Bond University

Australian Journal of Clinical Education

Volume 14 Issue 1

2025

Client Experiences, Perceptions and Acceptability of a Digital Health Enabled Student-Led Exercise Physiology Clinic for Metabolic Conditions: A Qualitative Study

Riley C C Brown
The University of Queensland

Sophie Marron
The University of Queensland

Jaimon T. Kelly
The University of Queensland

Nicola W. Burton
Griffith University

Ingrid J. Hickman
The University of Queensland

Jeff S. Coombes
The University of Queensland

Shelley E. Keating
The University of Queensland

Client Experiences, Perceptions and Acceptability of a Digital Health Enabled Student-Led Exercise Physiology Clinic for Metabolic Conditions: a Qualitative Study

Riley C C Brown,[*] Sophie Marron,[◊] Jaimon T. Kelly,[□] Nicola W. Burton,[<] Ingrid J. Hickman,[^] Jeff S. Coombes,[◊] Shelley E. Keating [◊]

[*] RECOVER Injury Research Centre & School of Human Movement and Nutrition Sciences, The University of Queensland
[◊] School of Human Movement and Nutrition Sciences, The University of Queensland
[□] Centre for Online Health & Centre for Health Services Research, The University of Queensland
[<] School of Applied Psychology & Centre for Mental Health, Griffith University
[^] Faculty of Medicine, The University of Queensland; Princess Alexandra Hospital

Abstract

Student-led digital health clinics allow for the practical application of knowledge and learned skills with real world clients. Understanding client perspectives of these programs may provide insights to improve clinics and maximise outcomes for clients and students. This study aimed to evaluate the perceptions and experiences of people with a metabolic condition (n=9) who participated in a student-led digital health exercise physiology clinic. Eligible participants were adults with overweight or obesity and/or a metabolic condition who completed a six-week clinic comprising weekly individual video consultations for exercise prescription and support (including a wearable activity monitor and asynchronous individual program via mobile app). Focus groups were conducted with participants within two weeks of clinic completion. Participant feedback was aligned against the constructs of the Theoretical Framework of Acceptability. Three key themes were identified: i) digital health clinics improve accessibility to exercise physiology services, but introduce an ongoing technical burden, ii) student exercise physiologists are valued, irrespective of their experience level, iii) technology issues are common and challenging for digital health service, but technology features are important to participants. Participants had positive feelings towards the clinic, appreciated the accessibility of the sessions and praised the empathetic and helpful nature of the student exercise physiologists. Challenges to acceptability included technological issues and inefficiencies with clinic structure (such as lack of technical orientation). This student-led digital health exercise physiology clinic had positive participant experiences and high client acceptability from this sample.

I INTRODUCTION

Physical inactivity and low cardiorespiratory fitness are risk factors for the development of chronic conditions (Franklin et al., 2022; Kodama et al., 2009). Nearly one third of adults are insufficiently active worldwide (Strain et al., 2024), with just 25% of Australian adults meeting the aerobic and muscle strengthening physical activity guidelines (Australian Institute of Health and Welfare, 2023). Among Australian adults living with chronic disease, only 5% received a subsidised physical health care service (defined as physiotherapy, exercise physiology, chiropractic and osteopathic services) in 2022-23 (Australian Institute of Health and Welfare, 2024). This highlights the need for novel approaches to service delivery to enhance access to and promote physical health care.

Student-led health clinics are an approach to work-integrated learning (WiL), and provide a supervised, authentic practical experience with clients (Ahern & O'Donnell, 2022; Cripps et al., 2023). The clinic model allows for application of skills in a profession-reflective environment (Ahern & O'Donnell, 2022). Student-led clinics reflect high quality care principles (Ahern & O'Donnell, 2022) and may result in clinical improvements for clients similar to that of professional-led interventions (Suen et al., 2020). Despite evidence supporting the efficacy of student-led clinics to deliver healthcare that enhances learning in different settings (including exercise science) (Cripps et al., 2023; Stuhlmiller & Tolchard, 2015; Wilson et al., 2023), there is a paucity of literature investigating the perceptions and experiences of clients undertaking these services.

Digital health is an umbrella term describing the application of digital technologies in a health-specific context (Herold et al., 2022). Exercise digital health interventions include mobile health (mHealth; e.g. wearable fitness monitors) and telehealth (e.g. video consultations) (Herold et al., 2022). These interventions appear to be feasible and cost-effective, with the potential to improve access to sustainable high-quality care (Brown et al., 2024). Digital health student-led clinics may be feasible for students and clients in WiL contexts (Walker et al., 2022), and could be used for exercise physiology educational settings.

Accredited Exercise Physiologists (AEPs) are tertiary qualified allied health professionals specialising in the delivery of individualised exercise assessment, prescription and programming for people with chronic diseases in Australia (Exercise & Sport Science Australia, 2024; Smart et al., 2016). Digital access to exercise physiology services was valued by participants through the COVID-19 pandemic, although enjoyment was influenced by a lack of social engagement and presence of technical issues (Brown et al., 2023). Exercise physiology services provided via digital health could therefore be a suitable option for clients to increase accessibility and WiL options. However, client perspectives are yet to be investigated. Therefore, the primary aim of this study was to evaluate the perceptions and experiences of people with a metabolic condition who participated in a student-led digital health exercise physiology clinic. We also sought to evaluate the acceptability of this clinic among participants.

II MATERIALS AND METHODS

This study was granted ethics approval by the University of Queensland Human Research Ethics Committee (project number: 2022/HE001498). Findings are reported in accordance with the Consolidated criteria for Reporting Qualitative research (COREQ) (Tong et al., 2007). All participants provided written informed consent prior to involvement in the study.

A *Overview of Study Design, Method and Context*

This study employed a qualitative description approach (Bradshaw et al., 2017) to understand client perceptions and experiences of a student-led digital health exercise physiology clinic (Bradley et al., 2007). This approach was chosen to explore the lived experience insights directly from participants without the constraints of a quantitative survey which may have limited the information obtained to a preconceived set of questions. This approach generally focuses on a low level of data interpretation and provides a rich description of the experience in understandable language (Mayr et al., 2022). This clinic was conducted during one semester (September-October

2022) at a metropolitan university, and videoconferencing focus groups were conducted at the end of the 6-week clinic.

B *Participants*

Participants were adults (age: ≥18 years; able to understand and write in English) with overweight or obesity and/or a metabolic condition (e.g. type 1/type 2 diabetes, liver/kidney disease, polycystic ovarian syndrome, gastrointestinal disorders) who had completed a 6-week student-led digital health exercise physiology clinic at The University of Queensland (UQ) in the last 4 weeks. The clinic included video consultations with student exercise physiologists (60-minute individual sessions offered weekly), clinic clients being given a wearable activity monitor (Fitbit Inspire HR™) to wear and access to an individualised asynchronous exercise program through an exercise app (Physitrack Ltd, London, UK; accessible by smartphone or web browser). Video consultations consisted of physical activity counselling, individualised exercise prescription and technical support. The clinic was facilitated by third year undergraduate clinical exercise physiology students from UQ.

All clinic clients from September-October 2022 were invited to participate in this descriptive study via email from the project manager (RCCB) upon clinic completion. Emails contained study information packages and consent forms. Clinic clients were given one email reminder message of the study invitation. Participants provided informed consent via email. Collectively, 36% (n=9/25) of clinic clients agreed to participate in focus group interviews. Reasons for non-participation were not assessed, and no participants withdrew consent following enrolment.

C *Data Collection*

The data collection period spanned from November 1st 2022 to November 4th 2022. Three focus groups were held on separate days via videoconferencing in participants' choice of setting (e.g. home or workplace). Two researchers experienced in facilitating focus groups and qualitative research (SEK, PhD, senior lecturer & AEP, woman; RCCB, PhD, research fellow & AEP, man) facilitated all focus groups. There were no established relationships between the facilitators and participants prior to focus group interviews. Focus group facilitators introduced themselves as a member of the research team and then verbally verified the consent of participants and discussed the process and relevant study-based information regarding aims, funding and participation.

Focus groups were video and audio recorded for transcription and data analysis (San Jose, CA: Zoom Video Communications Inc). Open-ended questions were presented in three overarching themes to elicit in-depth responses from participants (Supplementary Material 1). Prior to focus groups, interview questions were reviewed by the authorship team who have expertise in the delivery of digital health exercise interventions, qualitative research, program evaluation and health promotion. This process was completed to ensure consistency with principles of relevance and understandability. Questions were used to assess participant experiences and feedback of the clinic (enjoyment, implementation schedule, approach, support, satisfaction), wearable fitness monitor and apps (enjoyment, utility, recommendations, support strategies) and technology (issues, support, resolutions). During focus groups, facilitators displayed the assessment questions via screen share to help guide participant discussion. Facilitators asked further questions to clarify or obtain additional information following responses to key questions. No repeat interviews or field notes were taken. Due to the study timing and resource constraints, transcripts were not returned to participants for comment and/or correction.

D *Data Analysis*

Qualitative analysis comprised of two phases. Phase one included independent thematic analysis of written transcripts by one researcher (SM, final-year exercise physiology honours student, woman) using Microsoft Excel (Microsoft, Redmond, WA, USA). This process was supervised by two senior researchers on the investigator team (RCCB & SEK). Transcripts of recordings were verified for accuracy prior to analysis by one researcher comparing the audio recording and the transcript (SM). The integrated approach to analysing qualitative data involved:

i) summarising data and identifying initial response types, ii) creating and applying a framework of codes based on responses, iii) connecting codes and identifying themes and iv) corroborating coded themes (Fereday & Muir-Cochrane, 2006). These data were verified by a second researcher (RCCB). Each researcher (SM & RCCB) independently familiarised themselves with the data and extracted, coded and tabulated meaningful phrases. Themes and subthemes were derived using deductive and inductive approaches and compared, guided by the approach of Braun and Clarke (Braun & Clarke, 2012, 2024). Consensus discussions were held to confirm themes and subthemes. If consensus could not be reached, a third reviewer confirmed themes/subthemes (SEK). Trustworthiness of the data was assessed using four criteria: i) dependability (data triangulation by two researchers (RCCB & SM) with rigorous data collection techniques, procedures and analyses) ii) transferability (in-depth details on the study methods/results with purposive sampling), iii)) credibility (data triangulation from multiple perspectives in focus groups; two researchers confirming themes/subthemes (RCCB & SM)) and iv) confirmability (reflexivity, briefing and meetings between RCCB, SEK & SM were conducted to ensure methodological rigour).

Phase two included aligning the derived themes and subthemes with constructs of the Theoretical Framework of Acceptability (TFA) (Sekhon et al., 2017). The TFA was utilised to guide the assessment of acceptability from intervention recipients and consists of seven constructs which were applied to the current study as follows: i) affective attitude (feelings towards clinic), ii) burden (perceived effort of participation in the clinic), iii) ethicality (extent to which the clinic fits with participants' values), iv) intervention coherence (extent of understanding the clinic and how it works), v) opportunity costs (what was given up to engage with the clinic), vi) perceived effectiveness (beliefs about the clinic purpose being achieved) and, vii) self-efficacy (confidence to do required behaviours to engage with the clinic). Data were reviewed and aligned with the TFA by one author (RCCB) and confirmed via online discussions with a senior researcher co-author with expertise in acceptability research (NWB, PhD, Associate Professor & clinical/health psychologist, woman).

III RESULTS

Participant characteristics are described in Table 1. Out of the 25 people with metabolic conditions involved in the student-led clinic, nine participants (36%) were recruited for this study (seven women and two men). Average age was 54.7 ± 14.1 years. Metabolic conditions present in participants included Type 2 Diabetes (56%), Overweight/obesity (33%) and Polycystic Ovary Syndrome (11%). Three key themes with pertinent sub-themes were identified (Figure 1).

A *Participant Perceptions and Experiences*

1 *Digital health clinics improve accessibility to exercise physiology services, but introduce an ongoing technical burden*

A digital health exercise physiology clinic was perceived to enable access to healthcare beyond the usual in-person setting and was highly valued. Technical support when first learning how to use digital health tools was viewed as important.

2 *Having remote access to individualised exercise programs was desirable, accessible and convenient*

Participants valued the accessibility and convenience of the digital health exercise physiology clinic. Decreased time/travel commitments and the ability to do exercises at home were identified as advantageous compared to physically attending a central facility.

> "I enjoyed having not to come into the *[university campus]* to do the exercises. I thought it was great that I could do them from home in my own time and when I could fit them in. … I was glad that I didn't have to actually leave the house to do the exercises, I could do them at my own pace."- *Participant #6*

> "I couldn't have done it if it was at the *[university campus]* for a number of factors- my work, where I live, and also too, in my case, uh, we were away for three of the six weeks of it, so

having it as a telehealth and having those three lovely students, and all different personalities, brought the best out of me and in different ways." – *Participant #7*

"I did, just because I think I was able to slot it into my time frames when I wanted to. So, it was convenient" – *Participant #3*

3 *Clinic structure requires orientation to digital health with extra technical support at the commencement of the clinic*

Participants suggested that increased technical and exercise support at the beginning of the clinic would have been of benefit. Suggestions include more video consultation sessions in the initial phases of the program to learn exercises, or a preliminary in-person session to learn how to set up and use digital health tools.

“I think just initially getting that initial program defined it might be better to have two a week and then one, once a week. … In the beginning, I think if we've had a couple more sessions, I would have understood how to use the Fitbit a bit more too.” – *Participant #3*

"I would like one week or even two weeks of going through it face to face and then they send me off-right, now you can go and do it from the E health." – *Participant #8*

“I actually think it would be very beneficial if there was a pre-week, and so the pre-week was doing all the setup of the technology the other stuff, and then from the get go you actually have six weeks of measurements for your program, of your progress, of your goals and, and what you're achieving” – *Participant #7*

B *Student Exercise Physiologists are Valued, Irrespective of Their Experience Level*

1 *Person-centred approach to care by non-judgemental student exercise physiologists was helpful in establishing exercise habits*

Participants expressed positive feelings towards the student exercise physiologists. They felt supported by the students’ empathetic and person-centred approach to care.

“They got it when I spoke about different stuff, they understood. … It wasn't judgmental, and it was just encouraging and supportive.” - *Participant #7*

“With everything that they did, and everything they prescribed, they made sure that I was comfortable with it, and they would alter anything to what I liked or what I didn't like. … They basically simplified everything. … The more complicated terms, they really simplified that. I think that was a really good approach that they used.” - *Participant #9*

"I've got a, a bit of a shoulder injury, injury which slowed me down a little bit, and they did adjust my exercises for that." – *Participant #5*

“They were really good. Yeah, not judgmental at all. Very helpful, supportive.” - *Participant #8*

2 *Student exercise physiologists are developing confidence in practice and professionalism, but this did not adversely influence client clinic enjoyment*

Participants acknowledged that student exercise physiologists were developing their practice and professionalism, and the clinic was an important experience for students to develop their confidence. Some participants believed this influenced exercise programming (in terms of being more conservative), but it did not adversely affect participants’ enjoyment of the digital health clinic.

“They didn't have a lot of confidence, and they were quite gentle on me…” - *Participant #1*

“They were, from my point of view, obviously nervous, and obviously not 100% sure of what they were saying and doing. There was kind of, lots of embarrassed smiles. … I'm aware that as they get more experienced, they'll become more confident.” - *Participant #5*

“The funny thing I found was just that, that confidence level…at the end I actually said to them- I gave them like, mum advice, and you know like- got to be more confident! And stop saying sorry all the time! But that, overall, really grateful and I really enjoyed it.” – *Participant #1*

C *Technology Issues are Common and Challenging for Digital Health Service, but Technology Features are Important to Participants*

1 *Digital health has pervasive technological issues, which limits the utility of digital exercise tools*

Participants identified specific technological issues when using digital health tools. These included interface inefficiencies and technical and connectivity disruptions. Most issues were resolved by troubleshooting in video consultation sessions, but participants believed more preparatory sessions and information prior to the clinic would have been helpful.

> “What I didn't like was the exercise program went through the *[mobile application, brand anonymised]*, and it was so frustrating and slow that I ended up getting them to print it out on hard copy so I could do it a lot quicker.” - *Participant #4*

> "Knowing how to use it better would have been better. Just having it set up, up properly in the first place would have been better" – *Participant #7*

> “I think I just lost my place, that when I got my program through it didn't update and I wasn't sure whether it's because I had to turn the app off and turn it back on again.” - *Participant #5*

2 *Video consultations, exercise data monitoring and real-time prompts and feedback improve exercise adherence and motivation*

Weekly video consultation check-ins, real-time mobile app prompts, wearable activity monitor reminders to move and step counter features of the activity monitor were perceived by clients to help maintain exercise adherence and physical activity motivation.

> “Just little things like just getting up and walking 250 steps an hour is, like it just really makes you want to exercise and just keep you in check.” - *Participant #9*

> “And I love my fireworks! Got to my 5000 steps! I would do anything to get that 5000, and I'd just be walking along not even realizing went, and oh! I've done today already.” - *Participant #7*

> “I sort of got to look at it as more as a friend rather than as a monitor.” - *Participant #8*

> "So a lot of what I've been trying to do up until now has been YouTube, and you know, reading things online and very, very one sided with just me. So it was good to have real life. People and the personalization and the adjustments made as we went along, depending on how things were going." – *Participant #1*

3 *Acceptability*

A summary of participants’ experiences and feedback of the clinic against the acceptability components of the TFA is provided in Table 2. Participants generally had positive feelings towards the clinic (affective attitude), appreciated the flexibility and low demand the online sessions (burden) and praised the student exercise physiologists (ethicality). Challenges to acceptability included difficulties from technical issues with digital health tools (self-efficacy, intervention coherence) leading to frustration (perceived effectiveness).

IV DISCUSSION

Several themes were identified in this study of participant experiences and perceptions of a digital health student-led exercise physiology clinic for metabolic conditions. Clients perceived that digital health clinics enhance accessibility to exercise services, and student exercise physiologists and technology features (video consultations, exercise data monitoring and real-time prompts/feedback) were valued. High acceptability reflected flexibility and low demand from not attending a central facility, and access to specialised exercise services. Acceptability challenges included the technological issues and low levels of technical support at the start of the clinic. Clients also described insufficient orientation to the clinic structure.

A key positive experience of the clinic identified by participants was the remote access to individualised physical activity and exercise programs. Participants noted the flexibility and

convenience of the approach, and utility of different digital health tools (videoconferencing check in sessions and wearable fitness monitors). A 2021 report on Australian allied health telehealth services through the COVID-19 pandemic yielded similar results, with participants noting positive experiences and high satisfaction with videoconferencing-based exercise physiology services (Filbay, 2021). Factors contributing to satisfaction with digital delivery in the current study included delivery modality, the student experience and access to an individually prescribed exercise program. Access to the digital health tools was also described by clinic clients as positively influencing exercise motivation, enjoyment and adherence.

Despite nationally-compensable schemes for telehealth exercise physiology services available through Australia's universal healthcare system (Medicare), uptake by clinicians remains low (R. C. C. Brown et al., 2022). This may be attributed to low technical skill proficiency and preferences of practitioners (Thomas et al., 2022). The report on allied health telehealth services indicated that only 35% (n=56) of exercise physiologists had completed telehealth-specific training, the majority of which (n=24; 43%) received between two to four hours total (Filbay, 2021). Recent evidence suggests that digital health focus in university-based allied health curriculum is limited (Hui et al., 2021), with little focus on clinical application which is a key indicator of success with technology (Gallegos-Rejas et al., 2023). Given the effectiveness and acceptability of digital health in chronic disease cohorts (Barnett et al., 2024; Brown et al., 2022; Michaud et al., 2021; Taylor et al., 2022), student-led exercise physiology clinics may be of benefit for digital health training. Bimodal (i.e. embedded in curriculum, and external settings) WiL appears to elicit enhanced student outcomes in face-to-face settings in exercise and sport science (Cripps et al., 2023). Positive client experiences and acceptability identified in the current study may contribute to the continued advocacy for digital health student-led exercise physiology clinics to be included in academic curriculum. Such clinics could address multiple learning objectives related to the content of exercise physiology services as well as the process of providing digital health service. The latter objective could address current gaps in digital health training for future clinicians.

Another key finding of the current study was that the student exercise physiologists had high acceptability among clinic clients. They were described as empathetic, non-judgemental, supportive and able to adjust exercise programs to meet individual needs. This is consistent with person-centred care, which calls for a more holistic approach to care which incorporates individual context, beliefs and wellbeing to enhance outcomes (Santana et al., 2018). Although students were perceived by clients as sometimes lacking confidence and exercise programming experience, this did not adversely impact perceptions of the clinic. The data indicated that some of the clients enjoyed being able to encourage the students and thereby help the student learning process. This observation counters possible concerns about students providing clinic services and provides further support for student-led exercise physiology clinics in academic curriculum.

Negative experiences and challenges to acceptability related mostly to digital health technological issues and clinic structure (namely insufficient technical orientation). This finding is supported by a recent qualitative analysis of exercise physiologists and clients in Australia, where clients noted that digital health systems often frequently disrupted service delivery (Brown et al., 2023). In that study, although most technological issues could be addressed with troubleshooting, the perceived unreliability of technology for service delivery decreased overall satisfaction (both clinicians and clients) with telehealth (Brown et al., 2023). The COVID-19 context of the exercise physiology services delivered as part of that previous qualitative analysis differs from the current study, with clinicians and clients having to rapidly adapt service delivery to digital health mediums in response to public health restrictions (Brown et al., 2023). Considering the aforementioned lack of telehealth-specific training for exercise physiologists in Australia (Filbay, 2021), this may have increased technological issue occurrence rate. In addition to student training, student-led digital health clinics provide the opportunity for clients to experience digital health and if sufficient technology support is provided, clinics can possibly improve participant experiences with technology. Student-led clinics incorporating digital health may address the geographical and time barriers associated with clients accessing traditional exercise physiology services, while providing a supportive environment for behaviour change (Brown et al., 2023). This is especially important for individuals in remote underserved areas. This may also be relevant for those who find accessing in-person facility-based services challenging which may reflect concerns such as stigma (e.g. mental health), fatigue (e.g. chronic conditions) and competing time demands (e.g.

employment). In terms of structure of the current student clinic, participants would have preferred more supervised sessions at the start of the clinic, to assist with exercise and digital self-efficacy. Previous literature has suggested that prior use of technology and access to technical support equates to improved adherence outcomes (R. C. C. Brown et al., 2022; Chen et al., 2019). Therefore, future iterations of student-led exercise physiology clinics are encouraged to follow a front-loaded titrated format. This may include a higher number of supervised exercise sessions at the beginning of the clinic that then reduces throughout the intervention (as self-efficacy for using telehealth increases) or hybrid in-person/telehealth approaches. This is to provide increased technical and exercise support to clients and students at the beginning and support throughout the clinic, to facilitate exercise self-management and confidence with digital health tools.

For digital health to be optimised for exercise physiology service delivery, universal requirements should be met. This includes developing skilled personnel that are competent in both the delivery of digital health services and administrative requirements (including troubleshooting technological challenges) (Thomas et al., 2022). For future student-led digital health clinics, this may include: i) providing student with information prior to clinic commencement about how to conduct sessions in alignment with professional recommendations and standards (Brennan et al., 2010; Davies et al., 2021; Lee et al., 2024), ii) selecting telehealth modalities that are appropriate for individual participant preferences, goals and digital literacy (Owen et al., 2022), and iii) selecting exercise assessments and prescription that is easily deliverable and adaptable in a digital setting.

The qualitative analysis of focus group data was a strength of the study as it allowed for a rich, in-depth understanding of participant experiences. This provided more descriptive detail than quantitative approaches (e.g. survey with numeric satisfaction ratings). This study presents unique findings that support the recommendation of more delivery of digital health services to clients as part of university-based allied health curriculum. The clinic had a specific focus (i.e. exercise for people with metabolic conditions), and different clinic programming or client populations may have provided different results. The sample of the current study had a higher proportion of women than men, those aged 51+ years than younger, and those with type 2 diabetes vs other metabolic conditions. Participants were largely based in a major metropolitan city. Future research could explore acceptability and applicability of student-led digital exercise clinics in other populations and contexts. This study focused on acceptability, and as such we did not collect data on changes in physical activity levels or other objective health outcomes. Therefore, positive perceptions of the digital health clinic cannot be linked to improvements in quantitative outcome measures. Future research could include quantitative measures of physical activity and health to observe this relationship and thereby extend the evaluation of this student-led clinic. Future research could also explore the nuances of specific low acceptability components (e.g. technical inefficiencies) and engage with people declining to participate in the clinics for their perspectives to provide a broader understanding of acceptability for the clinics in these population groups. Less than half of the cohort involved in the student-led digital health clinic (n= 9/25) participated in this study. Due to study timing and resource constraints, it was not possible to return transcripts and findings to participants for corrections and interpretation. Since member checking is an important part of evaluating trustworthiness in qualitative research, these findings should be considered in this context.

This evaluation of participant experiences and perceptions with a student-led digital health exercise physiology clinic in metabolic conditions identified both positive client experiences and technology-related challenges. Client experiences highlighted key considerations for the creation, enhancement and facilitation of digital health programs, including: i) implementing a hybrid approach to delivery with in-person and digital elements, ii) having technical orientation at the start of the clinic, iii) utilising a variety of digital health tools and, iv) emphasising access to individualised exercise programming and contact with students. These findings indicate that digital health clinics could be implemented into exercise physiology tertiary programs with high levels of client acceptability. The provision of more initial support may address technological issues for clients and students therefore improving the service. Student-led exercise physiology clinics could enhance client access and engagement with physical health care and thereby contribute to the management of metabolic diseases such as type 2 diabetes.

1 *Declaration of interest statement*

No potential conflict of interest was reported by the authors.

2 *Funding*

This study was not supported by any external funding source.

References

Ahern, C., & O'Donnell, M. (2022). Are physiotherapy student-led services a suitable model of clinical education? - perceptions & experiences of physiotherapists, students & patients, a qualitative meta-synthesis. *Physiother Theory Pract*, *39*(5), 1-16. https://doi.org/10.1080/09593985.2022.2031362

Australian Institute of Health and Welfare. (2023). *Physical Activity*. Australian Government. https://www.aihw.gov.au/reports/physical-activity/physical-activity

Australian Institute of Health and Welfare. (2024). *Medicare-subsidised GP, allied health and specialist health care across local areas: 2022-23*. Australian Government. https://www.aihw.gov.au/getmedia/b8e74d24-c3eb-46ab-8593-a8780f1d6ff4/medicare-subsidised-gp-allied-health-and-specialist-health-care-across-local-areas-2022-23.pdf?v=20240307100238&inline=true

Barnett, A., Catapan, S. C., Jegatheesan, D. K., Conley, M. M., Keating, S. E., Mayr, H. L., Webb, L., Brown, R. C. C., Coombes, J. S., Macdonald, G. A., Isbel, N. M., Burton, N. W., Campbell, K. L., Hickman, I. J., & Kelly, J. T. (2024). Patients' acceptability of self-selected digital health services to support diet and exercise among people with complex chronic conditions: Mixed methods study. *Digit Health*, *10*. https://doi.org/10.1177/20552076241245278

Bradley, E. H., Curry, L. A., & Devers, K. J. (2007). Qualitative Data Analysis for Health Services Research: Developing Taxonomy, Themes, and Theory. *Health Services Research*, *42*(4), 1758-1772. https://doi.org/10.1111/j.1475-6773.2006.00684.x

Bradshaw, C., Atkinson, S., & Doody, O. (2017). Employing a Qualitative Description Approach in Health Care Research. *Global Qualitative Nursing Research*, *4*. https://doi.org/10.1177/2333393617742282

Braun, V., & Clarke, V. (2012). Thematic analysis. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopft, & K. J. Sher (Eds.), *APA handbook of research methods in psychology, Vol. 2. Research Designs: Quantitative, qualitative, neuropsychological, and biological* (pp. 57-71). American Psychological Association. https://doi.org/10.1037/13620-004

Braun, V., & Clarke, V. (2024). Supporting best practice in reflexive thematic analysis reporting in Palliative Medicine: A review of published research and introduction to the Reflexive Thematic Analysis Reporting Guidelines (RTARG). *Palliat Med*, *38*(6), 608-616. https://doi.org/10.1177/02692163241234800

Brennan, D., Tindall, L., Theodoros, D., Brown, J., Campbell, M., Christiana, D., Smith, D., Cason, J., & Lee, A. (2010). A blueprint for telerehabilitation guidelines. *International Journal of Telerehabil*, *2*(2), 31-34. https://doi.org/10.5195/ijt.2010.6063

Brown, R. C. C., Coombes, J. S., Jungbluth Rodriguez, K., Hickman, I. J., & Keating, S. E. (2022). Effectiveness of exercise via telehealth for chronic disease: a systematic review and meta-analysis of exercise interventions delivered via videoconferencing. *British Journal of Sports Medicine, 56*(18). https://doi.org/10.1136/bjsports-2021-105118

Brown, R. C. C., Coombes, J. S., Snoswell, C. L., Kelly, J. T., & Keating, S. E. (2022). Medicare reimbursed telehealth exercise physiology services were underutilised through the coronavirus (COVID-19) pandemic: an ecological study. *Australian Health Review, 47*(2), 175-181. https://doi.org/10.1071/AH22220

Brown, R. C. C., Keating, S. E., Jegatheesan, D. K., Mayr, H. L., Barnett, A., Conley, M. M., Webb, L., Kelly, J. T., Snoswell, C. L., Staudacher, H. M., Macdonald, G. A., Burton, N. W., Coombes, J. S., Campbell, K. L., Isbel, N. M., & Hickman, I. J. (2024). Utilizing technology for diet and exercise change in complex chronic conditions across diverse environments (U-DECIDE): feasibility randomised controlled trial. *BMC Health Services Research*, *24*(1), 935. https://doi.org/10.1186/s12913-024-11383-4

Brown, R. C. C., Keating, S. E., Owen, P. J., Jansons, P. S., McVicar, J., Askew, C. D., Clanchy, K. M., Maddison, R., Maiorana, A., Robinson, S. M., & Mundell, N. L. (2023). Client and Clinician Experiences and Perspectives of Exercise Physiology Services During the COVID-19 Pandemic: Qualitative Study. *Journal of Medical Internet Research*, *25*, e46370. https://doi.org/10.2196/46370

Chen, Y., Abel, K. T., Janecek, J. T., Chen, Y., Zheng, K., & Cramer, S. C. (2019). Home-based technologies for stroke rehabilitation: A systematic review. *International Journal of Medical Informatics*, *123*, 11-22. https://doi.org/10.1016/j.ijmedinf.2018.12.001

Cripps, A. J., Conlon, J. A., Ardzejewska, K., & Papaluca, C. (2023). Bimodal Work-Integrated Learning Experiences: Enhancing Graduate Attributes in Exercise and Sport Science. *International Journal of Work-Integrated Learning*, *24*(4), 465-475.

Davies, L., Hinman, R. S., Russell, T., Lawford, B., Bennell, K., & International Videoconferencing Steering, G. (2021). An international core capability framework for physiotherapists to deliver quality care via videoconferencing: a Delphi study. *Journal of Physiotherapy*, *67*(4), 291-297. https://doi.org/10.1016/j.jphys.2021.09.001

Exercise & Sport Science Australia. (2024). *Accredited Exercise Physiologist Scope of Practice*. https://www.essa.org.au/Common/Uploaded%20files/Standards/AEP%20Scope%20of%20Practice.pdf

Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods*, *5*(1), 80-92.

Filbay, S. H., Hinman, R., Lawford, B., Fry, R., & Bennell, K. (2021). *Telehealth by allied health practitioners during the COVID-19 pandemic: an Australian wide survey of clinicians and clients*. University of Melbourne. https://tinyurl.com/3wz78v47

Franklin, B. A., Eijsvogels, T. M. H., Pandey, A., Quindry, J., & Toth, P. P. (2022). Physical activity, cardiorespiratory fitness, and cardiovascular health: A clinical practice statement of the American Society for Preventive Cardiology Part II: Physical activity, cardiorespiratory fitness, minimum and goal intensities for exercise training, prescriptive methods, and special patient populations. *American Journal of Preventive Cardiology*, *12*, 100425. https://doi.org/10.1016/j.ajpc.2022.100425

Gallegos-Rejas, V. M., Thomas, E. E., Kelly, J. T., & Smith, A. C. (2023). A multi-stakeholder approach is needed to reduce the digital divide and encourage equitable access to telehealth. *Journal of Telemedicine Telecare*, *29*(1), 73-78. https://doi.org/10.1177/1357633X221107995

Herold, F., Theobald, P., Gronwald, T., Rapp, M. A., & Muller, N. G. (2022). Going digital - a commentary on the terminology used at the intersection of physical activity and digital health. *European Review of Aging and Physical Activity*, *19*(1), 17. https://doi.org/10.1186/s11556-022-00296-y

Hui, K. Y., Haines, C., Bammann, S., Hallandal, M., Langone, N., Williams, C., & McEvoy, M. (2021). To what extent is telehealth reported to be incorporated into undergraduate and postgraduate allied health curricula: A scoping review. *PLOS ONE*, *16*(8), e0256425. https://doi.org/10.1371/journal.pone.0256425

Kodama, S., Saito, K., Tanaka, S., Maki, M., Yachi, Y., Asumi, M., Sugawara, A., Totsuka, K., Shimano, H., Ohashi, Y., Yamada, N., & Sone, H. (2009). Cardiorespiratory fitness as a quantitative predictor of all-cause mortality and cardiovascular events in healthy men and women: a meta-analysis. *JAMA*, *301*(19), 2024-2035. https://doi.org/10.1001/jama.2009.681

Lee, A. C., Deutsch, J. E., Holdsworth, L., Kaplan, S. L., Kosakowski, H., Latz, R., McNeary, L. L., O'Neil, J., Ronzio, O., Sanders, K., Sigmund-Gaines, M., Wiley, M., & Russell, T. (2024). Telerehabilitation in Physical Therapist Practice: A Clinical Practice Guideline

From the American Physical Therapy Association. *Physical Therapy and Rehabilitation Journal*, *104*(5). https://doi.org/10.1093/ptj/pzae045

Mayr, H. L., Kelly, J. T., Macdonald, G. A., Russell, A. W., & Hickman, I. J. (2022). Clinician Perspectives of Barriers and Enablers to Implementing the Mediterranean Dietary Pattern in Routine Care for Coronary Heart Disease and Type 2 Diabetes: A Qualitative Interview Study. *Journal of the Academy of Nutrition and Dietetics*, *122*(7), 1263-1282. https://doi.org/10.1016/j.jand.2022.01.012

Michaud, T. L., Ern, J., Scoggins, D., & Su, D. (2021). Assessing the Impact of Telemonitoring-Facilitated Lifestyle Modifications on Diabetes Outcomes: A Systematic Review and Meta-Analysis. *Telemedicine and e-Health*, *27*(2), 124-136. https://doi.org/10.1089/tmj.2019.0319

Owen, P. J., Keating, S. E., Askew, C. D., Clanchy, K. M., Jansons, P., Maddison, R., Maiorana, A., McVicar, J., Robinson, S., & Mundell, N. L. (2022). Impact of the COVID-19 Pandemic on Exercise Physiology Services in Australia: A Retrospective Audit. *Sports Medicine Open*, *8*(1), 94. https://doi.org/10.1186/s40798-022-00483-2

Santana, M. J., Manalili, K., Jolley, R. J., Zelinsky, S., Quan, H., & Lu, M. (2018). How to practice person-centred care: A conceptual framework. *Health Expect*, *21*(2), 429-440. https://doi.org/10.1111/hex.12640

Sekhon, M., Cartwright, M., & Francis, J. J. (2017). Acceptability of healthcare interventions: an overview of reviews and development of a theoretical framework. *BMC Health Services Research*, *17*(1), 88. https://doi.org/10.1186/s12913-017-2031-8

Smart, N., Williams, A., & Lyndon, K. (2016). The role and scope of accredited exercise physiologists in the Australian healthcare system. *Journal of Clinical Exercise Physiology, 5*(2), 16-20.

Strain, T., Flaxman, S., Guthold, R., Semenova, E., Cowan, M., Riley, L. M., Bull, F. C., Stevens, G. A., & Country Data Author, G. (2024). National, regional, and global trends in insufficient physical activity among adults from 2000 to 2022: a pooled analysis of 507 population-based surveys with 5.7 million participants. *Lancet Global Health*, *12*(8), e1232-e1243. https://doi.org/10.1016/S2214-109X(24)00150-5

Stuhlmiller, C. M., & Tolchard, B. (2015). Developing a student-led health and wellbeing clinic in an underserved community: collaborative learning, health outcomes and cost savings. *BMC Nursing*, *14*(1), 32. https://doi.org/10.1186/s12912-015-0083-9

Suen, J., Attrill, S., Thomas, J. M., Smale, M., Delaney, C. L., & Miller, M. D. (2020). Effect of student-led health interventions on patient outcomes for those with cardiovascular disease or cardiovascular disease risk factors: a systematic review. *BMC Cardiovascular Disorders*, *20*(1), 332. https://doi.org/10.1186/s12872-020-01602-1

Taylor, M. L., Thomas, E. E., Vitangcol, K., Marx, W., Campbell, K. L., Caffery, L. J., Haydon, H. M., Smith, A. C., & Kelly, J. T. (2022). Digital health experiences reported in chronic disease management: An umbrella review of qualitative studies. *Journal of Telemedicine and Telecare*, *28*(10), 705-717. https://doi.org/10.1177/1357633X221119620

Thomas, E. E., Taylor, M. L., Ward, E. C., Hwang, R., Cook, R., Ross, J.-A., Webb, C., Harris, M., Hartley, C., Carswell, P., Burns, C. L., & Caffery, L. J. (2022). Beyond forced telehealth adoption: A framework to sustain telehealth among allied health services. *Journal of Telemedicine and Telecare, 30*(3), 559-569. https://doi.org/10.1177/1357633X221074499

Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*, *19*(6), 349-357. https://doi.org/10.1093/intqhc/mzm042

Walker, C., Forbes, R., Osborn, D., Lewis, P. A., Cottrell, N., Peek, S., & Argus, G. (2022). The transformation of a student-led health clinic in rural Australia from a face-to-face service

to a telehealth model: evaluation of student and client experiences during a COVID-19 driven transition. *Focus on Health Professional Education: A Multi-Professional Journal*, *23*(2), 79-92.

Wilson, O. W. A., Broman, P., Tokolahi, E., Andersen, P., & Brownie, S. (2023). Learning Outcomes from Participation in Student-Run Health Clinics: A Systematic Review. *Journal of Multidisciplinary Healthcare*, *16*, 143-157. https://doi.org/10.2147/JMDH.S385709

Table 1 Participant Characteristics

Characteristics	Participants (n=9)
Sex (M/F), n	2/7
Age category (years), n (%)	
18 to 25	1 (11)
26 to 40	0 (0)
41 to 50	1 (11)
51 to 60	4 (44)
61 to 70	3 (33)
Metabolic condition, n (%)	
Overweight/obesity	3 (33)
Type 2 Diabetes Mellitus	5 (56)
Polycystic Ovary Syndrome	1 (11)
Polypharmacy[a], mean ± SD	3 ± 2

Abbreviations: *M/F*, male/female; *n*, number; SD, standard deviation.

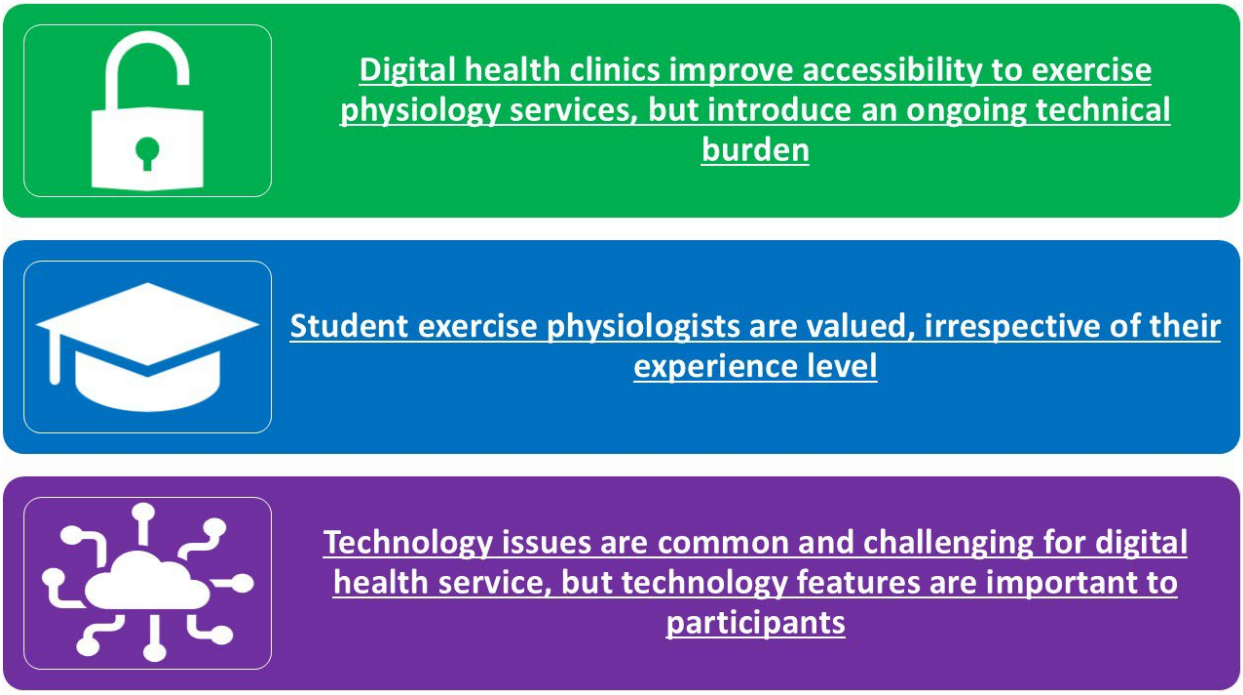
[a]Number of medications taken daily.

Table 2 Summary of clients' acceptability using the Theoretical Framework of Acceptability

TFA Construct	Summary of client feedback	Associated sub-theme
Affective attitude **Feelings towards clinic**	Positive feelings about delivery modality Positive feelings about student practitioners Positive feelings about individually prescribed exercise programs	Having remote access to individualised exercise programs was desirable, accessible and convenient Person-centred approach to care by non-judgemental student exercise physiologists was helpful in establishing exercise habits
Burden **Perceived effort of the participation in the clinic**	Reduced burden with telehealth Improved convenience due to flexibility of opportunity with online sessions Increased effort/time required for participants to accept uncertainty of student practitioners Issues with technology frustrated participants and required extra troubleshooting	Having remote access to individualised exercise programs was desirable, accessible and convenient Student exercise physiologists are developing confidence in practice and professionalism, but this did not adversely influence client clinic enjoyment Digital health has pervasive technological issues, which limits the translatability of digital exercise tools Clinic structure requires orientation to digital health with graded technical support at the commencement of the clinic
Ethicality **Extent to which the clinic fits with participants' values**	Valued being able to fit telehealth exercise sessions into their daily life Valued individually prescribed exercise programs Valued non-judgemental and supportive student practitioners	Having remote access to individualised exercise programs was desirable, accessible and convenient Person-centred approach to care by non-judgemental student exercise physiologists was helpful in establishing exercise habits
Intervention coherence **Extent of understanding the clinic and how it works**	Wanted more orientation to understand what was required for the clinic in terms of exercise and digital tools Technological issues highlighted a lack of understanding about digital health tools and clinic requirements	Digital health has pervasive technological issues, which limits the translatability of digital exercise tools Clinic structure requires orientation to digital health with graded technical support at the commencement of the clinic
Opportunity costs **What was given up to engage with the clinic**	Had to give up expectations of working with highly confident professionals when conversing with students	Student exercise physiologists are developing confidence in practice and professionalism, but this did not adversely influence client clinic enjoyment
Perceived effectiveness **Beliefs about the clinic purpose being achieved**	Lack of adequate orientation adversely affected the perceived effectiveness of the intervention Individualised exercise prescription and counselling from students seen as effective Technology perceived as an effective tool to improve exercise/physical activity Improved confidence in ability to exercise	Clinic structure requires orientation to digital health with graded technical support at the commencement of the clinic Person-centred approach to care by non-judgemental student exercise physiologists was helpful in establishing exercise habits Access to student exercise physiologists by videoconferencing, exercise data recording and real-time prompts and feedback improve motivation to exercise
Self-efficacy **Confidence to do required behaviours to engage with the clinic**	Technical issues adversely affected self-efficacy to use digital health tools Monitoring features of technology improved self-efficacy for physical activity	Digital health has pervasive technological issues, which limits the translatability of digital exercise tools Access to student exercise physiologists by videoconferencing, exercise data recording and real-time prompts and feedback improve motivation to exercise

Abbreviations: *TFA*, Theoretical Framework of Acceptability

Figure 1 Themes Arising from Client Interviews



Supplementary material 1 Focus group questions to examine client experiences and perceptions

Clinic
What did you enjoy and/or not enjoy about participating in the telehealth clinic?
Do you feel the frequency and duration of the student-led sessions were enough?
Were the goals and expectations of the clinic sessions clearly explained? If so, what approaches were good and/or could have been improved?
Did you get enough support to achieve you program goals during the program?
How would you describe your overall satisfaction with the e-Health program? Would you have any recommendations to change the program in any way?
Activity monitor and applications
What did you enjoy, and/or not enjoy, about having a Fitbit to help monitor your activity?
Which features of the Fitbit did you find most useful and why?
Would you recommend the Fitbit to others? Why or why not?
Did you enjoy using the PhysiApp? Why or why not?
What additional strategies do you believe would help you to increase your activity habits?
Technology
Did you have any technological issues during the program? What were they? Did you receive support? Were they resolved?
Was the Fitbit App and the PhysiApp easy to download? Were the instructions and support from student exercise practitioners sufficient?