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Impact of a Clinical Placement on Pre-Professional Health Students Perceived Knowledge, Skills, and Confidence in the Delivery of Behaviour Change and Physical Activity Support

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Abstract

Background: Clinical placements may provide an appropriate setting for health professional students to learn and apply skills for supporting clients to improve their physical activity.

Methods: A mixed methods study was conducted with pre-professional health students completing clinical placement at one of two interprofessional community clinics. Surveys assessed student self-reported perceived skills, knowledge, and confidence for behaviour change and physical activity support pre- and post-placement (unmatched n=40). Interviews were conducted with students (n=18) and clinical educators (n=4). Change in student knowledge, skills, and confidence were assessed using non-parametric tests; qualitative data underwent inductive thematic analysis.

Results: Post-placement, unmatched participants perceived knowledge and understanding ($p = 0.017$), skills ($p = 0.001$), and confidence ($p = 0.004$) in behaviour change significantly increased. Perceived confidence in providing physical activity behavior change support for low-risk ($p = 0.022$) and complex conditions ($p = 0.009$) significantly improved. Qualitative data emphasised the importance of clinical educators and direct clinical experiences in preparing students for future practice.

Conclusion: Student-facilitated interprofessional clinical placements may be important for developing pre-professional knowledge, skills, and confidence in delivering behaviour change and physical activity support. Further exploration of clinical placement opportunities for strengthening pre-professional health students training in physical activity promotion and behaviour change is recommended.

I INTRODUCTION

Health professional training relies on clinical placements as a means to foster the basic clinical performance requirements needed for students to enter the workforce, and to merge the requisite knowledge, specialised skills, and professional behaviours needed for their future careers (McKenna et al., 2019; Cant et al., 2021). Health professionals encompass individuals actively engaged in health research, promotion, and the practical application of scientific knowledge across various disciplines, including but not limited to medicine, nursing, dentistry, pharmacy, physiotherapy and exercise physiology (OECD, Eurostat & World Health Organization, 2017). One of the key skills that can be developed within clinical placement settings is supporting client behaviour change (Birks et al., 2017; Gates et al., 2020).

Behaviour change refers to the process of modifying or altering an individual's actions, habits, or patterns of behaviour, while behaviour change interventions involve employing specific strategies to bring about changes to an individual's behaviour (Michie et al., 2011; Davis et al., 2015). Clinical placements may offer an authentic and structured environment for students to work directly with clients and observe how their behaviours impact their health outcomes and allow them to directly practice behaviour change techniques (Lehane et al., 2019; Gorgon et al., 2013; Galbraith, 2017). Specifically, students may observe and learn from experienced healthcare professionals who may facilitate a range of strategies to help clients adopt healthier behaviours and can also apply behaviour change theories and principles to real-world situations, gaining a better understanding of how to tailor interventions to individual client needs and preferences. Overall, clinical placements may offer health students a valuable opportunity to learn and practice behaviour change skills, which are essential for promoting positive health outcomes in their clients.

Developing positive health behaviours, including regular physical activity, can help prevent chronic disease and mitigate associated risk factors (Barrett et al., 2021; Cradock et al., 2017). Health professionals have the potential to play a crucial role in promoting physical activity, as outlined in the World Health Organisation's Global Action Plan on Physical Activity (World Health Organisation, 2018). There are concerns that few health professionals can accurately describe physical activity guidelines, despite agreeing that supporting clients to improve their physical activity is a key aspect of their profession (Freene et al., 2019). It has been argued that strengthening the training of pre-professional health students in physical activity health promotion may improve the adoption and maintenance of client physical activity (Gates et al., 2020).

While the role of clinical placements in student learning and preparedness for practice are widely recognised (AlHaqwi & Taha, 2015; Sevenhuysen et al., 2015; Ferns et al., 2021; Smith et al., 2014), there have been limited studies that have explicitly focused on the impact of clinical placements on pre-professional health students perceived knowledge, skills, and confidence in the delivery of behaviour change, both more broadly and specifically for physical activity support. Previous research, across a range of health disciplines, have demonstrated promising improvements in pre-professional health students confidence in promoting physical activity (Matthews et al., 2020; Fortune et al., 2019; Ryan et al., 2017; Persky, 2009; Bell & Cole, 2008), attitudes (Fortune et al., 2019; Ryan et al., 2017; Kotecki & Clayton, 2003), knowledge (Ryan et al., 2017; Bell & Cole, 2008; Matthews et al., 2020), role perception (Sahlqvist et al., 2022; Tuohy et al., 2021; Kotecki & Clayton, 2003), and personal physical activity levels (Hsiao et al., 2005; Yeh et al., 2005). However, the role of placements in developing these skills for physical activity promotion is not as well understood. Enhancing the understanding of pre-professional health student development of physical activity promotion knowledge, skills, and confidence within the context of a clinical placement may aid in identifying areas for improving student education and training in this area, as well as informing future research.

The objective of this study was to explore the impact of an interprofessional clinical placement on pre-professional health students' knowledge, skills and confidence in the delivery of behaviour change and physical activity support. A convergent mixed methods study (Dawadi et al., 2021) was used with the primary aim to determine change in pre-professional health students perceived

knowledge of behaviour change and physical activity, perceived skills in the delivery of behaviour change and physical activity support, and perceived confidence in providing behaviour change support to clients, as a result of the placement. Secondarily, we explored perspectives from the clinical educators to understand their views on pre-professional health students' behaviour change and physical activity knowledge, skills, and confidence prior to, and during their placement.

II METHODS

A *Context: Structure of the Settings and Behaviour Change Activities*

The clinical placements in this study took place across two UQ Health Care clinics in South-East Queensland, Australia: 1) The University of Queensland Healthy Living (UQHL), a community-based clinic at Toowong, Brisbane, that promotes healthy aging and well-being for older adults aged 50 years and over (UQHL, 2022), and 2) Logan Healthy Living, a community-based clinic at Logan, Brisbane, that provides lifestyle management programs for adults to manage type II diabetes, which is co-funded by the Queensland Government through Health and Wellbeing Queensland (Logan Healthy Living, 2022). Both clinics use an interprofessional model of care (Forbes et al., 2020), including unique student-facilitated interprofessional delivery of healthcare by pre-professional students studying a range of disciplines including physiotherapy, exercise physiology, occupational therapy, dietetics, psychology, and social work. Typically, student placements are arranged in blocks that last between four and six weeks and require full-time attendance. Some students may be assigned consecutive blocks, resulting in additional weeks of placement. Students are supervised by clinical educators who are registered health professionals of their own disciplines. While there is no formal physical activity and behaviour change training provided to students during their placement, both clinics embed opportunities to enhance student behaviour change and physical activity knowledge and skills (Table 1). During the placement process, students are expected to present their preliminary planning and reasoning, while also receiving support in the form of guiding questions, explicit information, prompts on how to apply goal setting and motivational interviewing, direction on where to seek further information, as well as reinforcement of positive ideas and assumptions.

Table 1
Type and Delivery of the Behaviour Change Educational Opportunities Embedded at the Placement Sites and Provided to All Students

Behaviour change educational opportunities	Delivery of opportunities
Modelling	Clinical educators model providing appropriate behaviour change support, including physical activity behaviour change support, to a range of clients by having students shadow during appointments
Timely feedback	Clinical educator provides feedback to student on their behaviour change support provided during and after client interactions, including for physical activity
Communication throughout placement	Clinical educators have regular meetings with each student to discuss strengths, weaknesses, goals throughout their placement
Daily team meetings (huddles)	Daily team meetings occur between clinical educators and students (includes all students/interprofessional collaboration)
Case conferences	Presentation by students involving discussion of case studies/client interactions
Informal student-hub discussions	Discussion and collaboration encouraged between students and clinicians to problem solve and come up with solutions

Further education and resources	Although not routinely provided, clinical educator can recommend resources to student for further learning where required
Early interactions with clients	Students are provided early opportunities in their placement (almost immediately upon starting) in assessments and appointments with clients, including in relation to physical activity behaviour change support. Students derive some important information/education from clientele (for example, communication skills)

B *Design and Recruitment*

A concurrent mixed methodology (Creswell & Clark, 2018) study comprising self-report surveys and semi-structured focus groups, or interviews, was implemented. A mixed methods approach was employed in order to provide a more comprehensive understanding of the research question, offering insights that may not be fully captured by either method alone. Student participants completing a placement between November 2021 and November 2022 were recruited via convenience sampling through a verbal invitation from a member of the research team (EL) via on-site visits and then sent an email link to the survey. Participants could opt into the surveys and interviews separately. To gain sufficient insights into the placement sites, a minimum of 10 student participants each for surveys and interviews were sought from each site, with the maximum number of possible participants limited by cohort size. Earlier studies have suggested an appropriate participant range varies from 10 to 50 individuals, contingent upon the nature of the research and the specific research query (Creswell & Creswell, 2018; Braun & Clarke, 2019; Fugard & Potts, 2015). Specifically focusing on interviews, for research centred around evaluation, it is advised to consider a sample size falling within the range of eight to 16 interviews or opt for three to five focus groups for a comprehensive examination (Guest et al., 2016). All clinical educators at both sites were eligible to participate in interviews and were invited via email by a member of the research team (EL). All participants provided informed consent. The lead researcher responsible for data collection and analyses is a clinical exercise physiologist, bringing experience in physical activity and behaviour change support. The second researcher undertaking analyses is a physiotherapist and lecturer with over 17 years' experience as a clinical educator and highly experienced in clinical education research and qualitative research methods. This study was approved by the Human Research Ethics Committee at The University of Queensland on 21/10/2021 (2021/HE002231).

C *Data Collection*

Repeated cross-sectional surveys were administered to students, at the start and at the end of their placements. All students were sent the survey invitation email at both time points, regardless of whether they had completed the pre-placement survey. The surveys were hosted online on the web-based software, Qualtrics^{XM} and were anonymous, with participant-generated codes used to match pre- and post-placement surveys. At the end of their placements, all students were also verbally invited via an on-site visit by a member of the research team (EL) to participate in a semi-structured focus group or individual interview at their placement site or by Zoom (depending on participant choice). The option between an interview or focus group was presented to optimise participation considering the logistical challenges associated with the placement, such as time constraints, student availability, and researcher availability. The one-on-one, semi-structured interviews were conducted with the clinical educators via Zoom, after an email Invitation to participate.

D *Surveys*

The surveys collected demographic characteristics, perceived knowledge, skills, and confidence for behaviour change and physical activity, at both the start and end of placement,

using a mix of five-point Likert scale, yes/no and open-ended questions (Appendix A). The survey was developed by the authors, following information gained from a review of the literature (Chisholm et al., 2020; Persky, 2009; Matthews et al., 2020; Freene et al., 2019) and discussions around structure and wording from experienced academics and practitioners. The same questions were asked at both time points except for some demographic questions. Demographics captured included age, sex, student status, English as first language and education (both time points) and previous experience. Previous experience was defined as having either completed a previous placement, previous experience as a health professional or previously learning about behaviour change. The survey included a section on behaviour change and a section on physical activity. The behaviour change section consisted of eight questions with four designed to provide information about the participants perceived knowledge, skills and confidence regarding behaviour change and the remaining four questions (yes/no and open-ended questions) designed to explore the perceived importance of behaviour change to clinical practice. The physical activity section consisted of five questions designed to collect data about the participants perceived knowledge, skills and confidence regarding physical activity guidelines and physical activity behaviour change, including delivery of support to low-risk or complex clients. The survey was piloted with two senior academics at The University of Queensland and both the UQHL and Logan Healthy Living Clinical and Operations Managers, who are also experienced practitioners, for feedback on clarity and breadth of questions. Feedback resulted in two additional questions on behaviour change for clients with complex conditions.

E *Interviews*

The end of placement focus groups or one-on-one interviews with students were designed to further explore knowledge, skills and confidence related to providing physical activity behaviour change support and how this had been impacted by their experiences during their current placement (Table 2). The focus groups or interviews were conducted by a member of the research team (EL), who was not involved in the students' placements. The question guide for interviews was piloted with an expert in qualitative research and refined before commencing data collection (final interview guide is provided in Appendix B). Focus groups and interviews were between 20-30 minutes in length (mean 23 minutes) and were audio recorded. Interviews were semi-structured following a topic guide. Clinical educator interviews were between 30-40 minutes in length (mean 35 minutes) and were audio recorded (final interview guide is provided in Appendix C).

Table 2
Example Student and Clinical Educator Focus Group and Interview Topics

	Interview topics

Students	• Student expectations (before and during placement) around:
	  ○ Behaviour change
	  ○ Physical activity support
	• Specific experiences during placement:
	  ○ What they feel they have learnt
	  ○ If/how they had used this during their placement
	• Barriers or facilitators to:
	  ○ Behaviour change in practice
	  ○ Physical activity promotion and support

Clinical Educators	• Perspectives on students' readiness in terms of:
	  ○ Preparedness for clinical learning
	  ○ Foundational knowledge, skills and confidence
	  ○ Behaviour change
	  ○ Physical activity support
	• Perceived role as a clinical educator
	• Behaviour change opportunities and activities used at each site

F *Data Analysis*

1 *Survey Data*

Survey data were cleaned, and descriptive statistics used to summarise the findings. To facilitate analysis and reporting, each of the Likert scale questions were transformed into ordinal variables (i.e., Strongly disagree = 1, Somewhat disagree = 2, Neither agree nor disagree = 3, Somewhat agree = 4, Strongly agree = 5). The Shapiro-Wilk test was used to assess normality of continuous data, with all data non-normally distributed. Data were repeated cross-sectional, with students able to do just the beginning of placement survey, just the end of placement survey, or both. The primary analyses were undertaken utilising all data at each time point, with secondary analysis undertaken on the matched data. The study design aimed to assess overall group trends (unmatched analysis); however, during the data collection process we identified the opportunity to include a matched analysis in a subset. Asking participants to complete surveys at multiple time points may increase the burden on them, therefore providing options to respond to the survey at a single time point helped to streamline the data collection process and enhance feasibility within the constraints of full-time clinical placements. Pre- and post-placement survey group characteristics were compared using t-tests. Mann–Whitney U tests were used for unmatched analysis and Wilcoxon (paired) signed-rank tests were used for matched analyses. To identify whether previous experience, compared to no experience, impacted behaviour change and physical activity scores (for pre-placement survey data only), independent *t*-tests were used. In reporting the results, Z-scores were used to facilitate comparisons between groups and to calculate effect sizes. The recommended protocol for reporting was followed by providing the overall z-value and its corresponding p-value. All quantitative analyses were conducted using the Statistical Package for Social Sciences (SPSS), version 28 (IBM Corp., Armonk, NY, USA). The significance level was set at $p \leq 0.05$.

2 *Interview Data*

All focus groups and interview recordings were transcribed verbatim by the lead author (EL). Thematic analysis was then undertaken to condense data into key themes using an inductive approach to produce a list of statements reflective of the data collected (Nowell et al., 2017). In this approach, themes are generated inductively from the raw data collected specifically from the research and coding is data driven, without trying to fit into an already established framework based on the research question (Braun & Clark, 2013). Interview transcripts were read several times for data familiarisation and coding by the first author (EL). The first author copied these codes into Microsoft Excel for categorisation and development of overarching themes. Themes and categories were presented with supporting quotes from interviews (Figure 1). The emerging themes were then discussed with an experienced qualitative research team member (RF) until consensus was reached.

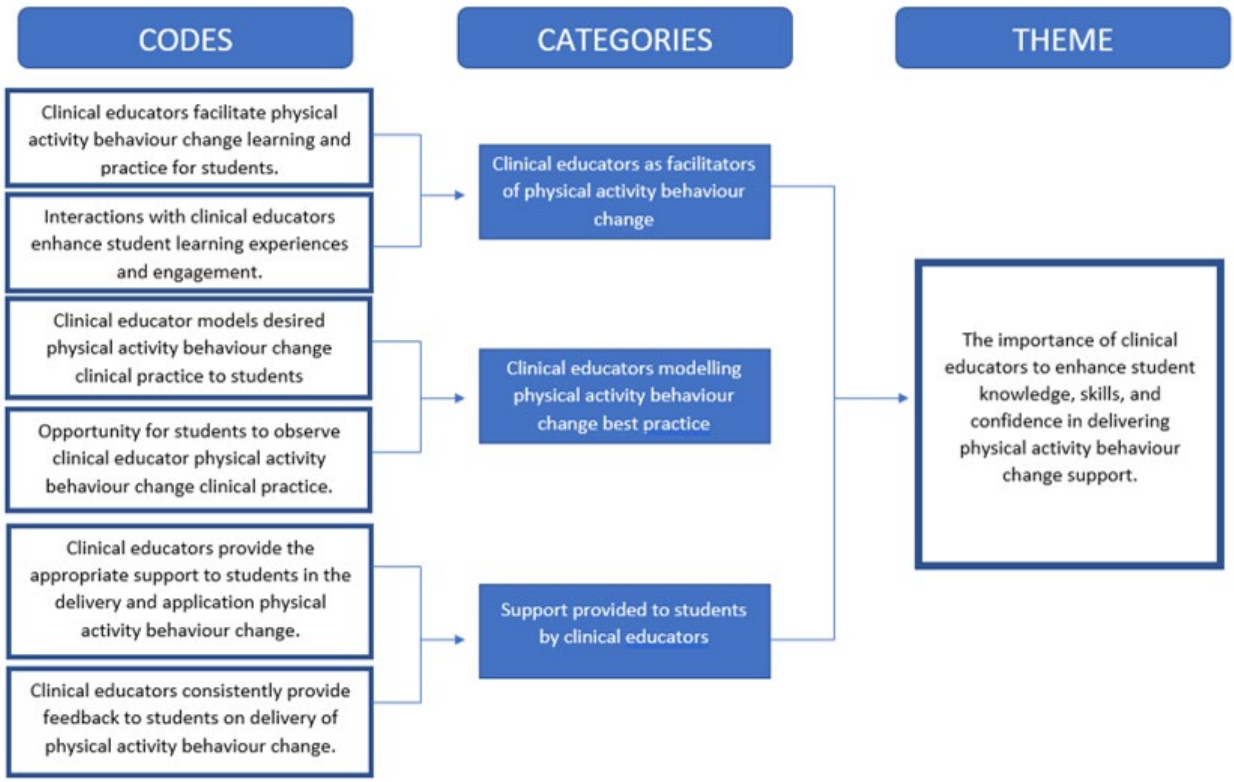

Figure 1
Theme 1 as an Example to Illustrate the General Inductive Approach to Qualitative Data Analysis

III RESULTS

A *Surveys*

A total of 102 students were invited to participate at each time point. There were 40 complete survey responses from students at each time point (response rate 39%), with 16 responses able to be matched. Participants were a median of 23 years of age (SD = 4.43) and the majority were female (Table 3). At each time point, over half were studying exercise physiology (56%; 50%) and nearly all were undergraduate health students (>87%). There were no large or meaningful differences in characteristics when comparing student participants from the start and end of placement surveys.

Table 3
Student Participant Characteristics Start and End of Placement Surveys

	Students survey data	
Characteristic	Start of placement	End of placement
	(*n* = 40)	(*n* = 40)
Sex, female *n* (%)	24 (61)	28 (70)
Student age (years), median (Q1, Q3)	23 (22, 25)	23 (22, 25)
Discipline, *n* (%)		
Exercise Physiology	22 (56.1)	20 (50)
Physiotherapy	15 (36.6)	14 (35)
Nutrition and Dietetics	2 (4.9)	6 (15)
Sport and Exercise Science	1 (2.4)	-
Undergraduate students, *n* (%)	40 (100)	35 (87.5)
Postgraduate students, n%	0 (0)	5 (12.5)
Year of degree *n* (%)		
Third	7 (17.1)	-
Fourth	33 (82.9)	-
Number of previous placements completed *n* (%)		
None	18 (45)	-
One	12 (30)	-
Two	4 (10)	-
Three or more	6 (15)	-
Any previous university study, yes *n* (%)	9 (22)	-
Prior experience as a health professional, yes *n* (%)	6 (17.1)	-
Learnt about behaviour change previously (outside of university studies), yes *n* (%)	2 (4.9)	-

B *Students Perceived Knowledge, Skills and Confidence in Regard to the Delivery of Behaviour Change and Physical Activity Support – Quantitative Findings*

Prior to their clinical placement, the majority of student participants agreed or strongly agreed that they had good knowledge of the influences on behaviour (77.5%) and were confident in providing this support to low-risk clients (62.5%). However less than half (47.5%) felt they had the skills to use behaviour change strategies in practice or confidence to provide this support to complex clients (40%). The majority (95%) agreed that they had good knowledge of physical activity guidelines and skills to provide support in line with these guidelines (95%). Four in five students agreed or strongly agreed they were confident in discussing physical activity behaviour change support (80%) and over half agreed they were confident in providing physical activity behaviour change support to low-risk (67.5%) and complex (50%) clients. All students agreed (100%) that providing behaviour change support to clients is an important responsibility of being a health professional, with 85% of students believing that providing behaviour change support to clients means they are more likely to change their health behaviours than if they don't deliver behaviour change support (Table 4).

Table 4
Health Students Perceived Knowledge, Skills and Confidence in Relation to Providing Behaviour Change and Physical Activity Support at the Start and End of Placement

	Student survey data							
Variable	**Disagree n (%)**		**Neither agree nor disagree n (%)**		**Agree n (%)**		**Median (Q1, Q3)**	
	Start of placement (n=40)	End of placement (n=40)	Start of placement (n=40)	End of placement (n=40)	Start of placement (n=40)	End of placement (n=40)	Start of placement	End of placement
Behaviour change								
I have a good knowledge and understanding of the influences on behaviour	3 (7.5)	0 (0)	6 (15)	3 (7.5)	31 (77.5)	37 (92.5)	4 (4, 4)	4 (4, 5)
I am confident in using behaviour change strategies as part of my clinical practice	12 (30)	2 (5)	9 (22.5)	7 (17.5)	19 (47.5)	31 (77.5)	3 (2, 4)	4 (4, 4)
I am confident in my ability to offer support and guidance to clients to help them make healthy behaviour changes	5 (12.5)	0 (0)	10 (25)	6 (15)	25 (62.5)	34 (85)	4 (3, 4)	4 (4, 4)
I am confident in my ability to offer support and guidance to clients with complex conditions to help them make healthy behaviour changes	12 (30)	3 (7.5)	12 (30)	11 (27.5)	16 (40)	26 (65)	3 (2, 4)	4 (3, 4)
Physical activity								
I have a good knowledge and understanding of the Australian physical activity guidelines	1 (2.5)	0 (0)	1 (2.5)	3 (7.5)	38 (95)	37 (92.5)	5 (4, 5)	5 (4, 5)
I am confident to provide advice in line with the Australian physical activity guidelines	1 (2.5)	1 (2.5)	1 (2.5)	2 (5)	38 (95)	37 (92.5)	5 (4, 5)	5 (4, 5)
I am confident in discussing behaviour change in relation to physical activity with a client	5 (12.5)	1 (2.5)	3 (7.5)	2 (5)	32 (80)	37 (92.5)	4 (4, 4)	4 (4, 5)
I am confident in providing physical activity behaviour change support to clients	8 (20)	1 (2.5)	5 (12.5)	3 (7.5)	27 (67.5)	36 (90)	4 (3, 4)	4 (4, 5)
I am confident in providing physical activity behaviour change support to clients with complex conditions	11 (27.5)	3 (7.5)	9 (22.5)	6 (15)	20 (50)	31 (77.5)	3.5 (2, 4)	4 (3, 4)

	Start of placement (*n*=40)			End of placement (*n*=40)		
	Yes, n (%)	No, n (%)	Unsure, n (%)	Yes, n (%)	No, n (%)	Unsure, n (%)
I believe that providing behaviour change support to clients is an important responsibility of being a health professional	40 (100)	0 (0)	0 (0)	40 (100)	0 (0)	0 (0)
Providing behaviour change support to clients means they are more likely to change their health behaviours than if I don't	34 (85)	1 (2.5)	5 (12.5)	35 (87.5)	2 (5)	3 (7.5)

When comparing all available data before and after placement (unmatched analyses) (Table 5), students' overall perceived knowledge and understanding of behaviour change ($z = -2.40$, $p = .017$), perceived behaviour change skills in clinical practice ($z = -3.33$, $p = .001$), and confidence in providing behaviour change support ($z = -2.90$, $p = .004$), was significantly higher post-placement. Further, following the placement, scores in perceived confidence in providing physical activity behaviour change support to low-risk ($z = -2.30$, $p = .022$) and complex conditions ($z = -2.62$, $p = .009$) were significantly higher. There were no significant changes in confidence to discuss physical activity behaviour change with a client, physical activity knowledge, and understanding of Australian physical activity guidelines.

When comparing the sub-sample of participants with both pre- and post-data (matched analyses) (Table 5), there was a significant increase in students' overall perceived skills in using behaviour change in clinical practice ($z = -2.60$, $p = 0.009$); and perceived confidence in providing behaviour change support to low-risk ($z = -2.40$, $p = 0.019$) and complex ($z = -2.32$, $p = 0.020$) clients. Further, following the placement there was a significant increase in perceived skills in discussing physical activity behaviour change with clients ($z = -2.50$, $p = 0.014$); and confidence when providing physical activity behaviour change support to low-risk ($z = -2.81$, $p = 0.005$) and complex clients ($z = -2.81$, $p = 0.005$). There were no significant changes in students' overall perceived knowledge and understanding of behaviour change, physical activity knowledge, and understanding of Australian physical activity guidelines. There were no significant associations between experience and higher perceived knowledge, skills and confidence in behaviour change and physical activity; however, data showed that participants with previous experience did score themselves higher for the behaviour change and physical activity questions at both time points.

Table 5
Health Students Perceived Knowledge, Skills and Confidence in Relation to Providing Physical Activity Behaviour Change Support at the Start and End of Placement, Unmatched and Matched Participant Data

	Student survey data			
Variable	Unmatched (n=40)		Matched (n=16)	
	Z score	P value	Z score	P value
Behaviour change				
I have a good knowledge and understanding of the influences on behaviour	-2.40	0.017*	-1.41	0.157
I am confident in using behaviour change strategies as part of my clinical practice	-3.33	0.001*	-2.60	0.009*
I am confident in my ability to offer support and guidance to clients to help them make healthy behaviour changes	-2.90	0.004*	-2.40	0.019*
I am confident in my ability to offer support and guidance to clients with complex conditions to help them make healthy behaviour changes	-2.90	0.004*	-2.32	0.020*
Physical activity				
I have a good knowledge and understanding of the Australian physical activity guidelines	-0.70	0.486	-0.58	0.564
I am confident to provide advice in line with the Australian physical activity guidelines	-0.11	0.913	-1.63	0.102
I am confident in discussing behaviour change in relation to physical activity with a client	-1.60	0.113	-2.50	0.014*
I am confident in providing physical activity behaviour change support to clients	-2.30	0.022*	-2.81	0.005*
I am confident in providing physical activity behaviour change support to clients with complex conditions	-2.62	0.009*	-2.81	0.005*

*$p < 0.05$

C *Perspectives of the Clinical Placement and its Impact on Pre-Professional Health Students Perceived Knowledge, Skills, and Confidence in the Delivery of Physical Activity Behaviour Change Support*

Five focus groups and two interviews were held with students (n=18, 11 female, 7 male) from a range of professions (n=12 Logan Healthy Living; n=6 UQHL) on the last week of their placement. All data were collected from clinical educators via interview (n=4; n=2 Logan Healthy Living, n=2 UQHL). Demographic characteristics of all participants are in Table 6. From all available data, four themes were generated: 1) the importance of clinical educators to enhance student knowledge, skills, and confidence in delivering physical activity behaviour change support; 2) recognition that behaviour change is a collaborative and interprofessional effort; 3) realisation of how complex and challenging behaviour change is; and 4) the reflection of how critical practical opportunities are.

Table 6
De-identified Demographic Information for Student and Clinical Educator Interviews

Participant #	Participant type	Sex	Discipline	Placement site	Date	Mode of interview
1	Student	F	Physiotherapy	Logan Healthy Living	1/4/22	One-on-one interview via Zoom
2	Student	F	Exercise Physiology	Logan Healthy Living	8/4/22	Focus group via Zoom
3	Student	M	Exercise Physiology	Logan Healthy Living	8/4/22	Focus group via Zoom
4	Student	F	Dietetics	Logan Healthy Living	6/5/22	Focus group via Zoom
5	Student	F	Dietetics	Logan Healthy Living	6/5/22	Focus group via Zoom
6	Student	F	Dietetics	Logan Healthy Living	6/5/22	Focus group via Zoom
7	Student	F	Physiotherapy	Logan Healthy Living	6/5/22	Focus group via Zoom
8	Student	F	Dietetics	Logan Healthy Living	6/5/22	Focus group via Zoom
9	Student	F	Dietetics	Logan Healthy Living	6/5/22	Focus group via Zoom
10	Student	F	Physiotherapy	Logan Healthy Living	2/6/22	One-on-one interview via Zoom
11	Student	M	Exercise Physiology	Logan Healthy Living	2/8/22	Focus group via Zoom
12	Student	F	Exercise Physiology	Logan Healthy Living	2/8/22	Focus group via Zoom
13	Student	M	Exercise Physiology	UQHL	22/2/22	Focus group at clinic site
14	Student	M	Exercise Physiology	UQHL	22/2/22	Focus group at clinic site
15	Student	M	Exercise Physiology	UQHL	22/2/22	Focus group at clinic site
16	Student	M	Physiotherapy	UQHL	31/3/22	Focus group at clinic site
17	Student	M	Physiotherapy	UQHL	31/3/22	Focus group at clinic site
18	Student	F	Physiotherapy	UQHL	31/3/22	Focus group at clinic site
19	Clinical educator	M	Exercise Physiologist	UQHL	1/12/22	One-on-one interview via Zoom
20	Clinical educator	F	Exercise Physiology	UQHL	1/12/22	One-on-one interview via Zoom
21	Clinical educator	F	Exercise Physiology	UQHL and Logan Healthy Living	29/11/22	One-on-one interview via Zoom
22	Clinical educator	M	Physiotherapy	UQHL and Logan Healthy Living	2/12/22	One-on-one interview via Zoom

1 *Theme 1: The Importance of Clinical Educators to Enhance Student Knowledge, Skills, and Confidence in Delivering Physical Activity Behaviour Change Support*

Students highlighted the significant role their clinical educators played and the impact that timely support had on their confidence and skills in providing physical activity behaviour change support to clients. Students felt their clinical educators provided a supportive environment and highlighted the timely feedback they were given during and after their interactions with clients. They felt this environment and feedback provided an opportunity to practice their skills, where they felt able to make mistakes and learn from them.

> "I think the supportive environment helps with all the things we learnt, but I guess in terms of behaviour change, they have facilitated that for us." (SP12)

> "Whenever I did have an issue, he (clinical educator) would help me to reflect and give me feedback and just help me work through seeing different patients." (SP1)

All clinical educators discussed their role in supporting and influencing students in their ability to deliver behaviour change support. Clinical educators also discussed providing a supportive learning environment and how their own communication skills can impact student learning.

> "We have the best opportunity to do that (support) because we are the ones who are providing feedback to our students ongoing and as I said early on, we model the behaviour that [they] hopefully follow on with." (CEP19)

> "I think our own communication skills and approach to a student to give them what's the term, psychological safety, to go and not feel judged, not feel like a mistake in week one or two or three is going to be held against them for their development or view of their capacity. I think that's something we can, well I like to feel that we're all proud of as well, because it must be a learning environment." (CEP21)

Students felt that modelling by the clinical educators helped to enhance their own confidence in providing behaviour change and physical activity support, as they were able to use what they had seen during their own clinical practice. Clinical educators also felt that modelling behaviour is an important part of the clinical educator's role and that although there may be limited structured learning opportunities for behaviour change, it is a central part of their work.

> "I think a big thing for me is observation. I feel like when I observe and see what other people doing, for example, then it kind of grows a bit of confidence in me… Rather than just telling me what to do and then just leading, expecting to do it." (SP18)

> "Early on (in the placement) it would be modelling what a clinician would do…. So that first week or two is a lot of observing and seeing what we do as clinicians and maybe look seeing the strategies that we employ to help people with motivation and building self-efficacy. ...they can (then) use that information along with the information they already have from university and create their own version of what that looks like for them." (CEP19)

2 *Theme 2: Recognising that Behaviour Change is a Collaborative and Interprofessional Effort*

Students acknowledged that through the placement, they were able to recognise that behaviour change is often a process that involves multiple factors. Participants felt that the placement helped them to consider the wider determinants of health and provided insight on how different disciplines can all contribute to enhance client behaviour change outcomes. On deeper inquiry, participants expressed that through interprofessional collaboration they were able to see how interprofessional collaboration can help to identify, consider, and address potential needs or barriers regarding behaviour change.

> "I think the fact that we have access to dietician, physiotherapists and stuff, that is a way that you can communicate with other professionals and see what needs to be done (for the client)." (SP11)

Clinical educators also commented on how the placement helped students to recognise the importance of interprofessional collaboration and the opportunities it provides students to learn and apply physical activity behaviour change clinical practice.

> "We are really focused on that interprofessional education approach (regarding physical activity behaviour change), and we had a facilitator for that. And the huddle was a really good way of us making

sure that students from all disciplines got exposure to what we offer. And then also often we prompt them around are there any sort of patient or clinical notes that need to be discussed and that can allow students from different disciplines to provide their input into a certain case." (CEP19)

3 *Theme 3: Realisation of How Complex and Challenging Behaviour Change Is*

Through their placement experiences, students expressed that behaviour change is a complex and challenging process that requires a multifaceted approach to address the various factors that contribute to behaviour. Through interaction with clients, they discovered that effective behaviour change requires a comprehensive understanding of the individual, social, cultural, and environmental factors that influence behaviour, and a tailored approach to support lasting change.

"I guess the bigger takeaway would be when you're applying something that's so theoretical, yes. Learn to apply to a client group. I guess in a way that's behaviour change thing or more of a subconscious thing that I, I was sort of thinking about actively, oh, how do I change behaviour? But more of a practical, how do I take what I've learned in theory to apply to an individual person that has so many factors and stuff in their life." (SP7)

It was clear that most students believed they had the appropriate knowledge and skills to deliver physical activity behaviour change support, however, most felt that they lacked confidence in putting this into practice; students also expressed uncertainty around their scope of practice.

"I think I did (feel confident in my knowledge), but putting it into practice, not as much confidence... Just learning the way to communicate. I think that's a really big part in it knowing how to interact with people. Not really challenges, but sometimes just not knowing what to say in response to something that they said. because not really knowing how to go about a certain situation." (SP1)

All clinical educators commented that they felt, in general, that students commence placements with the necessary knowledge and skills required to deliver behaviour change and provide physical activity support. Clinical educators also noted that students tend to be well-prepared in their knowledge of physical activity and nutrition, but often need more support in areas of behaviour change. All clinical educators agreed that readiness varies depending on the student, as some can come in being worried and with a lack of confidence, but others are more ready and eager to get involved.

"I think they have the theory of course behind what is physical activity and what are the recommended guidelines and same with diet. Behaviour change would be one that I haven't noticed as much sort of confidence and knowledge in that area. So, I think that's another sort of barrier potentially that they're a little bit afraid to cross potentially, cross that line." (CEP19)

Clinical educators also felt that students exhibited a lack of confidence when it came to fulfilling their role in providing behaviour change support. This specific aspect proved to be challenging for some students during their placement. The clinical educators remarked that there was frequently a sense of confusion regarding the precise nature of the support they should offer, especially in relation to offering general advice or guidelines that fell outside their specific discipline.

"I think they are rightfully aware that it's not their scope (specific aspects outside of their discipline) but aren't very confident in just general advice or public guidelines that they can give to the client or go back to or just talk about, here's the people that you should ask those questions and yes someone, or I, can make this recommendation to take back to your GP to get a proper official referral or an appropriate person for that." (CEP21)

4 *Theme 4: Reflection of How Critical Practical Opportunities Are*

Students reflected on how critical practical opportunities are for their development in physical activity behaviour change clinical practice. Students emphasised the importance of being able to adapt their clinical practice and use different approaches depending on the client or situation. They felt that during their university program there was in-depth learning around theoretical elements, however, not as much around how to apply this in a clinical setting. Students commented on a lack of real-world preparation for clinical placements, resulting in a lack of confidence in their skills relating to physical activity behaviour change.

> "Think at uni we kind of focus more on simple cases where a person just has one condition and then we kind of ignore everything else. Whereas in the real world, that's not practical, right? So, I think that getting exposure to that was really important and as well as just seeing how to handle all the other things. I think the more we get exposed to it, the better we learn." (SP7)

All students commented on the value of the opportunities to practice their skills and build confidence around the delivery of physical activity behaviour change which were provided at the two sites during their placement.

> "Given more face to face with clients and having a plan? One of the biggest things I have been thinking this past week, especially knowing that these clients are still coming here. If we're not here giving that opportunity with that, we need to have a plan and have a handover and have an idea of where their behaviour change is going as well, rather than at university, any face to face that we had at university was like, okay, cool, these weeks are done. Yeah. And then what's next kind of thing." (SP11)

IV DISCUSSION

The aim of this study was to explore the impact of a clinical placement on pre-professional health students perceived knowledge, skills, and confidence in the delivery of behaviour change and physical activity support using a mixed-methods design. The study found that post-placement, students' overall perceived behaviour change skills in clinical practice; confidence in providing behaviour change support to low-risk and complex clients; confidence in providing physical activity behaviour change support to low-risk, and complex conditions were significantly increased. There was a non-significant decrease in physical activity knowledge and understanding of Australian physical activity guidelines post placement. Qualitative findings attributed the opportunities the placements provided for applying knowledge and skills in behaviour change and delivery of physical activity support, and the vital role of clinical educators in supporting student development and learning.

Survey findings from the current study are consistent with previous literature which found that providing training in health behaviour change support for students had a positive impact on behaviour change competency, increasing students' knowledge, skills, and confidence from pre to post training (Matthews et al., 2020). The results of the previous study indicated that training had been successful in enhancing students' confidence in applying behaviour change interventions and developing the necessary skills to facilitate behaviour change in individuals they work with (Matthews et al., 2020). Additionally, the previous study collected qualitative data in the form of student reflections and feedback to gain insights into the perceived effectiveness and relevance of the training (Matthews et al., 2020). However, the findings were limited by the use of simulated clients and did not involve direct clinical practice.

The current study found that all students (100%) believed that providing behaviour change support to clients is an important responsibility of being a health professional. However, previous research has found inconsistencies in knowledge and application of the support being provided among various healthcare professions, which hinders effective clinical practice through inconsistent and differing quality of care provided (Kunstler et al., 2018; Cone & Unni, 2020). Our findings emphasise the critical role of practical opportunities for pre-professional health student development of knowledge, skills and confidence related to physical activity behaviour change. It is widely acknowledged that clinical placements are an important part of the education and training of pre-professional health students, largely for providing students with opportunities to apply theoretical knowledge in real-world practical settings, building skills and competencies (Zhang et al., 2022; Furness et al., 2019; Ahmady & Khani, 2022). In the current study, students reflected on how critical practical opportunities are for their development of their clinical practice and enhancing their skills in the delivery of behaviour change and physical activity support. These particular clinical placement environments were an important mechanism to provide students with the hands-on-experience and opportunities to apply behaviour change principles and practice delivery of physical activity support in tangible and relevant ways. Practical opportunities, such as clinical placements, offer students valuable opportunities to work directly with clients and apply their theoretical knowledge in a practical setting (Nyoni et al., 2021; McKenna et al., 2009; Wrenn

& Wrenn, 2009; Motsaanaka et al., 2022). This is especially advantageous for pre-professional health students who are learning about behaviour change and physical activity promotion, as it allows them to observe and directly work with clients who are trying to adopt healthy behaviours, such as increasing physical activity. Direct clinical experiences can allow students to develop their critical thinking and practical skills and provides insight into the complexities of delivering behavior change support in clinical settings, ultimately preparing students for their future careers (Bridges et al., 2011).

Clinical practice experiences also help to boost students' confidence in practical skills, including communication to clients (George et al., 2020). This was supported by findings from the survey data for both groups (unmatched and matched), which indicated that confidence in providing behaviour change and physical activity support to low-risk and complex clients increased significantly by the end of the clinical placement. Therefore, as an initial preliminary step in evaluating pre-professional health students, findings from the current study suggest that providing practical opportunities, such as clinical placements, to deliver behaviour change and physical activity support, may influence future practice which could also potentially enhance client outcomes.

The study highlights the significant role of clinical educators in providing timely feedback, creating a supportive environment, and modelling behaviour change strategies for physical activity promotion. Clinical educators provide support and guide students during their clinical placements by providing opportunities to practice and develop their clinical skills, professional identity and confidence and competence in clinical settings (Plack et al., 2018; AlHaqwi &Taha, 2015; Sevenhuysen et al., 2015; Ferns et al., 2021; Smith et al., 2014). Student participants in the current study highlighted the importance of their clinical educators and their contribution to their development. Clinical educators served as mentors, facilitating the development of students' knowledge, skills, and confidence in the delivery of physical activity behaviour change. Students reflected that support and guidance provided by their clinical educators allowed them to receive tailored feedback and guidance, which may have helped to deepen their understanding and enhance their skills. Previous research supports the crucial role of clinical educators in creating positive clinical teaching environments and providing opportunities for students to connect theoretical learning with practical experience through efficient feedback mechanisms (AlHaqwi & Taha, 2015; Souroush et al., 2021; Burgess & Mellis, 2015; Lehane et al., 2021; Mahajan et al., 2022; Vabo et al., 2022; Leedham-Green et al., 2020; Mathisen et al., 2022). However, it should be noted that this clinical placement is unique, with clinical educators in this specific setting primarily being physiotherapists and exercise physiologists with heightened emphasis on health behaviour change, particularly in relation to lifestyle modifications. This may not reflect the typical knowledge or practice of clinical educators found within other clinical settings. Clinical educators within the current study also reinforced that their role is to provide a supportive environment and highlighted the importance of feedback systems for students to develop their skills and confidence in the delivery of behaviour change and physical activity support to clients. The results of the study highlighted that early opportunities provided to students, with appropriate support and modelling from clinical educators, increased confidence in using behaviour change strategies as part of their clinical practice and ability to discuss behaviour change in relation to physical activity with clients. The clinical educators themselves acknowledged that one of the most important aspects of their role is to model to students what a clinician should do, incorporating strategies for physical activity behaviour change delivery which students can adopt into their own practice, in their own way. This study supports the use of activities that allow the student to actively observe others, including clinical educators undertaking complex clinical skills, such as behaviour change, to facilitate modelling of skills. The findings also support the importance of clinical educator feedback in the development of student clinical skills, confidence, and competence related to the delivery of behaviour change and physical activity support. Clinical educator feedback and support likely acted as mechanisms that promoted skill acquisition among students. Therefore, a supportive environment acts as a context that enhances the effectiveness of mechanisms. When students feel safe to make mistakes, receive feedback, and engage in reflective practice, the

mechanisms triggered by clinical educator support are more likely to yield positive outcomes (Zhang et al., 2022).

It has been acknowledged that behaviour change is a multifaceted process, requiring a collaborative effort to promote sustainable and long-term change (Michie, 2008). Recent research suggests that the implementation of collaborative practices by interprofessional healthcare teams can improve the provision of client-centered care and result in better health outcomes for both clients and healthcare systems (Brandt et al., 2014; Reeves et al., 2017; Sangaleti et al., 2017; Liddy et al., 2019; Sallis et al., 2015). Both students and clinical educators identified the importance of having diversity of disciplines represented in the clinical placement setting and how interprofessional practice can provide a more well-rounded approach to the delivery of behaviour change support. Further, the results overall indicate that the interprofessional model of care used by the placement clinics helped students to consider the wider determinants of health when delivering behaviour change and physical activity support. The context of the placement clinics and interprofessional model of care used, likely set the stage for collaboration, creating an environment where students could witness and appreciate the diverse perspectives and skills of various health disciplines. This collaboration likely promoted a broader understanding of behaviour change and physical activity support and encouraged students to take a more holistic and comprehensive approach. Students acknowledged the complexity of behaviour change and recognised that to provide effective behaviour change support, they must take into account the multiple factors that influence behavior, and they must be tailored to individual needs and preferences. This has been argued in previous research, which suggests that quality healthcare is grounded in client-centered care (Robinson et al., 2008), which in turn requires the essential utilisation of client-centered communication skills (Levinson et al., 2010).

V IMPLICATIONS

Findings from the current study provide novel insights on placements related to physical activity behaviour change and supports the overall importance of clinical placements for pre-professional health students. However, further exploration is needed in clinical placement opportunities and strengthening training for pre-professional health students in the delivery of physical activity behaviour change. The context of these particular clinical placement environments, including the involvement of supportive clinical educators, emphasis on interprofessional collaboration, provision of critical practical opportunities, and narrow range of patient diagnoses (type II diabetes and health ageing, respectively), may create a unique environment that is not representative of all placement settings. Different clinical settings, institutions and disciplines may vary substantially in their approaches to training pre-professional health students in the delivery of physical activity behaviour change. Factors such as varying levels of educator skills and engagement, institutional resources, and interprofessional integration could influence the effectiveness of the mechanisms identified in the study. Therefore, caution should be exercised when generalising the desired outcomes observed in this specific context to other placement environments, as the nuanced interplay of mechanisms and contexts may differ, impacting the achievement of similar positive results.

There are also learnings and associated implications from a data collection perspective. It is important to ensure that the research process does not disrupt the educational workflow or place undue burden on participants or providers. This study provided an important starting point in demonstrating the feasibility of the mixed method (survey and interview) approach. One suggestion to enhance this process is to further embed the data collection into the placement experience – for example, collecting baseline data as part of an induction process, and using the end-of-placement exit process as the follow-up data collection point for both survey and qualitative data. Researchers should work with placement providers to ensure that this process is seamless and pragmatic to minimise disruption.

This study represents an important first step regarding the development of physical activity promotion knowledge, skills and confidence for pre-professional health students. By emphasising the crucial role of educators in the clinical placement context to help equip students with the

necessary tools to deliver physical activity support and behaviour change, this research lays a foundational framework for improvement. Further exploration is needed in clinical placement opportunities to strengthen training initiatives aimed at pre-professional health students in the delivery of physical activity behaviour change. Factors such as knowledge acquisition, skill development, self-efficacy, and client satisfaction should be considered. Additionally, investigating the long-term impact of pre-professional health student behavior change and physical activity support training on client outcomes and sustained behavior change is recommended.

VI STRENGTHS AND LIMITATIONS

A key strength of this study was the use of a mixed-method design. By combining both quantitative and qualitative data collection and analysis methods, the study was able to provide a more comprehensive understanding of the impact of a clinical placement on pre-professional health students perceived knowledge, skills, and confidence in the delivery of behaviour change and physical activity support. The inclusion of clinical educator perspectives also enhanced the breadth and depth of information. However, this study has been undertaken with clinical educators in a specific setting that emphasises and prioritises health behaviour change, and this may not be representative of educators in other placement sites, which possess different contexts and settings. This mixed methods study also relied on self-report data. Self-report data is susceptible to recall bias (Rosenman et al., 2011) and specifically in this context, evidence suggests that there is often a discrepancy between how clinicians rate their own skills and the actual observed quality of their practice (Mullan & Kothe, 2010; Snibsøer et al., 2018; Lai & Teng, 2011; Glegg & Holsti, 2010; Leung et al., 2014; Buchanan et al., 2016; Rahmani, 2020). Further, while the survey was designed and tested by experts, it was not evaluated for test-retest reliability or validity. However, the quantitative data was supported by the findings from the qualitative interviews. The lack of matched data, not having all characteristics included from the pre to post survey, and the sample being drawn from two specific clinics, limits the generalisability of the findings. The sample size also limits statistical inference. A further limitation of this research is the lack of subgroup analysis. Although such analyses were not appropriate given the small sample sizes, the lack of such analyses meant that potentially relevant variations between different groups may have been missed. Examining subgroups should be considered in future investigations and would allow for more targeted insights into the diverse dynamics of clinical placement environments and variations that may exist within the broader participant population. Lastly, there is an absence of follow-up assessments to determine long-term impact of the clinical placement, which can provide valuable information about the retention of knowledge, skills, or attitudes acquired, as well as any lasting effects on behaviour or outcomes and should be considered in future research in this area.

VII CONCLUSION

Pre-professional health students play a pivotal role in the future promotion of physical activity and health behaviour change. The findings of this study underscore the important role of clinical educators in the potential to equip pre-professional health students with the essential knowledge, skills, and confidence pertaining to behaviour change and the delivery of physical activity support. Future research should further explore the barriers and facilitators to embedding physical activity behaviour change training strategies for pre-professional health students into diverse clinical placement environments.

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Appendix A
Student Surveys

Consent Form

I understand that:

- The purpose of this research is to investigate the current behaviour change knowledge and practice in health professional students
- The project involves completing an anonymous survey, approximately 15 minutes long
- There are no direct benefits to me of participating
- There are no anticipated risks of participation

If you consent to participate, please tick yes below and you will progress to the survey. Else, either tick no or just close the window.
O Yes O No

1. Generating your unique identification code

Please enter the first two letters of your mother's name (in capitals) and then the last three numbers of your phone number. This will generate a unique code so that we can link data while keeping it anonymous.

For example, if your mother's name is Margaret and the last three number of your phone are 123, then please enter MA123. Please do not leave any spaces. If you do know your mother's name, please enter XX. If you do not have a phone number, please enter the last three digits of your student number.

ID: [ ]

2. A little about you

This section asks a few questions to help us understand who is completing the survey

2.1 What is your year of birth?
O Year [ ] O Prefer not to answer

2.2 Are you…
O Male O Female O Indeterminant/Intersex O Prefer not to answer

2.3 Are you a…
O Domestic student O International student O Prefer not to answer

2.4 Is English your first language?
O Yes O No O Prefer not to answer

2.5 What is your program of study?

O Physiotherapy	O Exercise Physiology	O Dietetics	O Psychology
O Occupational Therapy	O Public Health	O Other [free text option]	O Prefer not to answer

2.6 Are you currently…
O Undergraduate O Postgraduate O Prefer not to answer

2.7 What year of study are you (FTE)?
If you are studying part time, please put in what your equivalent full-time year is
O 1st Year O 2nd Year O 3rd Year O 4th Year O Other [free text option] O Prefer not to answer

2.8 Have you undertaken University study before your current program?
O Yes O No O Prefer not to answer

2.8.1 If yes, what? [free text option]

2.9 How many full-time placements have you completed?
O 0 O 1 O 2 O 3 O 4 O 5 or more O Prefer not to answer

2.10 Have you had experience as a health care professional before this training?
O Yes O No O Prefer not to answer

2.10.1 If yes, what experience/profession and for how long? [free text option]

2.11 Outside of your university studies, have you completed any courses or programs on behaviour change?
O Yes O No O Prefer not to answer

2.11.1 If yes to formal training, please describe [free text option]

3. Behaviour Change
The next few questions ask about your knowledge of behaviour change and your experience in discussing behaviour change with clients.

During your placement, it is likely that you will discuss with clients about changing their health behaviours. Within your scope of practice, you may have to select appropriate behaviour change interventions and provide guidance and support to help clients make healthy behaviour changes. Areas for behaviour change may include physical activity, nutrition, and social connectedness.

3.1 I have a good knowledge and understanding of the influences on behaviour
O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

3.2 I am confident in using behaviour change strategies as part of my clinical practice
O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

3.3 I am confident in my ability to offer support and guidance to clients to help them make healthy behaviour changes
O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

3.4 I am confident in my ability to offer support and guidance to clients with complex conditions to help them make healthy behaviour changes
O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

3.5 I am confident in my ability to offer support and guidance to clients with complex conditions to help them make healthy behaviour changes
O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

3.6 I believe that providing behaviour change support to clients is an important responsibility of being a health professional
O Yes O No O Unsure

3.6.1 Why do you think this? [free text option]

3.7 Providing behaviour change support to clients means they are more likely to change their health behaviours than if I don't
O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

3.7.1 Why do you think this? [free text option]

4. Physical activity
The next few questions ask about your knowledge of physical activity and your experience in discussing physical activity with clients.
As part of your placement, it is likely that you will need to collect information on a client's current physical activity and sedentary behaviour, discuss the role of physical activity in health and wellbeing, and help clients set physical activity goals. Within your scope of practice, you may have to assess whether the relevant physical activity guidelines are being met, monitor progress towards physical activity and sedentary behaviour goals, and provide or refer clients to other professions for appropriate physical activity interventions.

4.1 I have a good knowledge and understanding of the Australian physical activity guidelines
O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

4.2 I am confident to provide advice in line with the Australian physical activity guidelines
O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

4.3 I am confident about discussing behaviour change in relation to physical activity with a client
O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

4.4 I am confident in providing physical activity behaviour change support to clients
O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

4.5 I am confident in providing physical activity behaviour change support to clients with complex conditions
O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

5. Nutrition

The next few questions ask about your knowledge of nutrition and your experience in discussing dietary guidelines and changes with clients. As part of your placement, it is likely that you will need to collect information on a client's current nutritional behaviour, assess their dietary intake relative to healthy eating guidelines, discuss these dietary guidelines and help clients set goals and monitor progress towards these goals, and refer to another profession for appropriate dietary intervention as required.

5.1 I have a good knowledge and understanding of the Australian dietary guidelines

O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

5.2 I am confident to provide advice in line with the Australian dietary guidelines

O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

5.3 I am confident about discussing behaviour change in relation to dietary behaviours with clients

O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

5.4 I am confident in providing dietary behaviour change support to clients

O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

5.5 I am confident in providing dietary behaviour change support to clients with complex conditions

O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

6. Social Connectedness

The next few questions ask about your knowledge of social connectedness and your experience in discussing social behaviours with clients. As part of your placement, it is likely that you will have to gather information regarding a client's living arrangements, the locality of their family and friends, their current social activities, whether they receive any in-home assistance, and their access to other services. Within your scope of practice, you may have to help clients set goals, monitor progress, and encourage or assist in engagement with external providers.

6.1 I have a good knowledge and understanding of factors that impact social connectedness

O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

6.2 I am confident to provide advice to assist with social connectedness

O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

6.3 I am confident about discussing behaviour change in relation to social connectedness with clients

O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

6.4 I am confident in providing guidance and support around social connectedness to clients

O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

6.5 I am confident in providing guidance and support around social connectedness to clients with complex conditions

O Strongly disagree O Somewhat disagree O Neither agree nor disagree O Somewhat agree O Strongly agree

Appendix B
Student Interview Guide

Before the interview

- Explain that the purpose of the interview is to explore their experiences and perceived knowledge, skills and confidence around behaviour change during their placement
- Explain that the interview will last between 20-30 minutes
- Explain that the interview will be recorded to allow for accurate transcription
- Remind the participant that the interview is voluntary, and they can discontinue the interview at any time
- Seek consent to continue and for interview to be recorded

Example questions

1. Before we start, can I ask a few questions about you and your studies:
    a. Program of study
    b. Year of study
    c. Any prior training in behaviour change?
    d. Age
    e. Sex
2. Tell me what you were expecting during your placement regarding use of behaviour change skills and knowledge?
    - Prompts: Your role, client interactions, expected challenges
3. Can you tell me about your experiences during your placement with applying behaviour change knowledge and skills?
    - Prompts: confidence, what did you find worked?
4. Tell me about what you learnt about behaviour change during your placement?
    - Prompts: Had you learnt this in your program? Why was this useful?
5. Tell me about some of the challenges you had around supporting your clients to achieve behaviour change?
    - Prompts: What do you think is the main reason? Did you find anything helped? What strategies did you use?
6. What do you see as the main barriers between learning behaviour change theory and being able to apply this during your placement?
    - Prompts: Why do you think this is? What do you think would help?
7. How do you think your placement influences or impacts your behaviour change knowledge and skill development?
    - Prompts: Any specific examples of this? Why do you think this?
8. What has your placement provider done well to specifically to help you to learn and apply these skills/build confidence/gain further knowledge?
    - Prompts: Any examples of this? Why do you feel that is the case?
9. What could your placement provider do better, specifically to help you to learn and apply these skills/build confidence/gain further knowledge?
    - Prompts: Any examples of this? How could this be better achieved?
10. Is there anything else you would like to add about your experiences during your placement in regard to behaviour change?

That's great, thanks so much for sharing that with me and talking to me about your experience. That's really all the questions I have for you.

Stop Recording

Once again, I would like to thank you for your participation, and after the completion of interviews and the analysis of data, we will be sending you a summary of findings and any related publications. We will also inform you about the next steps in this research.

Additional Probing Questions (as needed)

a. Could you explain that a little bit more?
b. Could you give an example?
c. Do you think other students would feel the same way?
d. How could this be better achieved?
e. Why do you feel that is the case?
f. Would you add anything else?

Appendix C
Clinical Educator Interview Guide

Before the interview

- Explain that the purpose of the interview is to explore clinical educator perspectives on undergraduate knowledge, skills and confidence during placement around 3 specific areas of behaviour change (physical activity, nutrition and social connectedness).
- Explain that the interview will last between 30-40 minutes
- Explain that the interview will be recorded to allow for accurate transcription
- Remind the participant that the interview is voluntary, and they can discontinue the interview at any time
- Seek consent to continue and for interview to be recorded

Example questions

- What is your profession?
- How long have you been a clinical educator?
- Which undergraduate discipline they are primarily responsible for during placements?

Icebreaker question: Tell me about your impression of students when they first come on placement.

Preparedness

- How do you feel students come into the work integrated learning placement at UQHL/LHL in terms of readiness and preparedness to provide behaviour change support?
    - Physical activity behaviour change?
    - Nutrition behaviour change?
    - Behaviour change regarding social connectedness?
- What is your role in terms of supporting students in delivering behaviour change?
- What knowledge and skills related to providing behaviour change support would you like students to have prior to them commencing their placement at UQHL/LHL?

  Prompts:

  - What do you think they need the most help with?
  - What do you think students would benefit from to help them in this area?
  - What supports do you need to help students in this area? What kind of time, learning activities are needed?

During Placement

- Tell me about your experience with students' knowledge, skills and confidence around providing behaviour change support during their UQHL/LHL placement.
- How do you think students UQHL/LHL placement influences or impacts behaviour change knowledge and skill development for students?

  Prompts:

  - Main facilitators?
  - Do you think this is due to the opportunities provided UQHL/LHL?

- Specific examples?

- Tell me about some of the challenges you feel students have with providing behaviour change support to patients/clients during their WIL placement at UQHL/LHL.

  Prompts:

  - Main barriers
  - Ability to apply this knowledge (of theory/concepts) during their WIL placement at UQHL/LHL?

- Tell me what activities UQHL/LHL provides in terms of helping students deliver behaviour change support during their placement.

  Prompts:

  - What is unique about these activities? What are the key aspects?
  - How could other placement sites adopt what is offered at UQHL?
  - What are the downsides of what is offered at UQHL? Time? Staffing?
  - What improvements could be made?

Clinical Educator Influence

- How do you think clinical educators influence or impact physical activity behaviour change knowledge and skill development for students during their placement at UQHL/LHL?

  Prompts:

  - How do you know work out/know student needs?
  - How do you deliver this support? Unique to UQHL/LHL or not?
  - Which specific aspects do you think are really impactful?
  - What are the challenges?

Final Question

- Is there anything else you would like to add about your experiences as a clinical educator in regard to student skills, knowledge, and confidence in providing behaviour change support and UQHL/LHL placements?

Additional Probing Questions (as needed)

a. Could you explain that a little bit more?
b. Could you give an example?
c. Do you think other clinical educators would feel the same way?
d. How could this be better achieved?
e. Why do you feel that is the case?
f. Would you like to add anything else?