information.
 - Text messaging.
 - Facebook.
-

Many organisations asked clients for written feedback but this was usually submitted anonymously and did not include ethnicity data, so no organisation could really recall receiving any Māori specific feedback or identify such feedback. One suggestion made was to develop and use with clients a Māori specific health feedback of services questionnaire.

One organisation felt however that it would be hard for Māori clients to give negative feedback and she would rather raise the issue directly with a client if she perceived there to be a problem:

I think that's really, you know it would be really hard for them to give me negative feedback ... and so if I perceive it as an issue yeah I'd raise it there. It is more a case of asking, yeah. It's not assuming anything.

Many of those interviewed referred to cultural competency. Most people did undertake some form of continuing education, and this had included sessions in cultural competence. A number of private practices (General Practices, Physiotherapists, Nurses) had in-service cultural training sessions and invited people in to provide these sessions, or they attended the local district health board, health trust, or their professional society training sessions.

With regards to cultural competence training, people mostly referred to specific culturally acceptable protocols, for example, using different pillows under heads and feet in physiotherapy practice or asking permission to touch. This narrowly framed perspective of cultural competence is illustrated by the following quote:

I used to always think, oh Māori culture, here we go again, you know but when they talk about you know the Māori sensitivities, nobody really actually said what they were And you are thinking right well what would be insensitive to them, nobody, you know all the workshops we went to nobody ever said or what the protocol is you know around, around funerals or being a patient in hospital, nobody had ever said you know.

This focused approach was different to the more encompassing approach taken by Māori service providers, summarised by one provider as:

No, very much...really around...our values...our Māori values. It's not just about tikaka...you know, tikaka's based on our values that were based around te reo Māori...so you know, whether it's whanaungatanga...manaakitanga...all of those good things...the principles ...yeah...and aroha.

In general, when asked about being culturally competent, those interviewed said it was about asking the client what they would like: *“we do try and suss out any needs or if we're not sure, we ask.”* *“Ah, basically if you just say what you're doing, is that OK, with you, and you give them the option.”* Some organisations were more specific about this:

.... because everybody is still individual, and so we ask them. You know, are you open to Māori models of practice? Would you like to know more about Te Wheke, or Whare Tapa Wha ... Checking how they want to be responded to, or engaged with, so, you know, but we are Māori. So you know, if they

want karakia, we'll do karakia, if they don't, we don't. If they want hello instead of kia ora, well that's fine. We're not about pushing something on somebody, but we do have assessment tools that are Māori flavoured, and you know, meet, greet, seek is all about whanangatanga, it's about making sure people feel comfortable. A lot of people are surprised that they get offered a hot drink or a cold drink, or, we just say that's part of our process, so yeah.

One suggestion made was for organisations to have a local cultural advisor, with whom they could regularly discuss and review Māori clients. The interviewee went on to say that a local cultural advisor would have local Māori knowledge, of whakapapa, which would help build relationships and trust with Māori, and this could be difficult for those who do not have such knowledge:

I think that the areas where I am perhaps not, you know is that sort of involvement of, or that awareness of whānau and spiritual things, I think that's where I would be inadequate and I probably wouldn't know of the sort of, have a sense of where people's history of their iwi and that might be 'cos that doesn't, and I sort of, I don't, I guess in some ways I can't see the relevance of that, but that's because I'm not making those cultural links and I'm probably never going to...

Although all organisations were disability accessible in the physical sense, interviewees felt that much could still be done to make the accessibly inviting from a cultural perspective. One provider summarised the important aspects of this:

What people say they like about coming here, is the meet, greet and seek process. Is, often you know, the accessibility to myself, because I have my doors open, most of the time and I like to mingle with our.. our whānau that come in and the things that I listen for, they say oh it's really warm here, and I go are we talking about the heating? And they go no we're not, we're talking about something else. That I think is more important than a flyer on the wall. But the flyer on the wall needs to be there too. But moreover, more overly important is the relationships and taking the time and ensuring that we're understanding and having you know, a proper exchange of information. And that we are meeting their needs.

DISCUSSION

This study explored, in one region of Aotearoa New Zealand, hauā Māori access to health services from the perspectives of the services and organisations. We found that all organisations were disability accessible in the physical sense, but were much less accessible from a cultural perspective.

In the literature reviewed to develop our survey, one pertinent issue in analysing workforce competencies was the under-representation of Māori in the health professions leading to an often unfulfilled preference for Māori clinicians or providers (Bolitho & Huntington, 2006; Nikora et al., 2004; Ratima et al., 2007; Wiley, 2009; Wilson, 2008). The physiotherapy profession is no exception: of the 6,654 registered physiotherapists in 2017, only 4% were Māori (Physiotherapy Board of New Zealand, 2017). Our survey findings reflect this under-

representation. One implication of this is that non-Māori staff are less likely to understand Māori concepts of health (Cram et al., 2003). There is a need for culturally appropriate staff to be involved in the development of services or policy, to ensure tikaka Māori practices and to meet the obligations of the Treaty of Waitangi (Cram et al., 2003). Although this is vital to registration of most health professionals, including physiotherapists (Physiotherapy Board of New Zealand, 2015) in Aotearoa New Zealand and is embedded in health professional training (for example, Physiotherapy New Zealand have online cultural competence resources for members), whether the theoretical attainment of knowledge truly transfers into everyday practice is debatable. Further, cultural competency of staff extends beyond that of the health professional staff. Some organisations were attempting to address this issue by having Māori representation on their Boards or Trusts, by consulting with Māori wardens, or via practice accreditation processes, practices that physiotherapists could consider to enhance their accessibility to hauā Māori. Whilst organisations encouraged staff to attend cultural training sessions our survey did not explore whether this action actually increased cultural knowledge and sensitivity of staff; this issue would benefit from further research.

Funding was an issue, especially for the many rurally located services surveyed, and prevented services from being offered optimally; a finding not unlike those identified by Wiley in 2009. Wiley (2009) reported service providers' concerns of the challenges of raising awareness of and access to their services to hauā Māori living rurally. In terms of service effectiveness and reducing disparities, the inadequate timing and availability of services and appointment systems was a common theme from the literature review but these issues were not apparent in our survey results or interviews. Health information was generally available, and organisations said that staff had face-to-face interaction with patients to check their understanding. Many organisations asked clients for written feedback but this was usually submitted anonymously and did not include ethnicity data, so no organisation could accurately recall receiving any Māori specific feedback or identify such feedback. One suggestion made was to develop and use with clients a Māori specific health feedback of services survey.

Another suggestion arising from the survey was for organisations to have a local cultural advisor, with whom they can regularly discuss and review Māori clients. Further, a local cultural advisor should have local Māori knowledge, which would help build relationships and trust with Māori, as this can be difficult for those who do not have such knowledge. Although not a novel recommendation, it is one worth emphasising (Hickey and Wilson, 2017; Hollinsworth, 2013; King, Brough & Knox, 2014).

Many organisations appeared to not fully understand their Treaty of Waitangi obligations. There was a misunderstanding between what could be deemed a non-racial, human rights approach of respect for all people, no matter the ethnicity, and the importance of tikaka for services provided for Māori (Cram et al., 2003; Hickey and Wilson, 2017; Hollinsworth, 2013; King et al., 2014). "We treat everyone who walks through the door the same" seemed to be the policy applied. As we probed

during the interviews, we frequently saw the “light bulb” moments when our questions made organisations think about how they could perhaps improve accessibility and make services welcoming to all, especially hauā Māori.

Health and disability accreditation of a service was considered to be one way of ensuring organisations took their Treaty obligations seriously and were accessible to those experiencing disability. For those organisations subject to accreditation, cultural competency was compulsory for all staff. Appointing a quality assurance person to assist in disability access was also suggested. For Māori and governmental service organisations, tikaka (customary Māori practice) is explicit. Values governed by tikaka include aroha ki te tangata (respect for people), he kanohikitea (face-to-face communication), titiro, whakarongo kōrero (look, listen, speak), manāki ki te tangata (looking after people), kia tūpato (caution), kua e takahia te mana o te tangata (do not trample on the spirit of people), kia ngakau mahaki (be humble) and whakawhānaungatanga (making connections) (Smith, 1999).

A strength of our study was the 58% response rate, considered good. A study which investigated response rates to surveys used in organisational research (n=1607 studies) reported that the average response rate was 35.7% (SD18.8%) (Baruch & Holtom, 2008). Furthermore, we had responses from a diverse range of services and locations. That said, in spite of our good response rate, a limitation may be that participating organisations inherently consider themselves to be more culturally responsive. We acknowledged that as our study focused on one region of Aotearoa New Zealand, the findings can be considered informative but not representative of Aotearoa New Zealand per se, especially as each region will most likely provide services in different ways and have in themselves nuanced cultural differences.

Recommendations

The survey provided valuable information that led to deeper exploration and probing of participants and organisations during the onsite interviews. The process of going through the survey with organisations in an interview format did make some people think more about their Treaty of Waitangi obligations and ways in which accessibility could be improved for hauā Māori. This methodology could be utilised in other organisations, such as physiotherapy practices and services, where indigenous peoples are being cared for, and international results would be interesting to compare.

To their credit, all organisations expressed interest in our study findings so they could learn how to better meet the needs of hauā Māori clients. Thus, it is possible that the process of this research itself sparked increased cultural awareness and a renewed interest in access issues among those surveyed and interviewed. In this case, a good place to start improving access for Māori would be to build relationships with the Māori community. Developing links with the local rūnaka would be considered good practice, as would asking the disabled community what they want. Physiotherapy practices might consider not only advertising their practice in the traditional way (e.g. website and newspaper presence), but actually going into the community and beginning dialogues as to what our

profession can offer and what it is that hauā Māori wish. Such community interactions truly give credence to Hickey and Wilson's (2017) proposition of Whānau Hauā, a model of health care that is holistic, relational, and collective in nature and encourages health professions to reach out into communities. To this end, a consultation hui to gain feedback from disabled whānau could be implemented, as well as having consumer advisory groups. User satisfaction evaluations which specifically target hauā Māori are recommended.

Networking between organisations should be improved so that clients are appropriately referred and resources shared, especially in rural areas where resources are limited. Some providers had developed memoranda of understanding with each other to facilitate this process. It was felt that improved communication would further assist current processes, and taking a larger step and appointing a local cultural advisor would demonstrate real commitment to developing greater responsiveness to hauā Māori utilising disability and health services.

Some organisations focused more on the ‘Māori accessibility’ perspective of the questions, as opposed to the ‘disability accessibility’. A frequent first response to our question about accessibility was that they “treated everyone equally” and “did not discriminate”. When asked if someone in the organisation specifically addressed issues regarding Māori, the answer was usually negative unless they were a Māori health provider or were part of a governmental department. One common response was that “local Māori were not particularly involved in their culture”. For genuine progress to be made, such assumptions need to be challenged. For example, the attitude that the local marae was not important to Māori was not a view shared by survey respondents who were Māori, or who were representing Māori, and demonstrates a failure by mainstream services to recognise the importance of specific cultural traditions. King et al. (2014) emphasise the erroneous assumption that a “non-Indigenous experience is universal rather than culturally specific” (pp 747-748). Their qualitative findings quite clearly showed that their Indigenous participants, people experiencing disability, experienced their disability within the context of their culture. We strongly recommend that physiotherapists should always respectfully establish ethnicity and ask patients/clients what is important for them in terms of health care delivery, after all a behaviour explicitly itemised as an essential component of threshold competence for initial and continuing registration as a physiotherapist in Australia and Aotearoa New Zealand is “Consider each client as a whole, adopt client-centred and family/whānau focused (where relevant) approaches and prioritise cultural safety and cultural respect” (Physiotherapy Board of New Zealand, 2015, p. 7).

As physiotherapy services were included in our study and our research team were predominantly physiotherapists and thus potentially applied a physiotherapy lens to the study, we believe our findings would be of interest and potentially helpful to physiotherapy services (both in private and in the district health board) seeking ways to be more accessible to hauā Māori.

KEY POINTS

To improve access of health services for hauā Māori, health service organisations, including physiotherapy services:

1. Need to truly value the importance of tikaka and ensure it is integral to the services they provide.
2. Should consider having a local trusted cultural advisor with whom to regularly discuss and review hauā Māori clients.
3. Should regularly evaluate their service's accessibility and effectiveness, to whom they are promoting their service, and the health information they are providing, to ensure ongoing quality accessibility.

DISCLOSURES

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PERMISSIONS

Ethical approval was gained from the University of Otago Human Ethics Committee (Ethics Committee's reference codes 12/028 and 12/175).

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REFERENCES

- Baruch, Y. & Holtom, B.C. (2008). Survey response rate levels and trends in organizational research. *Human Relations*, 61(8), 1139-1160. doi:10.1177/0018726708094863.
- Bolitho, S. & Huntington, A. (2006). Experiences of Māori families accessing health care for their unwell children: a pilot study. *Nursing Praxis in New Zealand*, 22(1), 23-32.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.
- Casamassimo, P.S., Seale, S. & Ruehs, K. (2004). General dentists' perceptions of educational and treatment issues affecting access to care for children with special health care needs. *Journal of Dental Education*, 68(1), 23-28.
- Critical Appraisal Skills Programme (2017). CASP (Qualitative Research) Checklist. Retrieved from http://docs.wixstatic.com/ugd/dded87_25658615020e427da194a325e7773d42.pdf.
- Cram, F., Smith, L. & Johnstone, W. (2003). Mapping themes of Māori talk about health. *The New Zealand Medical Journal*, 116(1170), 1-7.
- Crengle, S. (2000). The development of Māori primary care services. *Pacific Health Dialogue*, 7(1), 48-53.
- Creswell, J. W. & Plano Clark, V.L. (2011). Designing and conducting mixed methods research. (2nd ed.). Thousand Oaks, CA: SAGE.
- Dillman D.A. (2007). *Mail and Internet surveys: the tailored design method* (2nd ed). Hoboken, New Jersey: John Wiley & Sons.
- Edwards, D.M. & Merry, A.J. (2002). Disability Part 2: Access to dental services for disabled people: a questionnaire survey of dental practices in Merseyside. *British Dental Journal*, 193, 253-255. doi:10.1038/sj.bdj.4801538.
- Edwards, D.M., Merry, A.J. & Pealing, R. (2002). Disability Part 3: Improving access to dental practices in Merseyside. *British Dental Journal*, 193(6), 317-319.
- Harwood, M. (2010). Rehabilitation and indigenous peoples: the Maori experience. *Disability and Rehabilitation*, 32(12), 972-7. doi:10.3109/09638281003775378.
- Hickey, H., & Wilson, D. (2017). Whānau hauā: Reframing disability from an Indigenous perspective. doi:10.20507/MAIJournal.2017.6.1.7.
- Hollinsworth, D. (2013). Decolonizing Indigenous disability in Australia. *Disability and Society*, 28(5), 601-615. doi.org/b8bw.
- King, J. A., Brough, M., & Knox, M. (2014). Negotiating disability and colonisation: The lived experience of Indigenous Australians with a disability. *Disability and Society*, 29(5), 738-750. doi.org/b8bx.
- Kingi, T. (2007). The Treaty of Waitangi: a framework for Māori health development. *New Zealand Journal of Occupational Therapy*, 54(1), 4-10.
- Mead, N., Bower, P. & Roland, M. (2008). The General Practice Assessment Questionnaire (GPAQ) – development and psychometric characteristics. *BMC Family Practice*, 9(13). Retrieved from <http://www.biomedcentral.com/1471-2296/9/13>.
- Ministry of Health. (2004). *Living with Disability in New Zealand: A descriptive analysis of results from the 2001 Household Disability Survey and the 2001 Disability Survey of Residential Facilities*. Ministry of Health: Wellington. Retrieved from <https://www.health.govt.nz/system/files/documents/publications/livingwithdisability.pdf>.
- Ministry of Health. (2004). *Māori Providers: Primary health care delivered by doctors and nurses: the National Primary Medical Care Survey (NatMedCa):2001/2002 Report 3*. Wellington: Ministry of Health. Retrieved from <http://www.health.govt.nz/publication/maori-providers-primary-health-care-delivered-doctors-and-nurses>.
- Ministry of Health. (2010). *Kōrero Mārama: Health Literacy and Māori – Results from the 2006 Adult Literacy and Life Skills Survey*. Wellington: Ministry of Health. Retrieved from <http://www.health.govt.nz/publication/korero-marama-health-literacy-and-maori-results-2006-adult-literacy-and-life-skills-survey>.
- Ministry of Health. (2011). *Whānau Ora: Transforming our futures*. Ministry of Health: Wellington. Retrieved from <https://www.health.govt.nz/publication/whanau-ora-transforming-our-futures>.
- Ministry of Health. (2012). *Whaia Te Ao Marama. The Maori Disability Action Plan for Disability Support Services 2012 to 2017*. Ministry of Health: Wellington. Retrieved from <https://www.health.govt.nz/publication/whaia-te-ao-marama-maori-disability-action-plan-disability-support-services-2012-2017>.
- New Zealand Doctor. (2017). *New Māori glossary helps bridge gap in understanding mental health addiction and disability issues*. Retrieved from <https://www.nzdoctor.co.nz/un-doctored/2017/june-2017/26/New-Maori-glossary-helps-bridge-gap-in-understanding-mental-health-addiction-and-disability-issues.aspx>.
- Nikora, L.W., Karapu, R., Hickey, H. & Te Awekotuku, N. (2004). *Disabled Māori and disability supports*. University of Waikato and the Ministry of Health. Hamilton: Māori and Psychology Research Unit. Retrieved from <http://hdl.handle.net/10289/460>.
- Office for Disability Issues. (2016). *Disability Action Plan 2016 – 2018: Updated 2015*. Retrieved from <http://www.odl.govt.nz/nz-disability-strategy/disability-action-plan/>
- Physiotherapy Board of New Zealand. (2015). *Physiotherapy practice thresholds in Australia and Aotearoa New Zealand*. Retrieved from <https://www.physioboard.org.nz/physiotherapy-practice-thresholds-australia-aotearoa-new-zealand>.

- Physiotherapy Board of New Zealand. (2017). *Annual report 2017*. Retrieved from <https://www.physioboard.org.nz/sites/default/files/Physiotherapy%20Board%20Annual%20Report%202016-2017.pdf>.
- Ratima, M. M., Brown, R. M., Garrett, N. K. G., Wikaire, E. I., Ngawati, R. M., Aspin, C. S., & Potaka, U. K. (2007). Strengthening Māori participation in the New Zealand health and disability workforce. *Medical Journal of Australia*, *186*, 541–543.
- Robson B, Harris R. (eds). (2007). *Hauora: Māori standards of Health IV. A study of the years 2000-2005*. Wellington: Te Rōpā Rangahau Hauora A Eru Pōmare.
- Smith, L. (1999). *Decolonising Methodologies: Research and Indigenous Peoples*. Dunedin: University of Otago Press.
- The Centre for Health, Activity, and Rehabilitation Research (CHARR). (2014). *Hauā Mana Māori: Living unique and enriched lives*. Retrieved from <http://www.otago.ac.nz/physio/research/ageing/otago065884.html>.
- United Nations. (2006). *Convention on the Rights of Persons with Disabilities: Article 25 - Health*. Division for Social Policy and Development, United Nations. Retrieved from <https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-persons-with-disabilities/article-25-health.html>.
- White, N., Mavoia, H., & Bassett, S. F. (1999). Perceptions of health, illness and physiotherapy of Maori identifying with Ngati Tama iwi. *New Zealand Journal of Physiotherapy*, *27* (1), 5-15.
- Wiley, A. (2009). At a cultural crossroads: Lessons on culture and policy from the New Zealand Disability Strategy. *Disability and Rehabilitation*, *31*(14), 1205-1214. doi:10.1080/09638280902773935.
- Wilson, D. (2008). The significance of a cultural appropriate health service for Indigenous Māori women. *Contemporary Nurse*, *28*, 173-188.
- Wyeth, E.H., Derrett, S., Hokowhitu, B., Hall, C. & Langley, J. (2010). Rangatiratanga and Oritetanga: responses to the Treaty of Waitangi in a New Zealand study. *Ethnicity and Health*, *15*(3), 303-316. doi:10.1080/13557851003721194.

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The within-day reliability of scapular and shoulder EMG measurements in asymptomatic individuals during shoulder abduction

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ABSTRACT

The purpose of this study was to assess the within-day reliability of scapular and shoulder surface electromyography (sEMG) measurements during shoulder abduction. Twenty asymptomatic individuals performed 10 repetitions of shoulder abduction, which was then retested 10 minutes later. sEMG was used to record the activity of upper and lower trapezius; anterior, middle and posterior deltoids; supraspinatus; infraspinatus; and serratus anterior muscles. Muscle activation was expressed as a percentage of maximum voluntary isometric contraction (MVIC). The intraclass correlation coefficient (ICC) and standard error of measurement (SEM) were used to assess within-day reliability for concentric and eccentric phases of shoulder abduction. For the concentric phase, ICC values ranged from 0.87 to 0.98 and SEM values from 8.6% to 18.9% MVIC. For the eccentric phase, ICC values ranged from 0.65 to 0.97, and SEM values from 9.8% to 24.4% MVIC. In asymptomatic individuals, EMG measurements of the scapular and shoulder muscles during the concentric phase of shoulder abduction had excellent reliability, and for the eccentric phase, had good to excellent reliability depending on the analysed muscle. These findings provide valuable information on reliability of sEMG for assessing muscle activity of scapular and shoulder muscles.

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Keywords: Electromyography, Reliability, Scapular, Shoulder

INTRODUCTION

Electromyography (EMG) is used as a tool to assess muscle activity levels and recruitment patterns of muscles during functional activities (Konrad, 2005). Surface EMG (sEMG) is a non-invasive technique where electrodes are placed directly onto the skin and over the belly of the muscle that is investigated (Konrad, 2005). During joint movement or isometric muscle contraction, the electrodes detect electrical discharges from active motor units that can be used to assess neuromuscular disorders or as a research tool to identify abnormalities with motor control (Chowdhury et al., 2013).

Current literature regarding the reliability of EMG to the upper limb, specific to the shoulder complex is very limited. One study

suggests that isometric maximal contraction, as a normalisation procedure, is linked to high EMG reliability for the upper limb muscles (Rota, Rogowski, Champely, & Hautier, 2013). Most published studies have assessed the reliability of EMG for measuring muscle activity of the trunk in patients with lower back pain (Dankaerts, O'Sullivan, Burnett, Straker, & Danneels, 2004) or lower limb muscles, such as vastus medialis obliquus (VMO), in patients with knee disorders (Worrell, Crisp, & LaRosa, 1998). Within-day EMG testing has excellent reliability (intraclass correlation coefficient (ICC) 0.91) in contrast to between-day reliability, which showed to have lower reliability (ICC 0.70) for vastus lateralis and VMO (Worrell et al., 1998). This variance could be due to several factors, such as, changes in the strength of contraction between tests and different placement of

electrodes on different days (Oskouei, Paulin, & Carman, 2013; Worrell et al., 1998).

Findings from previous studies suggest that the method used for normalising EMG measurements can impact on reliability of measurements. Both submaximal and maximal methods were found to be linked to excellent reliability of EMG recordings (Oskouei et al., 2013). Normalising EMG recordings is not only essential for obtaining reliable measurements, but also for allowing appropriate interpretation of the EMG parameters (Burden, 2010).

The purpose of this study was to assess the within-day reliability of scapular and shoulder muscle EMG measurements in asymptomatic individuals as the evidence surrounding this topic is very limited. Findings from this study will help to interpret data from future studies assessing EMG recording when measuring muscle activity levels and recruitment patterns of scapular and shoulder muscles within the same day.

METHODS

Study Design

This was a repeated measure cross-sectional study. Scapular and shoulder muscle activity was recorded using surface electromyography (sEMG). Muscles measured included the upper and lower trapezius; anterior, middle and posterior deltoids; supraspinatus; infraspinatus; and serratus anterior muscles. Each participant performed 10 repetitions of shoulder abduction with their dominant arm. The same task was then re-tested 10 minutes later.

Participants

Twenty asymptomatic individuals from the local community were included in this study. Participants signed an informed consent form prior to taking part in the study. A screening examination involved the cervical spine and shoulder. This involved full cervical active range of motion with overpressure, active shoulder elevation with overpressure, and maximum voluntary isometric shoulder internal and external rotation strength testing. Participants were excluded from the study if they presented with any pain or discomfort during these tests. The study was approved by the University of Otago Ethics Committee (reference number: H15/020).

Equipment

We used a 16-channel wireless Noraxon TeleMyo 2400T G2 (Noraxon USA Inc., Arizona, USA) with a 3000 Hz sampling frequency, and gain of 500 to record muscle activity. Raw sEMG signals were sent wirelessly from the transmitter to a Noraxon TeleMyo EMG receiver. To record shoulder and scapular muscle activity, we used disposable, self-adhesive surface Ag/AgCl electrodes (Product SP-00-S/50, Ambu, DK-2750 Ballerup, Denmark). Electrodes were placed on the upper and lower trapezius; supraspinatus; infraspinatus; anterior, middle and posterior deltoid; and serratus anterior muscles.

We followed the Surface Electromyography for the Non-Invasive Assessment of Muscles (SENIAM) guidelines for electrode placement on upper and lower trapezius, anterior, middle and posterior deltoid muscles, and serratus anterior muscles (Hermens et al., 1999). We followed recommendations and

descriptions by Criswell (Criswell, 2010) and Waite et al. (Waite, Brookham, & Dickerson, 2010), for electrode placement on the supraspinatus and infraspinatus muscles. Surface electrodes were placed parallel with muscle fibres, with a 2 cm inter-electrode distance (Criswell, 2010; Hermens et al., 1999). We used the spinous process of the seventh cervical vertebrae for the reference electrode (Hermens et al., 1999).

We monitored the upper limb movements using a 3D motion analysis system (Motion Analysis Corporation, Santa Rosa, CA), with a frequency sample of 120 Hz. Reflective markers were placed over the acromion, lateral and medial epicondyles. During data processing, we monitored upper limb movements to identify concentric and eccentric phases of movement. We synchronised kinematic and EMG measurements using a trigger system.

Procedures

To reduce EMG baseline noise, the participant's skin was shaved, wiped with a coarse towel and rubbed with an alcohol wipe. This was repeated several times until skin impedance was verified as less than 5k Ω using a standard voltmeter, before placement of the electrodes. After this procedure, maximal isometric voluntary contraction (MIVC) was performed and measured for each individual muscle being monitored. The MIVC was then used to normalise EMG data gained during the study.

Following a rest period of 5 minutes, participants were asked to elevate their arms in the coronal plane 10 times. Participants were asked to elevate their arm until the end of the available active range of motion, without any compensatory movements. To standardise movement velocity, a metronome was used and set at 30 beats/min. This procedure was repeated 10 minutes later.

Data Processing

Processing of sEMG data was performed with MyoResearch XP Master Edition Software. Firstly, sEMG electrocardiogram artefact spikes were removed and the signal was processed using root mean square (RMS), with an average window of 50 ms. During shoulder abduction trials, sEMG data was normalised using the MIVC of muscle activity (during a 50 ms window of the 5s contraction). sEMG and kinematic data was processed using a tailored code written in MATLAB 7.12 (Mathworks, Inc., USA). EMG data were used to resample the kinematic data. The concentric and eccentric phases of shoulder abduction were identified by calculating the midpoint from the medial and lateral epicondyle reflective markers. The start and end of the concentric and eccentric phases were determined using the maximum and minimum values on the vertical axis of the midpoint. For each phase of abduction, the normalised mean muscle activity was calculated for each trial, for all participants. Following this, the mean for each of the 10 trials was calculated for every individual.

Primary Outcome Measures

The mean level of muscle activity and standard deviation across the 10 trials for each monitored muscle was calculated and expressed as a percentage of the muscle-specific MIVC magnitudes.

Statistical Analyses

All statistical analyses were performed using SPSS software.

Within-Session Reliability of Muscle Activity Levels

EMG data were used to assess the within-day reliability of muscle activity between two measurements. The intraclass correlation coefficient (two-way mixed model, consistency definition ICC) was used to assess the within-session reliability (Hsu, Ho, Ho, & Hedman, 2000). The mean value of the 10 repetitions performed, for each muscle, for baseline and follow up measurements was used as input data for this model. It was assumed that the clinical researcher was the single rater. The standard error of measurement (SEM) was calculated from the data obtained from the 10 repetitions of shoulder abduction performed by participants, and was calculated using the square root of the error mean square term, obtained from

the ANOVA test. This is beneficial as the SEM can be estimated independently from the ICC value (Weir, 2005).

Interpretation of Results

For the purposes of this study, ICC values were analysed using the categories: ICC values <0.40 suggested poor reliability; ICC values ranging from 0.40 to 0.75 suggested fair to good reliability; >0.75 suggested excellent reliability (Fleiss, 1999). Currently, there are no clear guidelines explaining how to interpret SEM. Due to this, SEM values were qualitatively discussed.

RESULTS

Twenty participants took part in this study (6 males/12 females). The participants' anthropometric characteristics are reported on Table 1.

Table 1: Demographic data for the 20 participants.

Participants	Mean	SD	Range
Age (years)	28.1	7.4	22-55
Height (m)	168.6	9.5	152.5-189.1
Weight (kg)	67.1	14.5	54-118.7
Body Mass Index (kg/m ²)	23.6	3.4	19.4-33.3
Gender (M/F)	6/14		

Notes: SD, standard deviation; M, male; F, female.

The concentric phase presented ICC values ranging from 0.87 to 0.98 (Table 2). As shown in Table 3, the SEM values ranged from 8.6% MVIC to 18.9% MVIC. With reference to the eccentric phase, ICC values ranged from 0.65 to 0.97 (Table 2). The SEM values ranged from 9.8% MVIC to 24.4% MVIC (Table 3).

Table 2: Within-day reliability (intraclass correlation coefficient) of muscle activity measurements between baseline and follow-up.

Muscles	Concentric ICC (95% CI)	Eccentric ICC (95% CI)
Upper Trapezius	0.97 (0.92 to 0.99)	0.83 (0.57 to 0.93)
Lower Trapezius	0.94 (0.84 to 0.98)	0.78 (0.44 to 0.91)
Supraspinatus	0.91 (0.77 to 0.96)	0.65 (0.11 to 0.86)
Infraspinatus	0.98 (0.95 to 0.99)	0.93 (0.81 to 0.97)
Anterior Deltoids	0.87 (0.67 to 0.95)	0.79 (0.47 to 0.92)
Middle Deltoids	0.91 (0.77 to 0.96)	0.80 (0.49 to 0.92)
Posterior Deltoids	0.96 (0.90 to 0.98)	0.89 (0.71 to 0.95)
Pectoralis Major	0.97 (0.92 to 0.99)	0.94 (0.84 to 0.98)
Latissimus Dorsi	0.96 (0.91 to 0.99)	0.97 (0.93 to 0.99)

Notes: ICC, intraclass correlation coefficient; CI, Confidence Interval; SEM, standard error of measurement; MVIC, maximal voluntary isometric contraction.

Table 3: Within-day reliability (standard error of measurement) of muscle activity measurements between baseline and follow-up.

Muscles	Concentric phase			Eccentric phase		
	Mean activity (% MVIC)	SEM (%MVIC)	SEM (%mean)	Mean activity (% MVIC)	SEM (%MVIC)	SEM (%mean)
Upper Trapezius	33.01	8.6	2.8	12.0	19.8	12.0
Lower Trapezius	28.4	12.6	3.6	11.4	22.7	2.6
Supraspinatus	26.6	12.6	3.4	10.9	18.9	2.1
Infraspinatus	19.8	8.8	1.7	9.4	14.7	1.4
Anterior Deltoid	43.3	11.5	5.0	14.4	20.1	2.9
Middle Deltoid	27.3	11.2	3.1	9.9	16.4	1.6
Posterior Deltoid	14.1	9.4	1.3	5.8	15.0	1.0
Pectoralis Major	12.6	18.9	2.4	4.9	24.4	1.2
Latissimus Dorsi	10.2	10.2	1.4	5.1	9.8	1.0

Notes: ICC, intraclass correlation coefficient; CI, Confidence Interval; SEM, standard error of measurement; MVIC, maximal voluntary isometric contraction.

Values for mean activity as a percentage of the MVIC during the concentric phase range from 10.2% to 33.01% and for the eccentric phase, range from 4.9% to 14.4% (Table 3).

The SEM values expressed as a percentage of the mean for the concentric phase range from 1.3% to 5.0% and for the eccentric phase, range from 1.0% to 12.0% (Table 3).

DISCUSSION

This study assessed the within-day reliability of scapular and shoulder EMG measurements in asymptomatic individuals. Our results suggest that EMG measurements have excellent reliability for concentric contractions and good to excellent reliability during the eccentric phase of shoulder abduction. The upper trapezius, lower trapezius, infraspinatus, anterior deltoids, middle deltoids, posterior deltoids, pectoralis major and latissimus dorsi muscles had excellent reliability for both the eccentric and concentric phases of muscle contractions, with reference to their ICC values. Moreover, the SEM percentages of the MVIC for all of the muscle groups during the eccentric phase were larger compared to the concentric phase (Table 2). Therefore, the eccentric phase seems to be less reliable than the concentric phase during unloaded shoulder abduction in asymptomatic individuals.

Numerous studies support our findings on excellent reliability for the concentric phase of contraction. One study investigated test-retest reliability of EMG during maximal concentric knee extensions (Larsson, Karlsson, Eriksson, & Gerdle, 2003). The results showed excellent reliability for the vastus lateralis (ICC \geq 0.82), vastus medialis (ICC \geq 0.88) and rectus femoris (ICC \geq 0.83) muscles. Larsson et al. (2003) used a very similar method to our study, using maximal muscle contractions to normalise EMG data. Another study investigated test-retest reliability of onset concentric and eccentric EMG activity in

stair stepping tasks and showed excellent reliability (ICC 0.91) during concentric contractions, similar to our findings (Cowan, Bennell, & Hodges, 2000). Despite both these studies assessing the activity of lower limb muscles, they both had a focus on dynamic contractions similar to our study.

Previous studies reported EMG recordings to be reliable, but with different reliability scores being reported for concentric and eccentric phases of movement. One study reported excellent reliability scores for both eccentric and concentric data when monitoring scapular and shoulder muscles (Ribeiro, Day, & Dickerson, 2017). Another study assessed the reliability of quadriceps femoris muscle (Finucane, Rafeei, Kues, Lamb, & Mayhew, 1998), and reported good to excellent reliability, with eccentric contractions associated with higher ICC scores (similar to our findings). Our results, on the other hand, showed noticeably lower ICC values and higher SEM values for EMG activity levels during the eccentric phase of movement, when compared to the concentric data. Variability on EMG recordings may arise due to electrode placement, within- and between-subject variability when recruiting muscles to perform a task. These factors might explain the different findings reported by previous studies and our study.

In contrast, some studies have identified the eccentric phase of contraction to be more reliable compared to the concentric phase. Finucane et al. (1997) observed superior intra-rater and inter-rater ICC values in participants when performing eccentric isokinetic knee extensor contractions. All eccentric results were rated as excellent (intra-rater results ranging from 0.84 to 0.97, and inter-rater results ranging from 0.78 to 0.90). In comparison, concentric values ranged from good to excellent (intra-rater results ranging from 0.62 to 0.91, and inter-rater results ranging from 0.64 to 0.96). Moreover, another study (Finucane et al., 1998) found similar results, i.e. higher ICC

values (intra-rater results ranging from 0.84 to 0.97, and inter-rater results ranging from 0.78 to 0.90), and lower SEM values (0.17 for intra-rater data and 0.27 for inter-rater data) for the eccentric phase of movement. Lower ICC values (intra-rater results ranging from 0.62 to 0.91, and inter-rater results ranging from 0.66 to 0.96), and higher SEM values (0.33 for intra-rater and 0.33 for inter-rater), were found for concentric data (Finucane et al., 1998).

Limitations

One of the main limitations for the use of sEMG is the potential crosstalk between adjacent muscles. Previous studies have proposed that sEMG may detect signals generated by a number of concurrently active motor units near the electrode (De Luca & Merletti, 1988; Solomonow et al., 1994). Regarding scapular and shoulder muscles, there is concern about potential crosstalk between the supraspinatus and upper trapezius muscles. A previous study suggests minimal crosstalk between the upper trapezius and supraspinatus, and the trapezius (upper and middle fibres) and infraspinatus (Waite et al., 2010) muscles. It is suggested that sEMG overestimates fine-wire recordings for the supraspinatus muscle. However, this was not due to crosstalk between these muscles, but due to muscle fibre orientation being recorded by sEMG and fine-wire EMG, muscle size and location. It was found that the supraspinatus muscle activity recorded by sEMG is lower when measuring submaximal muscle exertion or when the muscle is the primary mover (e.g. shoulder abduction, as analysed in this study) (Allen, Brookham, Cudlip, & Dickerson, 2013; Waite et al., 2010). Another limitation of sEMG is muscle activity measurement variability during dynamic contractions. During dynamic contractions, there is potential for displacement of the electrode in regards to the muscle being recorded. Consequently, this could reduce the intensity of the signal being recorded, affecting the reliability of the data (Massó et al., 2010). Moreover, as only surface muscles can be measured and analysed using sEMG, this study does not provide findings on the shoulder complex as a whole (Massó et al., 2010).

CONCLUSION

In asymptomatic individuals, EMG measurements of the shoulder and scapular during the concentric phase of shoulder abduction had excellent reliability and for the eccentric phase had good to excellent reliability of results. This study adds to current knowledge regarding the reliability of EMG measurements to muscles of the upper limb and helps to better understand the use of EMG as a reliable tool in assessing muscle activity levels and recruitment patterns to the shoulder complex. To date, literature concerning the reliability of EMG measurements to the upper limb is very limited which allows for the opportunity of further research on this topic.

KEY POINTS

1. EMG is a reliable tool for assessing scapular and shoulder muscle activity pattern.
2. Reliability of EMG recordings for scapular and shoulder muscles was higher during the concentric phase of shoulder abduction.

DISCLOSURES

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REFERENCES

- Allen, T. R., Brookham, R. L., Cudlip, A. C., & Dickerson, C. R. (2013). Comparing surface and indwelling electromyographic signals of the supraspinatus and infraspinatus muscles during submaximal axial humeral rotation. *J Electromyogr Kinesiol*, 23(6), 1343-1349. doi:10.1016/j.jelekin.2013.08.002.
- Burden, A. (2010). How should we normalize electromyograms obtained from healthy participants? What we have learned from over 25 years of research. *J Electromyogr Kinesiol*, 20(6), 1023-1035. doi:10.1016/j.jelekin.2010.07.004.
- Chowdhury, R. H., Reaz, M. B., Ali, M. A., Bakar, A. A., Chellappan, K., & Chang, T. G. (2013). Surface electromyography signal processing and classification techniques. *Sensors (Basel)*, 13(9), 12431-12466. doi:10.3390/s130912431.
- Cowan, S. M., Bennell, K. L., & Hodges, P. W. (2000). The test-retest reliability of the onset of concentric and eccentric vastus medialis obliquus and vastus lateralis electromyographic activity in a stair stepping task. *Physical Therapy in Sport*, 1(4), 129-136. doi:https://doi.org/10.1054/ptsp.2000.0036.
- Criswell, E. (2010). *Cram's Introduction to Surface Electromyography*: Jones & Bartlett Publishers.
- Dankaerts, W., O'Sullivan, P. B., Burnett, A. F., Straker, L. M., & Danneels, L. A. (2004). Reliability of EMG measurements for trunk muscles during maximal and sub-maximal voluntary isometric contractions in healthy controls and CLBP patients. *Journal of Electromyography and Kinesiology*, 14(3), 333-342.
- De Luca, C. J., & Merletti, R. (1988). Surface myoelectric signal crosstalk among muscles of the leg. *Electroencephalography and clinical neurophysiology*, 69(6), 568-575.
- Finucane, S., Rafeei, T., Kues, J., Lamb, R., & Mayhew, T. (1998). Reproducibility of electromyographic recordings of submaximal concentric and eccentric muscle contractions in humans. *Electroencephalography and Clinical Neurophysiology/Electromyography and Motor Control*, 109(4), 290-296.
- Fleiss, J. L. (1999). *The design and analysis of clinical experiments* (Wiley classics library ed.). New York: Wiley.
- Hermens, H. J., Freriks, B., Merletti, R., Stegeman, D., Blok, J., Rau, G., . . . Hägg, G. (1999). European recommendations for surface electromyography. *Roessingh research and development*, 8(2), 13-54.
- Hsu, A.-T., Ho, L., Ho, S., & Hedman, T. (2000). Immediate response of glenohumeral abduction range of motion to a caudally directed translational mobilization: a fresh cadaver simulation. *Archives of physical medicine and rehabilitation*, 81(11), 1511-1516.
- Konrad, P. (2005). The abc of emg. *A practical introduction to kinesiological electromyography*, 1, 30-35.
- Larsson, B., Karlsson, S., Eriksson, M., & Gerdle, B. (2003). Test-retest reliability of EMG and peak torque during repetitive maximum concentric knee extensions. *Journal of Electromyography and Kinesiology*, 13(3), 281-287.
- Massó, N., Rey, F., Romero, D., Gual, G., Costa, L., & Germán, A. (2010). Surface electromyography applications. *Apunts Medicina de l'Esport (English Edition)*, 45(166), 127-136.

- Oskouei, A. H., Paulin, M. G., & Carman, A. B. (2013). Intra-session and inter-day reliability of forearm surface EMG during varying hand grip forces. *Journal of Electromyography and Kinesiology*, 23(1), 216-222.
- Ribeiro, D. C., Day, A., & Dickerson, C. R. (2017). Grade-IV inferior glenohumeral mobilization does not immediately alter shoulder and scapular muscle activity: a repeated-measures study in asymptomatic individuals. *Journal of Manual & Manipulative Therapy*, 25(5), 260-269. doi:10.1080/10669817.2017.1290310.
- Rota, S., Rogowski, I., Champely, S., & Hautier, C. (2013). Reliability of EMG normalisation methods for upper-limb muscles. *Journal of sports sciences*, 31(15), 1696-1704.
- Solomonow, M., Baratta, R., Bernardi, M., Zhou, B., Lu, Y., Zhu, M., & Acierno, S. (1994). Surface and wire EMG crosstalk in neighbouring muscles. *Journal of Electromyography and Kinesiology*, 4(3), 131-142.
- Waite, D. L., Brookham, R. L., & Dickerson, C. R. (2010). On the suitability of using surface electrode placements to estimate muscle activity of the rotator cuff as recorded by intramuscular electrodes. *Journal of Electromyography and kinesiology*, 20(5), 903-911.
- Weir, J. P. (2005). Quantifying test-retest reliability using the intraclass correlation coefficient and the SEM. *Journal of strength and conditioning research*, 19(1), 231.
- Worrell, T. W., Crisp, E., & LaRosa, C. (1998). Electromyographic reliability and analysis of selected lower extremity muscles during lateral step-up conditions. *Journal of athletic training*, 33(2), 156.

What helps or hinders clinicians in their decision-making processes when using or prescribing mHealth apps in practice? An exploratory study.

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Abstract

Recent advancement and use of technology in healthcare has led to a rapid growth and availability of mobile health applications (mHealth apps) in clinical practice. This proliferation has led to growing concern over the unregulated nature of this new industry. The expectation that clinicians abide by the rule "do no harm" has also raised concerns regarding the maintenance of client safety and questions as to how clinicians navigate this tension and how mHealth apps are being used in clinical practice. This research investigated what helps and hinders the use and prescription of mHealth apps in allied health clinical practice. Using a qualitative descriptive methodology, an exploratory study was conducted utilising a mixed methods approach. The twelve participants consisted of 11 physiotherapists and an occupational therapist. Thematic analysis was used to analyse data. Two themes were constructed from the data: (1) Deflection of professional responsibility and (2) Dependence on the physiotherapy toolbox and evidence based practice. This research established basic understanding of the acceptability and use of mobile technology in allied health practice. Results demonstrated a poor use of mHealth apps and a preference for a certain kind of evidence-based technique in clinical practice. Clinicians also voiced a lack of knowledge and confidence in their own skills or judgements in relation to mHealth apps, with many admitting to relying on recommendations by colleagues, professional bodies and clients.

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Key Words: mHealth Apps; Health Technology; Thematic Analysis; Clinicians

INTRODUCTION

As smartphone accessibility increases, exposure to and use of mHealth apps is escalating. Despite this, uptake of mobile health applications (mHealth apps) in clinical practice has not paralleled rising smartphone ownership (Chan, Torous, Hinton & Yellowlees, 2015; Donker et al, 2013). This is hypothesised to be a result of clinician uncertainty, limited available research, and "app overload" (Chan et al., 2015; Chan & Misra, 2014; Donker et al., 2013; Van velsen, Beaujean & Van Gemert-Pijnen, 2013).

With increasing availability of mHealth apps, particularly for self-management of various chronic conditions, there is potential for clients to self-prescribe or seek recommendations and guidance from clinicians on their use (Ozdalga, Ozdalga & Ahuja, 2012; Mosa, Yoo & Sheets, 2012; Powell, Landman & Bates, 2014). Recognising this, Fairburn & Rothwell (2015) suggest that clinicians should enquire about their clients' mHealth app use during initial assessments. This sets the expectation that clinicians are familiar with and knowledgeable about mHealth apps in their field of practice.

Currently, mHealth apps are poorly defined and demarcated in research and clinical practice, resulting in a thin and overly broad

literature base (Cummings, Borycki & Roehrer, 2013). Broadly, mHealth might be considered a sub-set of eHealth, but with a specific focus on smartphone technologies, in particular how apps are developed and used on these phones for health and fitness purposes (e.g., MS Energise, a new app that facilitates fatigue management using cognitive behavioural techniques). The combination of rapid industry growth and a lack of quality assurance has generated concerns of potential risk to patients' physical and psychological safety (Boulos, Brewer, Karimkhani, Buller & Dellavalle, 2014). Risks may arise through provision of inaccurate information, poor privacy, and potential lack of therapeutic benefits (Boudreaux et al., 2014; Buijink, Visser & Marshall, 2013). Unchecked industry development adds to these concerns, as rapid technological advances can sacrifice client safety for consumer demand (Doarn & Merrell, 2013). Although mHealth apps must meet specific criteria to be sold via application stores (e.g. Google Play, Apple iStore), these criteria are predominantly technological in nature, and do not require medical oversight (Butcher, MacKinnon, Gadd & LeBlanc-Duchin, 2015). Consequently, mHealth apps may lack appropriate content quality and sufficient medical accuracy prior to public availability. This highlights the need to identify safe and trustworthy mHealth apps (Jin & Kim, 2015; Yasini & Marchand, 2015).

According to Butcher et al. (2015) and Donker et al. (2013), clinicians demonstrate poor overall knowledge regarding suitable and safe use of mHealth apps. Butcher and colleagues (2015) stated that of the 77% of nurses and doctors using mHealth apps in the United Kingdom, only 23% conducted an informal evaluation of mHealth suitability prior to use. Other studies have tended to assume the use of evaluation tools for critical assessment of mHealth apps prior to clinical use (e.g., Hussain et al., 2015; Donker et al., 2013).

Literature concerning the implementation of mHealth apps in clinical practice appears limited, especially as this applies to implementation within Aotearoa/New Zealand (A/NZ), with none directly or exclusively pertaining to the allied health professions. The extent to which the use of mHealth apps occurs within clinical practice remains thus largely unknown. The aim of this study was to provide insight into the barriers and facilitators for the clinical use of mHealth apps by allied health clinicians. In this study, an mHealth app was defined as any application used for education, point of care, patient interaction or clinical reference on a portable smart device, such as a smart phone or a tablet (Aungst, Clauson, Misra, Lewis & Hussain, 2014).

METHODS

Design

This paper reports on a qualitative descriptive study, exploring the perspectives of A/NZ registered allied health professionals regarding their mHealth app use in clinical practice – especially in light of the expectation to “do no harm.” A post-positivist, realist perspective has been used throughout the study, underpinned by the principles of naturalist enquiry (Golafshani, 2003). Prior to the research project ethics approval was gained through the Auckland University of Technology Ethics Committee (reference number: 15/459).

Recruitment and Sampling

Participants were recruited initially through convenience sampling using social and professional connections within allied health professions; snowball sampling was used after this point.

Potential participants received a participant information sheet and invitation to take part via email. Only A/NZ registered health professionals were included.

Health professionals were eligible to take part when they a) owned or had access to a smart device (phone or tablet), b) were familiar with the use of smart phones and apps, c) had an mHealth app or were willing to download an mHealth app on their phone and d) were using or intended to use mHealth apps in clinical practice.

Data collection

Three data collection methods (online survey and single in-person interview or focus group) were used at two data collection points. First, participants were invited to select a mHealth app of their choice, or from a list provided by the research team, and evaluate the chosen app for its usability, quality and safety in preparation for the first data collection point. Participants were then invited to take a “qualitative dominated” online survey (Terry & Braun, 2017) with a set of open and closed questions that focused on the clinician’s experience of evaluating their chosen app. A number of participants began the survey and were therefore allocated a participant number, but did not complete the survey.

For the second data collection point, participants were invited to take part in a single individual interview or focus group depending on their preference. Focus group and interview questions were semi-structured and offered an opportunity to further explore survey question answers and generate a richer understanding of the research question. Interviews and focus group data were transcribed verbatim. Participants were offered the choice to participate at both collection points or take part in either depending on their available time; therefore, not all participants took part in all collection points. A total of 12 Auckland-based participants completed one or both data collection points. Offering this flexibility was a predetermined strategy to facilitate recruitment. For all participants, demographics and consent were obtained. Table 1 gives participants’ demographics and data collection methods.

Table 1: Participant demographics

Participant Code	Sex	Age	Ethnicity	Professional background	Level of experience	Data collection method
John	Male	40-49	NZ European	Physiotherapist	Very/Specialist	OS
Jacinda	Female	-	NZ European	Physiotherapist	Experienced	OS
Jessica	Female	40-49	NZ European	Physiotherapist	Very/Specialist	OS + II
Jennifer	Female	30-39	NZ European	Physiotherapist	Experienced	OS
Julia	Female	40-49	NZ European	Physiotherapist	Very/Specialist	OS
Jamie	Female	50-59	NZ European	Physiotherapist	Experienced	OS
Jenna	Female	20-29	British	Physiotherapist	Experienced	II
Jasmine	Female	20-29	NZ European	Physiotherapist	Experienced	OS
Jade	Female	40-49	NZ European	Occupational Therapist	Very/Specialist	II
Joy	Female	30-39	NZ European	Physiotherapist	Very/Specialist	FG
Jane	Female	20-29	British	Physiotherapist	Experienced	FG
Jordan	Female	20-29	British	Physiotherapist	Experienced	FG

Notes: Very/specialist, refers to clinicians who were senior within their chosen specialties; II, individual interview; FG, focus group; NZ, New Zealand; OS, online survey.

Analysis

Data from the surveys and interviews and focus group were analysed using thematic analysis, following Braun and Clarke's (2006) six-stage process. This process of analysis included familiarisation with collected data, coding at a semantic level, identifying key ideas of interest, identifying candidate themes, refining candidate themes, naming and defining final themes (Terry, Hayfield, Clarke, & Braun, 2017). The first author familiarised herself with the data and coded them, and met with the second and third authors to discuss coding and initial impressions. Coding was returned to, and improved upon, in a recursive manner. Theme construction was consultative and iterative, with all authors meeting regularly to discuss findings and to test interpretations.

RESULTS

Two salient themes were generated within the dataset, with each cohering around a distinct central organising concept (Terry et al., 2017): (1) Deflection of professional responsibility; and (2) Dependence on the professional toolbox and evidence based practice. We will discuss each below with illustrative data extracts.

Theme 1: deflection of professional responsibility.

This theme was constructed from accounts of practitioner tentativeness in taking responsibility for client use of mHealth apps. The primary reason for this deflection of responsibility was a self-described lack of knowledge and experience. Participants argued that they were "not tech savvy", limiting their ability to offer what they understood to be specialist advice. Further, participants seemed reluctant to identify their level of technology use and skills.

Despite these assertions, participants described multiple incidences of mHealth app use, and commonly claimed to use social media in multiple aspects of their lives. It might be hypothesised that this disparity regarding use may be due to constant immersion and unconscious integration of technology. As a result, clinicians appeared to have become unaware of the knowledge and skills they have. When interview questions prompted thinking, participant comments suggested an increasing recognition of technology use: *"I think we know a little more about technology than I thought... when you dig deeper you realise how much you do use it day to day"* (Jane)

However, a number had trouble identifying what might be categorised as an mHealth app, referring to other software used in clinical practice, for instance: *"thinking about it a bit more, we use an online programme called PhysioTech"* (Jenna).

This confused or unclear definition of mHealth apps was often portrayed as contributing to their inability to identify the extent of their technology use. For example: *"I'm not sure about the health bit, but, I, in terms of, um, managing an illness... I don't know whether that would be classed as a health app"* (Jade).

This lack of clarity, may have contributed to clinicians' lack of perceived ability and "tech savvy-ness", giving rise to deflection of responsibility. Participants commonly argued that their low confidence in their evaluative skills made it hard to offer advice concerning many technologies or apps: *"I think if I was going to*

recommend something, I would need to have experience in it" (Jenna). *"Yeah, I mean, my limitation is my own confidence and knowledge"* (Jade).

Many clinicians also indicated that the use of technologies was more "naturally" aligned with other allied health professionals, for example, *"I think occupational therapists use quite a few"* (Joy) and *"it's more the speech therapists"* (Jade), not connecting app use to their own professional domain.

Further, clinicians tended to profile certain types of clients as being uninterested in app use. For example, most participants classified a number of their clients as "too old" to use technology and therefore assumed a disinterest: *"If all of us were in our sixties then maybe we wouldn't use technology so much"* (Jane)

Responsibility was further deflected by minimising risk. For example, clinicians expressed a higher willingness to *"get on board"* (Jenna), with 'self-motivated' clients who initiated the use of mHealth apps. This reliance on client initiation absorbed the risk which might otherwise be directly applicable to the clinician.

Clinicians also appeared hesitant regarding the use of newer, unfamiliar clinical technologies and apart from "one or two" familiar apps claimed to rely on recommendations from peers or other trusted sources: *"I tend to stick to the ones that I already know, unless somebody else talks to me probably"* (Jade)

Clinicians often deflected responsibility for gaining new knowledge, preferring "tried and true" approaches, which tended to be constrained by the training they had experienced formally and informally. It is this reliance on a particular clinical sense-making framework that our second theme will discuss.

Theme 2: dependence on the physiotherapy toolbox and evidence based practice.

The second theme explored the idea of clinician dependence on their professional "toolbox" and evidence based practice. The most prominent aspect of this theme was preference for traditional and familiar techniques, rather than newer technologies. Many participants mentioned the familiarity and well-established nature of their current professional toolbox versus mHealth app technologies, which tended to be less frequently utilised and more easily forgotten: *"I think it's just remembering that the technology is there"* (Jade). *"So, I think it's just being aware that these things exist, and you can use them for part of your tools"* (Jessica).

This tendency to default to familiar practising techniques may also be increased by "app overload". Overwhelming variability of choice, excessive availability and rapid development may all have the potential to paralyse practitioner engagement. One participant (Jade) further alluded to poor integration into professional education, suggesting there was an inflexibility among students and new graduates when it came to the use of new technologies. Both Jade and Jessica suggested a conservative orientation toward standardised approaches within university environments. These more traditional methods of thinking were thought to promote the security of routine and established knowledge, for example: *"Doing your study and*

stuff, you don't want to learn something new [above the basics] at that point" (Jade).

Participants also referred to the gap between rapid app proliferation and much slower rates of academic publication. Evidence supporting the clinical use of apps was described as lagging behind the fast-paced innovative nature of app technology: "Yeah, so I don't know that we explicitly talk about those as tools to use, the problem is I don't think there's much evidence that they work" (Jessica).

Despite these assertions, there appeared to be an underlying expectation that young graduate clinicians will integrate technology into their practice due to "native" familiarity. This may be generated from assumptions that universities are now educating students in technology use, or that younger individuals' lives are more immersed in various technologies. However, Jessica, reasoned "we don't know how technology might be integrated into the physiotherapy curriculum", indicating its incorporation in some areas is still incomplete. Jade further recognised integration is not always plausible, suggesting "as a new grad, just doing the basics is enough... anything extra was like, no way" with time often identified as a limited resource.

As a result, many clinicians could be hesitant in clinically recommending unfamiliar technology use to patients as they "may look like complete fools" (Joy) attempting to educate clients in this regard. On the other hand, participants argued, this was rarely experienced with familiar, well-rehearsed techniques currently integrated in clinical practice, which they would generally fall back on when they felt out of their depth.

These factors suggest that clinicians operating strictly within evidence-based medicine paradigms may restrict mHealth app integration into their wider practising toolbox due to the risk of feeling like a failure that may be associated with newer approaches. This risk-averse orientation may contribute to a lack of mHealth app uptake in clinical practice, avoiding their use, despite technology being "unavoidable now" (Jade).

DISCUSSION

Our findings have provided insight into the lack of mHealth technologies uptake into allied health clinical practice, especially as it pertains to physiotherapists. Although mobile technology is pervasive in society, our participants remained unsure of its potential in clinical work. Further, there is often an assumption in the literature that clinicians are technologically literate and using published evaluative tools prior to prescription of mHealth apps (Fairburn & Rothwell, 2015; Aungst et al., 2014; Hussain et al., 2015; Donker et al., 2013). Other relevant studies have revealed tools to evaluate mHealth apps are predominantly unknown and underused in clinical practice (Butcher et al., 2015). Only one participant in our study demonstrated knowledge of an mHealth app evaluative process. Assuming systematic evaluations of apps prior to use may thus prove problematic.

Due to a lack of clinician knowledge or confidence with regard to technology, and the absence of established pre-publication evaluation criteria, or even adequate and understandable

privacy policies, public consumers may be at risk (Butcher et al., 2015; Chan et al., 2015; Murfin, 2013). Indeed, Cummings et al. (2013), proposed the rapid proliferation of mHealth apps causes difficulty for health consumers generally in successfully identifying high quality examples.

Non-systematic evaluation risks both clinicians and patients. Although most studies state that evaluation is orientated toward patient safety, our study revealed that most participants had only considered the potential for unhelpful or improper advice. Users and clinicians must remain cautious, as security and the development of adequate privacy (including location information), are not always a priority for mHealth app developers (Knorr & Aspinall, 2015; Buijink et al., 2013).

Amongst our participants, there was a reliance on published literature and colleague recommendation for mHealth app use. However, due to the disparity between mHealth app deployment and evidence accumulation, reliability of published technological recommendations is suspect (Zapata, Fernández-Alemán, Idri & Toval, 2014; Björk & Solomon, 2013). Despite this, many published evaluative measures, such as Boudreaux et al. (2014) and Butcher et al. (2015), still include scoping of relevant published literature in their proposed systematic evaluations (Boudreaux et al., 2014; Butcher et al., 2015).

This exploratory study is directly relevant to practising and researching clinicians as it allows insight into current technology use in clinical practice by physiotherapists in A/NZ, which was previously unavailable. In order to maintain client safety, it is essential that future research aims to quantify the efficacy of technology use in clinical practice. This study has identified that uptake of mHealth apps into clinical practice can be hindered by lack of proven efficacy, poor integration into clinical toolboxes, and a tendency to deflect professional responsibility to know or understand the value, or not, of the various mHealth apps that are available. Recommendation from trusted sources such as colleagues or professional bodies and client proposition acted as facilitators.

Although this study has provided some insight into technology use, there were limitations, such as a small number of study participants. We anticipate that a larger sample size may yield a wider range of perspectives or may provide deeper insights. Although representative of physiotherapy and occupational therapist populations, participants were predominantly A/NZ European/Pākehā female working age physiotherapists, which may have narrowed the transferability of the findings. A more heterogeneous population with regards to ethnicity, gender and healthcare profession, would likely have provided a more diverse and richer source of data.

CONCLUSION

In conclusion, this exploratory study has established a base for understanding the integration of technology into modern day clinical practice. It offers insight into what helps and hinders clinician use and prescription of mHealth apps and technology. These insights are novel in that mHealth app use has not been sufficiently explored, especially in the New Zealand context. As a result, this study may provide clinicians a platform for reflection which may enable them to identify technology as part

of their clinical toolbox more readily, allowing for integration of technology into treatment plans for patients who may benefit from this approach. By developing knowledge in this area, clinicians may also be encouraged to recognise their existing skills and build their confidence in taking responsibility for understanding the value and uses of technology in practice with patients, as done with other familiar clinical techniques. This level of engagement means avoiding a reliance on colleagues and/or clients to introduce these newer tools into practice. Clinicians may then propose mHealth apps in support of treatment, based on sound clinical reasoning and systematic evaluation of safety and clinical usability for their clients. In this way, our findings are relevant, as positive clinical mHealth app use begins with informed recommendations to patients, but more importantly the normalisation of technology-use in clinical practice. Therefore, in the future, a place must be developed for mHealth apps within a clinician's toolbox.

KEY POINTS

1. mHealth apps are a growing industry, gaining in popularity and use. However, little is known about the current state of utilisation in clinical practice.
2. Clinicians may not be aware of their responsibilities with regard to health technology and lack the confidence to integrate mHealth apps into their clinical practice.
3. Clinicians demonstrated deferral of responsibility and lack of integration of mHealth apps into professional toolboxes. Consideration should be given towards this aspect of clinical practice.

DISCLOSURES

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REFERENCES

- Aungst, T. D., Clauson, K. A., Misra, S., Lewis, T. L., & Husain, I. (2014). How to identify, assess and utilise mobile medical applications in clinical practice. *International Journal of Clinical Practice*, *68*, 155-162. doi:10.1111/ijcp.12375.
- Björk, B. C., & Solomon, D. (2013). The publishing delay in scholarly peer-reviewed journals. *Journal of Informetrics*, *7*, 914-923. doi:10.1016/j.joi.2013.09.001.
- Boudreaux, E. D., Waring, M. E., Hayes, R. B., Sadasivam, R. S., Mullen, S., & Pagoto, S. (2014). Evaluating and selecting mobile health apps: strategies for healthcare providers and healthcare organizations. *Translational Behavioral Medicine*, *4*, 363-371. doi:10.1007/s13142-014-0293-9.
- Boulos, M. N. K., Brewer, A. C., Karimkhani, C., Buller, D. B., & Dellavalle, R. P. (2014). Mobile medical and health apps: state of the art, concerns, regulatory control and certification. *Online Journal of Public Health Informatics*, *5*, 229. doi:10.5210/ojphi.v5i3.4814.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3* (2), 77-101.
- Buijink, A. W., Visser, B. J., & Marshall, L. (2013). Medical apps for smartphones: lack of evidence undermines quality and safety. *Evidence Based Medicine*, *18*, 90-92. doi:10.1136/eb-2012-100885.
- Butcher, R., MacKinnon, M., Gadd, K., & LeBlanc-Duchin, D. (2015). Development and examination of a rubric for evaluating point-of-care medical applications for mobile devices. *Medical Reference Services Quarterly*, *34*, 75-87. doi:10.1080/02763869.2015.986794.
- Chan, S. R., & Misra, S. (2014). Certification of mobile apps for health care. *Journal of the American Medical Association*, *312*, 1155-1156. doi:10.1001/jama.2014.9002.
- Chan, S., Torous, J., Hinton, L., & Yellowlees, P. (2015). Towards a framework for evaluating mobile mental health apps. *Telemedicine and e-Health*, *21*, 1038-1041. doi:10.1089/tmj.2015.0002.
- Cummings E, Borycki E, Roehrer E. (2013). Issues and considerations for healthcare consumers using mobile applications. *Studies in Health Technology and Informatics*, *183*, 227-231. doi:10.3233/978-1-61499-203-5-227.
- Doarn, C. R., & Merrell, R. C. (2013). There's an app for that. *Telemedicine and e-Health*, *19* (11), 811-812. doi:10.1089/tmj.2013.9983.
- Donker, T., Petrie, K., Proudfoot, J., Clarke, J., Birch, M. R., & Christensen, H. (2013). Smartphones for smarter delivery of mental health programs: a systematic review. *Journal of Medical Internet Research*, *15*, 247. doi:10.2196/jmir.2791.
- Fairburn, C. G., & Rothwell, E. R. (2015). Apps and eating disorders: a systematic clinical appraisal. *International Journal of Eating Disorders*, *48*, 1038-1046. doi:10.1002/eat.22398.
- Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report*, *8*, 597-606.
- Hussain, M., Al-Haiqi, A., Zaidan, A. A., Zaidan, B. B., Kiah, M. L. M., Anuar, N. B., & Abdulnabi, M. (2015). The landscape of research on smartphone medical apps: Coherent taxonomy, motivations, open challenges and recommendations. *Computer Methods and Programs in Biomedicine*, *122*, 393-408. doi:10.1016/j.cmpb.2015.08.015.
- Jin, M., & Kim, J. (2015). Development and evaluation of an evaluation tool for healthcare smartphone applications. *Telemedicine and e-Health*, *21*, 831-837. doi:10.1089/tmj.2014.0151.
- Knorr, K., & Aspinall, D. (2015, April). *Security testing for Android mHealth apps*. Paper presented at the IEEE Eighth International Conference on Software Testing, Verification and Validation Workshops (ICSTW) (pp. 1-8) doi:10.1109/ICSTW.2015.7107459.
- Mosa, A. S. M., Yoo, I., & Sheets, L. (2012). A systematic review of healthcare applications for smartphones. *BioMed Central Medical Informatics and Decision Making*, *12*, 1. doi:10.1186/1472-6947-12-67.
- Murfin, M. (2013). Know your apps: an evidence-based approach to evaluation of mobile clinical applications. *The Journal of Physician Assistant Education*, *24*, 38-40.
- Ozdalga, E., Ozdalga, A., & Ahuja, N. (2012). The smartphone in medicine: a review of current and potential use among physicians and students. *Journal of Medical Internet Research*, *14*, 128. doi:10.2196/jmir.1994.
- Powell, A. C., Landman, A. B., & Bates, D. W. (2014). In search of a few good apps. *Journal of American Medical Association*, *311*, 1851-1852. doi:10.1001/jama.2014.2564.
- Terry, G., Hayfield, N., Clarke, V., & Braun, V. (2017). Thematic analysis. In C. Willig & W. Stainton Rogers (Eds.), *The SAGE handbook of qualitative research in psychology* (2nd ed., pp. 17-37). London: SAGE.

- Terry, G., & Braun, V. (2017). Short but often sweet: The surprising potential of qualitative survey methods. In V. Braun, V. Clarke & D. Gray (Eds.), *Collecting qualitative data: A practical guide to textual, media and virtual techniques*: Cambridge University Press.
- Van Velsen, L., Beaujean, D. J., & Van Gemert-Pijnen, J. E. (2013). Why mobile health app overload drives us crazy, and how to restore the sanity. *BioMed Central Medical Informatics and Decision Making*, *13*, 1. doi:10.1186/1472-6947-13-23.
- Yasini, M., & Marchand, G. (2015, August). *Mobile health applications, in the absence of an authentic regulation, does the usability score correlate with a better medical reliability?* Paper presented at MEDINFO 2015: eHealth-enabled Health: Proceedings of the 15th World Congress on Health and Biomedical Informatics (pp. 127-131). Retrieved from <http://ebooks.iospress.nl/volumearticle/40182>.
- Zapata, B. C., Fernández-Alemán, J. L., Idri, A., & Toval, A. (2015). Empirical studies on usability of mHealth apps: A systematic literature review. *Journal of Medical Systems*, *39*, 1–19. doi:10.1007/s10916-014-0182-2

An online fitness to practise specific module alters physiotherapy students' health knowledge, perceptions and intentions

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ABSTRACT

Health professional students experience fitness to practise (FTP) issues but commonly do not seek help. Strategies to support students' FTP in preparation for clinical placement are warranted. This article adds further insights into curriculum to support students' FTP. The purpose of the study was to gain insight into students' perception, levels of confidence, knowledge, understanding and help-seeking intentions regarding FTP issues and their supports.

Year 3 and 4 Bachelor of Physiotherapy students provided open-ended responses regarding the impact of undertaking an education module to increase their awareness of FTP issues and associated support systems.

After completing the module, students were more confident to define FTP, able to identify support systems and more likely to seek help for FTP issues. They were less likely to self-manage FTP issues although this was not statistically significant. After viewing the curriculum students increased their awareness of where to seek help from 52/68 (77%) to 50/50 (100%). Students also increased their understanding of what to do if a peer had an FTP issue from 31/68 (45%) to 46/50 (92%). The factors that both facilitate and discourage help-seeking behaviour were discussed.

An FTP specific module altered students' perceptions, levels of confidence, knowledge and understanding regarding FTP issues. It also increased students' intentions to seek help. Strategies to support students' FTP issues were described with discussion of strategies to improve the FTP specific module.

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Keywords: Clinical Education; Curriculum; Fitness to Practise

We acknowledge the traditional owners of the land on which this work occurred and pay our respects to their elders, past and present.

INTRODUCTION

Health professional students experience fitness to practise (FTP) issues consisting of impaired clinical competence, physical and mental health impairment and professionalism issues (Parker, 2006). While FTP has primarily been explored in medicine, there is also research on FTP in nursing (Tee & Jowett, 2009), dentistry (Shaw, 2009), psychology (Johnson, Porter, Campbell, & Kupko, 2005), occupational therapy (Warne, 2002) and medical radiation (Wright, Jolly, Schneider-Kolsky, & Baird, 2011). There is however little research on FTP within the discipline of physiotherapy.

Supervising physiotherapy students with FTP issues may impact on clinical educators' wellbeing and work satisfaction (Lo,

Curtis, Keating, & Bearman, 2017). Physiotherapy students' self-declaration of FTP issues has been used to proactively flag and supportively manage FTP (Dyrbye, Schwartz, Downing, Sloan, & Shanafelt, 2011). Self-declaration of FTP issues has been done specifically with physiotherapy students (Lo, Maloney, Bearman, & Morgan, 2014). It has been found that the key factors that support students' self-declaration include confidentiality, positive relationships with staff and a supportive environment (Lo et al., 2014).

Health professional courses are stressful, and students may not have formalised strategies for managing these negative emotions. The stress can be amplified on clinical placements and stress management techniques are, therefore, indicated in modern health professional educational programmes.

The literature shows that medical students seek support from family and friends and avoid professional advice particularly in the case of mental health issues (Chew-Graham, Rogers, & Yassin, 2003). Avoidance of help-seeking starts early in medical education due to a perceived stigma (Chew-Graham et al., 2003). As Devereux and colleagues (2012) have identified, students may lack information as to what might potentially impair their practice and could be concerned that disclosure may affect their academic progression. Education on FTP must, therefore, include education regarding the definition of FTP and signs and symptoms of FTP issues that may impact on their practice. This education is important both for the students themselves but also for their friends and colleagues. Information on confidentiality about FTP issues and academic progression is also considered to be an important inclusion.

While more relevant recent research on the topic of FTP was unable to be located, Schweitzer (1996) found that students may also lack awareness of appropriate student support. Students need information on FTP issues to encourage them to identify, disclose and seek support, or encourage their friends to seek support, for any FTP concerns (Devereux et al., 2012). The lack of FTP knowledge may be addressed by educating students and forming effective partnerships between academic and student support services to mitigate risk and help to identify appropriate management strategies (Kernan, Wheat, & Lerner, 2008). Such a programme may include educating students on available services, such as mental health supports including counselling. One of the goals of this early intervention is to prevent students experiencing a "cycle of failure" where students experience unsatisfactory performance which decreases their confidence, leading to the potential for further unsatisfactory performance (Cleland, Arnold, & Chesser, 2005).

Research by Roberts et al. (2005) also found the majority of medical students had not sought care due to training demands, cost and desire for confidentiality, and these issues need addressing. A potential FTP learning module, therefore, needs to include content on confidentiality and FTP issues. A provision in the busy timetable needs to be made for discussing and supporting FTP. Funding needs to be sought for university support services such as general practitioners and counsellors.

The authors aimed to investigate whether a short online module focused on defining and using examples of FTP issues, stress management and the benefits of obtaining confidential support would alter the perceptions of obtaining help for FTP issues. The research question was "How do students' perception, levels of confidence, knowledge and understanding, and help-seeking regarding FTP and appropriate supports change in response to an online module focusing on support strategies for FTP issues?"

METHOD

Educational context

Third and fourth year undergraduate Bachelor of Physiotherapy students have a significant increase in their exposure to clinical practice. Transitioning to a workplace learning environment may be associated with an increase in stress and an increased incidence of FTP issues. An online education programme regarding FTP issues and the benefits of obtaining proactive support was developed. Fitness to practise (FTP) issues were

defined according to Parker's definition of FTP (Parker, 2006) and discussed in a supportive manner. This FTP specific module focused on privacy and students' rights. Case studies of students who had successful outcomes after receiving help and a video of a current student and her experience of an FTP support meeting with the university unit coordinator were included. Links to appropriate professional services, such as doctors and counsellors, were included along with additional university supports, for example, disability support services. External mental health support services were also included, such as "beyondblue" (beyondblue, 2017) which is an independent, not-for-profit organisation supported by the Australian Federal Government and every State and Territory Government in Australia. Links to "Headspace" (Headspace, 2017) a popular website on mindfulness (awareness of the present moment), were also included. Mindfulness has been found to positively modify stress in randomised controlled trials (de Vibe et al., 2013; Erogul, Singer, McIntyre, & Stefanov, 2014) and has a number of other benefits in terms of wellbeing (Lo et al., 2017). Given students are most likely to contact their family or friends within the course, it was important to include content on what to do if a peer has an FTP issue. Also included were some mindfulness practices which included a body scan and meditation practices.

The FTP specific module was written in Articulate Storyline™ by an instructional designer. This design allowed for interactive tasks where students matched answers, for example, students' issues with the relevant support service. The FTP specific module was administered through the online learning management system Moodle™. A link was provided to an article (Lo et al., 2014) that discusses the benefits of proactively seeking support for FTP issues.

Design

This study was a mixed methods study of the perceptions of physiotherapy students.

Population

All year three and four students of the 2015 cohort in the undergraduate Bachelor of Physiotherapy programme at Monash University, which was a total of 151 students, were eligible for inclusion.

Data collection

Ethics approval was granted by Monash University Human Research Ethics Committee, approval number CF10/1321 - 2010000703. Students were invited to participate in an anonymous pre- and post- survey regarding FTP. As no survey fitting the criteria had been previously developed, a survey was constructed and piloted with academics with expertise in FTP issues to enable its face validity. The pre-survey was based on a survey used to evaluate mental health first aid programmes (Jorm, Kitchener, Fischer, & Cvetkovski, 2010). This survey was modified to suit the FTP module. The post-survey was developed through consultation with academics to identify the types of information that might be useful to discern as part of an FTP learning module. The developed post-survey was then piloted with academics and health service providers. The 15 item pre-survey and the 18 item post-survey are provided in Appendix 1. Questions 2-5 were rated on a modified Likert scale, for

example from 1 = not at all confident to 5 = very confident. The remaining questions were open-ended questions.

Data analysis

The quantitative data were analysed using Graph pad TM with pre- and post-data being analysed by dependent t-testing. Parametric testing was used for Likert scales (Norman, 2010). Given four comparisons were made (pre- and post- measures of confidence to define FTP, confidence to identify relevant supports, likelihood of students self-managing, and likelihood of students seeking help), a Bonferroni adjusted alpha level of 0.0125 was used (Bland & Altman, 1995). The qualitative data were summarised independently by two researchers based on thematic analysis (Braun & Clarke, 2006). Responses were coded into themes with a period of consensus to refine the themes. Responses were then recoded into the defined themes until data saturation. A second period of consensus followed including selection of illustrative quotes.

RESULTS

Confidence

Sixty-eight students provided pre-data and 40 students, post-data. The confidence levels of students' ability to define FTP is provided in Figure 1.

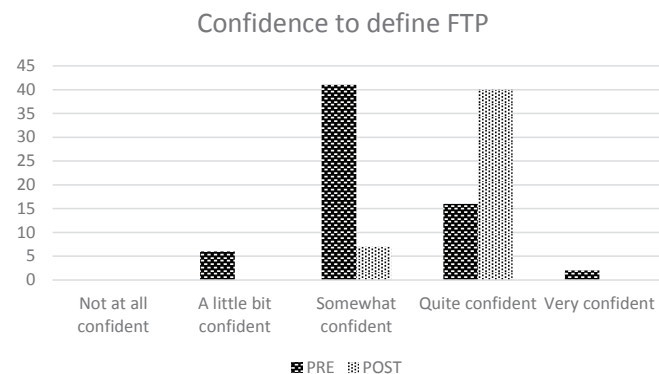


Figure 1: Confidence to define FTP

Forty students had both pre-survey and post-survey data and these data were used in repeated measures t-testing (Table 1).

Table 1: Results of repeated measures t-tests for pre and post the FTP specific curriculum

Variable	n	Pre		Post		t	df	Sig (2 tailed)	95% CI
		m	SD	m	SD				
Student confidence to define FTP	39	3.10	0.72	3.90	0.31	7.14	38	< 0.0001	0.57 to 1.02
Student confidence to identify relevant supports	39	2.47	0.92	3.76	0.43	9.17	38	< 0.0001	1.00 to 1.57
Likelihood of students self-managing	38	3.69	0.83	3.41	0.99	1.81	38	0.08	-0.60 to 0.03
Likelihood of students seeking help	36	3.33	1.10	4.14	0.76	6.45	35	< 0.0001	0.55 to 1.06

Notes: m, mean; SD, standard deviation; CI, confidence interval

The confidence levels of students to identify relevant university support is provided in Figure 2.

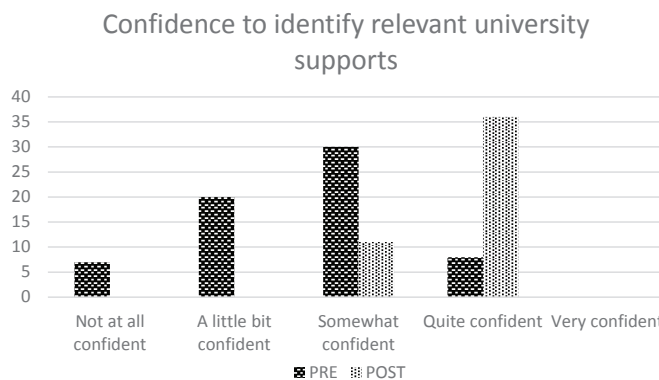


Figure 2: Confidence to identify relevant university supports

Self-managing

The likelihood of students self-managing FTP issues can be seen in Figure 3.

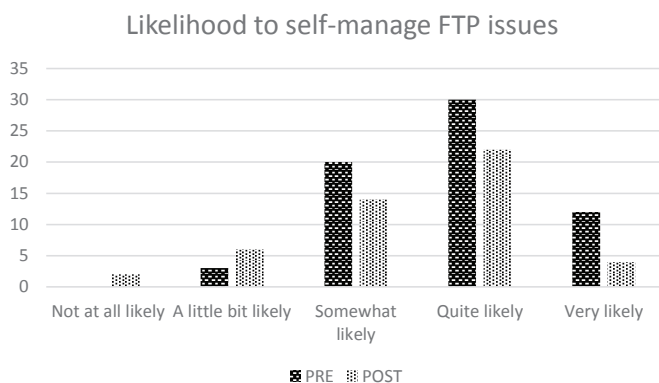


Figure 3: Likelihood to self-manage FTP issues

Seeking help

The likelihood of students seeking help for FTP issues can be seen in Figure 4.

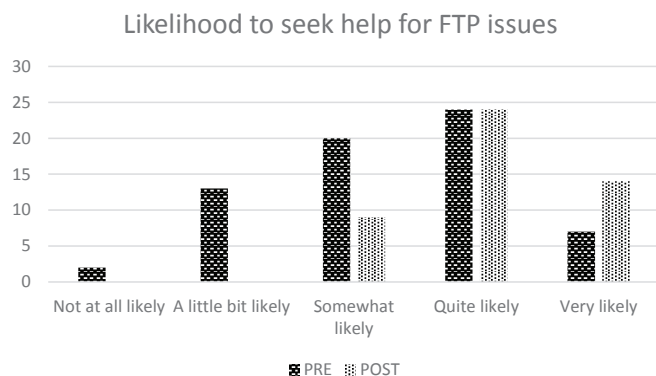


Figure 4: Likelihood to seek help for FTP issues

FTP issues

In the pre-survey 17 (17/68; 25%) students had a previous FTP issue. All students stated that this had affected their clinical placements. There were five students who felt absenteeism affected their clinical placements (5/17; 29%): *"[I] had to withdraw 2 weeks into a placement. I felt it hard to resume and pick up where I had left off"*.

There were two (2/17; 12%) students who stated FTP issues affected their clinical competence: *"I wasn't able to think clearly and concentrate/focus on my performance when I had other things that I was thinking about at the time"*.

Five (5/17; 29%) students stated that FTP issues were related to their mental health status: *"If you are extremely anxious this may cause you to make silly mistakes you wouldn't normally make, causes you to find it hard to adapt to different environments ... [and] makes it hard to perform/demonstrate skills to different supervisors"*.

Five (5/17; 29%) students provided no reasons for their FTP issues. Nine (9/17; 53%) students with FTP issues sought help. Of those that had not sought help, three students stated that they *"Didn't realise that it was affecting me that badly"*. Other students stated this was due to *"Not wanting to appear incompetent"*, there was *"No interest or input from the staff member I spoke to about it"* and *"I did not feel comfortable talking to anyone"*.

Nine (9/68; 13%) students identified as having a current FTP issue. These students anticipated that this issue would affect their clinical placement in the following ways: *"Talking to staff that I am not comfortable with, coping with stress"*, *"Difficulty obtaining all information during placement from patients and HCP (Health Care providers)"* and *"Loss of confidence from previous negative experiences on placement"*.

Promoting help-seeking

When asked what might help encourage help-seeking, students responded with factors such as *"Wanting to do well in the placement, and wanting the FTP issue to not be the one to affect my results"*. These students also wanted *"Encouragement from positive staff"* and knowledge that *"There are no repercussions"*. Students indicated that they could benefit from *"More awareness of how to seek help"* and *"Knowing about*

the services available". When asked what might discourage help-seeking, students responded: *"A supervisor who lacks understanding or empathy"*, *"Feeling like nobody can really help me"* and *"Being found out that I'm not coping as well or as competent"*. These students also listed *"Stigma"*, *"Time constraints"* and *"Feeling isolated on a placement"* as issues. One student mentioned that they *"Have had to seek help before, several times, and I am quite sick of needing to ... contact(ing) relevant parties and filling out forms to get the assistance I need"*. There was one other interesting response *"If I feel like it's not self-manageable, I will seek help with the support of peers"*.

When asked whether they knew where to seek help for FTP issues, 53 (53/68; 78%) student said 'Yes'. Thirty-seven (37/68; 54%) knew someone with an FTP issue and 31 (31/68; 46%) knew what to do if a colleague had an FTP issue.

Results from the post-survey found that 12 (12/50; 24%) students had an FTP issue. All respondents (50; 100%) knew where to seek help about FTP issues. Forty-six (46/50; 92%) students knew what to do if a colleague had an FTP issue. After viewing the FTP specific module, 49/50 (98%) students were more likely to identify FTP issues in themselves and others. Forty-five (45/50; 90%) were positively influenced by viewing the FTP specific module.

Module duration

The FTP specific curriculum took an average of 44 minutes (SD 17.92, range 20-90 minutes) to complete.

Key learnings

In regards to the FTP specific module, three themes representing key learnings were identified in the open question responses. These themes are listed below along with illustrative quotes:

1. **To identify key resources** (n = 26 responses) *"Be aware of the available resources that the university can provide"* and *"Three-minute mindfulness training which can be utilised during the day"*.
2. **To proactively seek help when needed and not to be afraid of asking** (n = 22 responses) *"Seek help from support services to come up with strategies to better cope with issues which can impede performance during placement (or even while working)"* and *"The university is there to help us if we have a fitness to practise issue. We should utilise this"*. *"You may put yourself and others at risk if you do not seek help"*.
3. **Define FTP and recognise possible impairments** (n = 14 responses) *"Recognising possible impairments which may affect FTP, including professional behaviour, physical and mental health, and commitment to learning"* and *"Fitness to practise is an important multifactorial area that needs regular attention and awareness"*.

FTP issue identification

After viewing the FTP specific module, 49 (49/50; 98%) respondents said they were more likely to identify FTP issues in themselves and others. The increased likelihood to identify FTP issues was represented in two themes, detailed below with accompanying quotes:

1. **Awareness of definition of FTP** (n = 24 responses) *"I now know what is the definition of an FTP issue, whereas before it was a little grey as to what would and wouldn't be considered as an issue".*
2. **Importance of identification and seeking help** (n = 9 responses) *"I can see that it is simple to raise the issue and the Uni will support me". "I am aware of what to suggest for friends to do. I am aware of the process required to discuss any issues".*

Ability to self-manage

Viewing the FTP specific module impacted on 45 (45/50; 90%) students' ability to self-manage FTP issues. For five (5/50; 10%) students, however there was no change in their ability to self-manage. For those students that the module had an impact on the influence was positive as described in four themes with quotes below:

1. **Proactive strategies** (n = 12 responses) *"It has given me more insight and awareness of what are the possible aspects in mental/ physical health and competence that might affect my performance and motivation during placement. It has provided me with more options and services to seek help in university that I was not aware of" and "There is always help out there. The onus is on me".*
2. **OK to seek support** (n = 10 responses) *"I would be more likely to seek out extra help now having completed the module rather than keep my issues to myself".*
3. **Awareness of wellbeing strategies** (n = 4 responses) *"Managing stress/sleep issues".*
4. **Confidence** (n = 3 responses) *"I think I feel more confident about seeking assistance if I were to have an FTP issue in the future".*

Seeking support

Four (4/50; 8%) students said they were *"Already aware when to seek support"*. Forty-six (46/50; 92%) students, however stated they were more likely to seek support as illustrated by the following three themes:

1. **Awareness of support services** (n = 25 responses) *"It provides details on who to contact, and how they may be of assistance".*
2. **Beneficial processes** (n = 16 responses) *"Yes definitely, as all the cases had successful outcomes due to the help and services of the uni" and "I know how important it is to consult with the university and clinical supervisors to really deal with whatever is affecting my learning and performance".*
3. **Easy** (n = 8 responses) *"It looks easy and confidential". "It reminded me how easily accessible the uni's support groups are and how lovely the physiotherapy staff are - very approachable".*

Impact on help-seeking

When asked *"Were there any factors that may impact on you seeking help for FTP issues?"* Twenty-nine (29/50; 58%) respondents said *"No"*. The respondents that said *"Yes"* described this under the following three themes:

1. **Significance of issues** (n = 5 responses) *"The reason why I would hesitate is because sometimes my problems do not seem significant when compared with others. Hence, I do not want to come off as an incompetent student who cannot deal with her own emotions/ feelings", "Knowing that you are not the only student to have had or experiencing FTP issues".*
2. **May complicate issue** (n = 4 responses) *"...Sometimes [I] feel getting others involved may complicate the situation" and "Supervisors may be prejudiced if they know the issue".*
3. **Reluctance** (n = 5 responses) *"I feel I would not have the time to seek help e.g. go to appointments for counselling". "Having never been to see a counsellor or anything like that before I think I would be a bit hesitant". "Confidentiality as I know that even though it is said that the unit coordinator will tell no one, I'm pretty sure they will".*

FTP module components

When asked *"What components of the FTP specific module did you find least helpful, most helpful and any suggested improvements?"* respondents discussed these under a number of themes as seen in Table 2.

Respondents were then asked if there were any other comments / queries or suggestions. The eight responses were reported in one theme:

1. **Positive comments** (n = 8 responses) *"The whole module was very clear, easy to follow and didn't take too long and has definitely made me feel more confident in identifying any FTP issues I may have and the best way to manage these. As well as reassure me that it is ok to seek help".*

DISCUSSION

Physiotherapy students were more confident in their ability to define FTP and identify relevant supports after completing the FTP specific module. However, no significant change was observed in their likelihood to self-manage FTP issues. Students stated that they were more likely to seek help for FTP issues. This was a statistically significant change. This latter finding may challenge the literature that health professional students tend to obtain informal 'curb-side' assistance from colleagues (assistance given when the opportunity arises e.g. when they are walking home from clinical placement) (Roberts et al., 2000). At the post-survey, thirty-eight (38/47; 81%) students were *"Quite likely"* or *"Very likely"* to seek help for FTP issues. This is a promising finding.

In the pre-survey, 17/68 (25%) students had an FTP issue compared to 12/50 (24%) students in the post-survey. These figures could be considered high, highlighting the importance of this work. All students with FTP issues stated that these affected their clinical placements, such as impacting on clinical competence, absenteeism and mental health issues. Mental health issues and interpersonal concerns, such as issues about family or relationship issues, are particularly important to identify as these factors have been found to negatively impact on academic performance (Kernan et al., 2008). Given these factors are amenable to change, are frequent in occurrence and have

Table 2: Components of the FTP module that were least and most helpful and suggested improvements

Least helpful	Most helpful	Improvements
<p>1. Videos (n = 9 responses) There were comments about the length of videos, difficulty loading due to slow internet speed and video content <i>"Also more videos or at least reasons for seeking FTP help from the unit coordinator; it is often not clear whether I should be seeking help with my issue, as I think that it may not be classified as such"</i>.</p>	<p>1. Links to resources (n = 23 responses) <i>"Slides that have links and questions that require us to look up information and sites about the services" and the "Journal article"</i>.</p>	<p>1. Duration (n = 10 responses) <i>"Lots of reading, maybe compress it/make it shorter particularly the privacy information". "The slides were very brief with information on for example mental health; I would've liked more information on the topics. It sort of just skimmed the surface, but I am aware that maybe that's how it's supposed to be?"</i></p>
<p>2. Mindfulness content (n = 8 responses) <i>"The meditation type slides"</i>.</p>	<p>2. Videos (n = 13 responses) <i>"The video showing Krista and Kristin [university unit coordinator] as it shows how the conversation could go with the unit coordinator; it definitely makes it less scary"</i>.</p>	<p>2. Video case studies (n = 7 responses) <i>"Maybe include more case studies so that students can maybe relate to one of the many scenarios where students should seek help with"</i>.</p>
<p>3. Too much information (n = 4 responses) <i>"I'm much more likely to read a quick summary of key points than to go browse a whole document. It is good to have them to refer back to though!"</i></p>	<p>3. Interactive activities (n = 10 responses) <i>"The mini quizzes throughout the module were extremely helpful in consolidating learnt information, the videos and the website hyperlinks were easy to follow, making learning enjoyable"</i>.</p>	<p>3. Hurdle task (n = 3 responses) <i>"This module should be a hurdle task for Year 3 students prior to commencing clinical placements"</i>.</p>
<p>4. Matching questions (n = 2 responses) <i>"The matching questions (they are pretty obvious in their answers). Nevertheless, they made the module a little more interactive and fun to do"</i>.</p>	<p>4. Case scenarios (n = 7 responses) <i>"Case studies. One with a medical issue and one with a mental health issue helped cover all bases"</i>.</p>	<p>4. Technical issues (n = 3 responses) <i>"Only technical things something on the Moodle screen that acknowledges you have completed it"</i>.</p>
	<p>5. Definition of FTP (n = 3 responses) <i>"Descriptions as the start of the different types of FTP"</i>.</p>	

the potential to significantly impact on academic performance, they should be a priority for intervention (Kernan et al., 2008).

Factors identified by students that may facilitate help-seeking behaviour were encouragement from positive and approachable staff, knowing that there are no repercussions, privacy and beneficial processes. Awareness of how to seek help including easy access to available services and knowledge of how to apply for special consideration were also important to students. These findings align with those of Tee and Jowett's (2009) that support was needed to achieve a student-friendly, private, online FTP self-declaration process and that effective procedures are needed for follow-up, to enable issues to be addressed in a timely manner.

It is also important to, where possible, address factors that may discourage students from seeking help such as a lack of staff empathy, stigma of certain FTP issues or perception that issues are not bad enough and should be self-managed. Tertiary education providers should also address the perceived lack of privacy, time constraints and feeling isolated on clinical placement. Additional factors include the perception that

disclosing FTP concerns may complicate issues or prejudice supervisors, students feeling like they are the only one with an FTP issue, the repetition of contact to obtain support such as special consideration, and dispelling fears about consulting health practitioners. These factors are similar to Givens and Tija (2002) who found that depressed medical students cited the barriers to seeking professional help as being a lack of time, perceived lack of confidentiality, stigma associated with using mental health services, fear of documentation on academic record, fear of unwanted intervention, and cost. The cost of student support services was not an issue for this cohort as the University health services, counselling and academic support are included in university fees.

The response of one student, that when they feel like an issue is not self-manageable they seek help from peers, is characteristic of previous responses in the literature (Roberts et al., 2000).

The key learnings were to define FTP and the importance of being more able to recognise possible impairments, understand the processes in place to support FTP, identify key resources, understand the benefits and achieve confidence in proactively

seeking help, understand privacy legislation, and create a supportive environment. The importance of a supportive environment is supported by Kernan (2008) who states that academic success can be optimally achieved when the barriers to wellbeing are low and strategies are in place to address health concerns that may impact on student learning. This environment can best be fostered when the health concerns that have the most potential to negatively affect learning are known.

Further learnings from the FTP specific module were to practise wellbeing strategies such as mindfulness, be aware that students may place others at risk if they do not seek help, and to understand that the onus is on the students themselves. The latter reflects the limitations found in a nursing and midwifery university FTP programme where processes did not encourage student self-reflection or taking responsibility of their issues by self-declaring FTP concerns (Tee & Jowett, 2009).

The insights demonstrated by this cohort of students are different to those observed by Cleland (2005) who found that underperforming medical students did not consider it their responsibility to seek help. The reason for the difference between our findings and those by Cleland may be a consequence of the type of students who may participate in a voluntary educational programme.

The important aspects to include in an FTP module were links to resources, case study videos demonstrating student scenarios, and an example of a meeting with the academic unit coordinator to increase participant confidence to access help. Interactive activities such as mini quizzes which can be reattempted and website links throughout the FTP specific module to consolidate learning material were also beneficial inclusions. Descriptions of FTP issues are important to include as well as written resources, such as relevant journal articles. It is important for tertiary education providers and policymakers to be made aware of these important inclusions. In the development of the FTP module, the education developer and the instructional designer needed to work together to create an informative and engaging educational experience. Great care was taken to accurately inform students and no adverse educational impacts were noted.

Limitations to the module

To address any limitations of the video used, the videos need to be succinct and include realistic examples of the behaviours that are deemed inappropriate. In trying to make the module interactive, students with limited internet access need to be acknowledged and alternative options be made available to them. As suggested by participants, the module must incorporate summaries of key points so students receive clear messages in an efficient manner. The module also needs to have access to full documents so that they can be referred to for further reading.

As students found the wellbeing content both a strength and a limitation, this content should be kept concise and relevant. The module's interactive matching questions were a helpful inclusion however the answers need to be less obvious. A relatively small number of students completed the package and this could be

increased by making the module a 'hurdle' or compulsory task prior to attending clinical placement. Technical issues such as acknowledging when students have completed the module on the learning system home page could be addressed. There could be more content on topics such as mental health with details on how to navigate the services available using the university website.

This study was a pilot of Australian physiotherapy students and we are not aware of the demographic differences between students or cultures of different academic programmes limiting the transferability of the findings. As we reassessed the outcomes immediately post-module, we cannot comment on the long term impact of the module. This would be an area for future research. Including gender, age, ethnicity and marital status of participants and the types of FTP issues experienced by participants in a future survey would improve the generalisability of the findings.

Future research

Future research includes the potential to create consistency across Australia and New Zealand in supporting students with FTP issues as has been done with the physiotherapy bi-national practice thresholds (Physiotherapy Board of Australia & Physiotherapy Board of New Zealand, 2015). Approaches are also required to support clinical educators in the supervision of students with FTP issues. There is potential for this education resource to be accessible to both clinical educators and university academic staff to increase their awareness of relevant support services.

CONCLUSION

FTP issues are common in health professional education and often arise on clinical placements where stress levels peak. Students are traditionally less inclined to seek help for FTP issues. An FTP specific module has demonstrated increased student learning and understanding with regard to seeking help. Strategies to improve FTP specific curricula are important for universities and policymakers to consider.

KEY POINTS

1. Health professional students experience fitness to practise (FTP) issues particularly on clinical placement but are less inclined to seek help.
2. To our knowledge there is no evidence regarding online FTP specific curricula for health professional students.
3. Students need more information on FTP issues and relevant support services to encourage them to identify, disclose and seek help for any FTP concerns.
4. An online FTP specific module can improve student help seeking confidence.
5. Tertiary education providers and policymakers are encouraged to utilise student feedback when considering an FTP specific module.

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REFERENCES

- beyondblue (2017). Retrieved from https://www.beyondblue.org.au/?utm_source=google&utm_medium=cpc&utm_campaign=Branded-All-OtherKW&utm_term=beyond%20blue&gclid=CK2XseK50c8CFU0DvAodJ5olnQ.
- Bland, J. M., & Altman, D. G. (1995). Multiple significance tests: the Bonferroni method. *British Medical Journal*, *310*(6973), 170.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77-101. doi:10.1191/1478088706qp063oa.
- Chew-Graham, C. A., Rogers, A., & Yassin, N. (2003). 'I wouldn't want it on my CV or their records': medical students' experiences of help-seeking for mental health problems. *Medical Education*, *37*(10), 873-880.
- Cleland, J., Arnold, R., & Chesser, A. (2005). Failing finals is often a surprise for the student but not the teacher: identifying difficulties and supporting students with academic difficulties. *Medical Teacher*, *27*(6), 504-508.
- de Vibe, M., Solhaug, I., Tyssen, R., Friberg, O., Rosenvinge, J. H., Sorlie, T., & Bjorndal, A. (2013). Mindfulness training for stress management: a randomised controlled study of medical and psychology students. *BioMedCentral (BMC) Medical Education*, *13*, 107. doi:10.1186/1472-6920-13-107.
- Devereux, J., Hosgood, P., Kirton, J., Jack, B. A., & Jinks, A. M. (2012). Why do students fail to disclose health problems? *Nursing Times*, *108*(1-2), 18-20.
- Dyrbye, L., Schwartz, A., Downing, S., Sloan, J., & Shanafelt, T. (2011). Effectiveness of a brief screening tool to identify medical students in severe distress. *Journal of General Internal Medicine*, *26*, S49-S50.
- Erogul, M., Singer, G., McIntyre, T., & Stefanov, D. G. (2014). Abridged mindfulness intervention to support wellness in first-year medical students. *Teaching and Learning in Medicine*, *26*(4), 350-356.
- Givens, J. L., & Tjia, J. (2002). Depressed medical students' use of mental health services and barriers to use. *Academic Medicine*, *77*(9), 918-921.
- Headspace (2017) Retrieved from <https://www.headspace.org.au/>.
- Johnson, W. B., Porter, K., Campbell, C. D., & Kupko, E. N. (2005). Character and Fitness Requirements for Professional Psychologists: An Examination of State Licensing Application Forms. *Professional Psychology: Research and Practice*, *36*(6), 654.
- Jorm, A. F., Kitchener, B. A., Fischer, J.-A., & Cvetkovski, S. (2010). Mental health first aid training by e-learning: a randomized controlled trial. *Australian and New Zealand Journal of Psychiatry*, *44*(12), 1072-1081.
- Kernan, W. D., Wheat, M. E., & Lerner, B. A. (2008). Linking learning and health: a pilot study of medical students' perceptions of the academic impact of various health issues. *Academic Psychiatry*, *32*(1), 61-64.
- Kirkpatrick, D. L. (1975). *Evaluating training programs*: Tata McGraw-Hill Education.
- Lo, K., Curtis, H., Keating, J. L., & Bearman, M. (2017). Physiotherapy Clinical Educators' perceptions of student Fitness to Practise. *BioMedCentral (BMC) Medical Education*. *7*(1), 16.
- Lo, K., Maloney, S., Bearman, M., & Morgan, P. (2014). Proactive Student Engagement with Fitness to Practise. *Journal of Biomedical Education*, *2014*, 8. doi:10.1155/2014/578649.
- Lo, K., Waterland, J., Todd, P., Gupta, T., Bearman, M., Hassed, C., & Keating, J. (2017). Group interventions to promote mental health in health professional education: a systematic review and meta-analysis of randomised controlled trials. *Advances in Health Sciences Education*, 1-35. doi:10.1007/s10459-017-9770-5
- Norman, G. (2010). Likert scales, levels of measurement and the "laws" of statistics. *Advances in Health Sciences Education*, *15*(5), 625-632.
- Parker, M. (2006). Assessing professionalism: theory and practice. *Medical Teacher*, *28*(5), 399-403.
- Physiotherapy Board of Australia & Physiotherapy Board of New Zealand. (2015). *Physiotherapy practice thresholds in Australia and Aotearoa New Zealand*. Retrieved from <https://www.physioboard.org.nz/physiotherapy-practice-thresholds-australia-aotearoa-new-zealand>.
- Roberts, L. W., Hardee, J. T., Franchini, G., Stidley, C. A., & Siegler, M. (1996). Medical students as patients: a pilot study of their health care needs, practices, and concerns. *Academic Medicine*, *71*(11), 1225-1232.
- Roberts, L. W., Warner, T. D., Carter, D., Frank, E., Ganzini, L., & Lyketsos, C. (2000). Caring for medical students as patients: access to services and care-seeking practices of 1,027 students at nine medical schools. *Academic Medicine*, *75*(3), 272-277.
- Roberts, L. W., Warner, T. D., Rogers, M., Horwitz, R., Redgrave, G., & Care, C. R. (2005). Medical student illness and impairment: a vignette-based survey study involving 955 students at 9 medical schools. *Comprehensive Psychiatry*, *46*(3), 229-237.
- Schweitzer, R. D. (1996). Problems and awareness of support services among students at an urban Australian university. *Journal of American College Health*, *45*(2), 73-77. doi:10.1080/07448481.1996.9936865.
- Shaw, D. (2009). Ethics, professionalism and fitness to practice: three concepts, not one. *Br Dent J*, *207*(2), 59-62.
- Tee, S. R., & Jowett, R. M. (2009). Achieving fitness to practice: Contributing to public and patient protection in nurse education. *Nurse Education Today*, *29*(4), 439-447.
- Warne, C. (2002). Keeping in shape: achieving fitness to practice. *British Journal of Occupational Therapy*, *65*(5), 219-223.
- Wright, C. A., Jolly, B., Schneider-Kolsky, M. E., & Baird, M. A. (2011). Defining fitness to practice in Australian radiation therapy: A focus group study. *Radiography*, *17*(1), 6-13. doi:10.1016/j.radi.2010.10.001.

Appendix 1.

Pre-survey

- Q1. What is your current year of study?
- Q2. Do you feel confident to define FTP? (1 = Not at all, 2 = a little bit confident, 3 = somewhat confident, 4 = quite confident, 5 = very confident)
- Q3. How confident are you to identify relevant resources in the university to support FTP? (1 = Not at all, 2 = a little bit confident, 3 = somewhat confident, 4 = quite confident, 5 = very confident)
- Q4. If you had a FTP issue, how likely are you to self-manage? (1 = not at all likely, 2 = a little bit likely, 3 = somewhat likely, 4 = quite likely, 5 = very likely)
- Q5. How likely are you to seek help for FTP issues? (1 = not at all likely, 2 = a little bit likely, 3 = somewhat likely, 4 = quite likely, 5 = very likely)
- Q6. Have you previously had a FTP issue?
- Q7. Did it affect your clinical placement?
- Q8. Did you seek help?
- Q9. Do you feel you currently have a Fitness to Practise (FTP) issue?
- Q10. If you feel it will affect your clinical performance, please describe how below
- Q11. Are you planning on seeking help?
- Q12. What might encourage / discourage you from seeking help?
- Q13. Do you know where to seek help about FTP issues?
- Q14. Have you known someone else with a FTP issue?
- Q15. Do you know what to do if a colleague has a FTP issue?

Post survey

- Q1. How many minutes did the FTP specific module take?
- Q2. Do you feel confident to define FTP? (1 = Not at all, 2 = a little bit confident, 3 = somewhat confident, 4 = quite confident, 5 = very confident)
- Q3. How confident are you to identify relevant resources in the university to support FTP? (1 = Not at all, 2 = a little bit confident, 3 = somewhat confident, 4 = quite confident, 5 = very confident)
- Q4. If you had a FTP issue, how likely are you to self-manage? (1 = not at all likely, 2 = a little bit likely, 3 = somewhat likely, 4 = quite likely, 5 = very likely)
- Q5. How likely are you to seek help for FTP issues? (1 = not at all likely, 2 = a little bit likely, 3 = somewhat likely, 4 = quite likely, 5 = very likely)
- Q6. What were the key learnings from this FTP specific module?
- Q7. Do you have a current FTP issue?
- Q8. Are you planning on seeking help?
- Q9. Do you know where to seek help?
- Q10. Do you know what to do if a colleague has a FTP issue?
- Q11. After viewing this FTP specific module, are you more likely to identify FTP issues in yourself or others? Please describe why this might be?
- Q12. Has this FTP specific module impacted on your ability to self-manage FTP issues? Please describe why might this be?
- Q13. If you had a FTP issue are you more likely to seek supports after viewing this FTP specific module? Please describe why might this be?
- Q14. Are there any factors that may impact on you seeking help for FTP issues (eg: confidentiality / benefits of seeking help etc)? Please describe why might this be?
- Q15. What components of the FTP specific module did you find least helpful?
- Q16. What components of the FTP specific module did you find most helpful?
- Q17. How could this FTP specific module be improved?
- Q18. Any other comments / queries / suggestions?

