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Carroll, Sean Paul; Augeard, Nathan; Tennant, Jacob; Seenan, Christopher

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How do the attitudes, confidence, knowledge and understanding differ in pre-registration healthcare students toward treating people with chronic pain: An Observational, cross sectional study.

Sean Paul Carroll^a, Nathan Augeard^a, Jacob Tennant^a & Christopher Seenan^a.

^aSchool of Health and Life Sciences, Glasgow Caledonian University, Cowcaddens Road, Glasgow G4 0BA, UK

Corresponding author*: E-mail address: sean.carroll@gcu.ac.uk (S. Carroll). Telephone: 0141 331 8306 Address: A266, Govan Mbeki building, School of Health and Life Sciences, Glasgow Caledonian University, Cowcaddens Road, Glasgow G4 0BA, UK

Orcid: <https://orcid.org/0000-0001-5615-8518> Twitter: @SPCphysio

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ABSTRACT

Background Attitudes, knowledge and understanding may predispose practitioner adherence to clinical guidelines for chronic pain. To date there is no data exploring this in adult, mental health and paediatric nursing, or occupational therapy, podiatry and physiotherapy student healthcare professionals at the same institution.

Methods We approached 1383 students enrolled on pre-registration healthcare programmes at a Scottish University, using the Healthcare Practitioners Pain and Impairment Relationship Scale (HC-PAIRS) and Pain Knowledge and Understanding Confidence Questionnaire (PUnCQ).

Results: Three hundred and forty-six students completed the survey (response rate 25%). There was a significant effect of degree discipline on HC-PAIRS and PUnCQ with a moderate effect size of $\eta_p^2 = .212$ and $\eta_p^2 = .204$, respectively. Postgraduate pre-registration physiotherapy students had more positive attitudes toward function with pain, $M(SD)$ HC-PAIRS score=49.6(8.9) CI 95% = 46.5 – 52.8, and greater confidence toward management of chronic pain $M(SD)= 6.3$ CI 95% = 5.9 – 6.8 compared to the other disciplines surveyed. Undergraduate physiotherapy and mental health nursing also displayed significantly more positive attitudes $M(SD) = 55.2 (10.2)$, CI 95% 53.3 – 57.2, and 62.6 (7.6), 60.1 – 65.2, respectively.

Conclusions: Physiotherapy students have more biopsychosocial-orientated attitudes, and higher confidence toward the management of people in pain than the other disciplines surveyed. Despite similar levels of knowledge and understanding of pain.

Keywords: Attitudes, Chronic Pain, Confidence, Knowledge, Health Professional, Education, Understanding.

Introduction

Chronic pain is the largest cause of disability globally and affects between 18 to 28 million people in the UK alone [1,2]. Despite the publication of clinical guidelines to inform healthcare providers on best practice nearly half of those who experienced chronic pain in Europe reported receiving insufficient pain management [3]. Previous research has indicated that biomedical-orientated attitudes toward function with pain, held by healthcare professionals, may predispose their clinical recommendations against best practice guidelines [4–7]. Compared to a biopsychosocial viewpoint, biomedical attitudes and beliefs are regarded as reductionist toward function with pain [8].

It is thought that knowledge and understanding (K&U) of pain may be a contributing factor toward the prevalence of negative attitudes regarding chronic pain, as more biopsychosocial orientated attitudes have been found in disciplines who receive a larger proportion of pain education in their course [5,9], as well as those receiving structured pain related education [10–12]. Currently, pain education is highly variable across healthcare courses [13,14], and even in those with more curriculum time dedicated to it the amount of time is still disproportional to the prevalence and burden of this long-term condition [15]. This could have clinical implications, as professionals and students alike, may feel a lack of confidence in managing the complexities involved in chronic pain [16–18]. Worryingly, this may affect patients and services, as ineffective management of chronic pain can have major health, social and economic consequences [2].

Pain is a multidimensional problem that requires multidisciplinary care due to its various physical, social, and psychological components [19]. Previous research has examined attitudes in students of physiotherapy, nursing, occupational therapy (OT), chiropractic and medicine, in the majority of studies where physiotherapists have displayed more

biopsychosocial-orientated attitudes when compared with other pre-registration healthcare courses [5,20]. However, normative values in a cross-sectional study of final year medicine students by Morris et al [21] showed similar scores to the values reported in another study examining final year physiotherapy students within the same city [22]. Despite this, the comparison of normative values between studies is confounded by variance in design, heterogeneity of questionnaires, cultural and socio-genic contributors [20,23]. In order to evaluate the importance of curriculum change for this population, a need exists to assess multiple disciplines within the intended higher education institution (HEI) for change.

The aims of this cross-sectional study were to investigate: (1) if there were differences between disciplines in pre-registration healthcare student's attitudes, confidence, knowledge and understanding toward treating people with chronic pain; and (2) examine the magnitude of difference between disciplines, as well as within disciplines between first and final year students.

Methods

Design

A web based online survey (Survey Monkey, Palo Alto, CA, USA) consisting of two questionnaires collected information on the attitudes, applied K&U and confidence of pre-registration healthcare students toward treating people with chronic pain. The survey was administered in the first trimester of the academic year, and open for a duration of three weeks in October 2017. Participants received a reminder email weekly until the close of the survey. All participants provided consent through the online survey before taking part in the study and were able to withdraw during the survey by closing the browser window. After the survey was completed the responses were downloaded as an anonymised excel spreadsheet from Survey Monkey and stored on a password protected hard drive at Glasgow Caledonian University. Ethical approval for this study was obtained from the Glasgow Caledonian

University Ethics Committee (Ref: HLS/PSWAHS/17/007). This research has been reported in line with the Strengthening of the Reporting of Observation Studies in Epidemiology guidelines for cross-sectional studies [24].

Participants

An invitation to join the study was emailed by programme leaders to pre-registration students studying adult, child, mental health and learning disability (LD) nursing, OT, physiotherapy and podiatry degree programmes at Glasgow Caledonian University (GCU). The inclusion criteria consisted of being in a pre-registration healthcare course at GCU, completion of at least 50% of one questionnaire (to allow sufficient data for imputation of missing answers), and having a minimum of ten respondents per course to allow for a degree of generalisability. Responses not meeting the above criteria were deleted before analysis. According to Yamane's formula [25], in order for the study to be powered at 80% (alpha set at .05), a minimum sample size of 328 participants was required.

Outcomes

Two questionnaires were used as primary outcome measures: the Health Care Providers' Pain and Impairment Relationship Scale (HC-PAIRS) [8], and the Pain Understanding and Confidence Questionnaire (PUnCQ) [26,27].

The HC-PAIRS is a questionnaire assessing the attitudes and beliefs of healthcare providers, about the relationship between pain and function in patients with chronic low back pain. The total score is based on 15 statements, each scored by a seven-point Likert scale, ranging from "completely disagree" (1) to "completely agree" (7). Individual item scores are totalled, with items 1, 6 and 14 reverse scored, giving the overall HC-PAIRS score. Total scores range from 15 to 105, and a lower overall score indicates a more biopsychosocial/positive attitude towards function in chronic pain patients (Supplementary file S1). The HC-PAIRS has

demonstrated good convergent validity (Pearson's $r = 0.51$ to 0.77), good to high level of internal consistency, (Cronbach's $\alpha = 0.78 - 0.92$), excellent test-retest reliability (intraclass correlation coefficient >0.75) [28], and has been used previously with healthcare students and professionals [4,10,20,22,29].

The PUnCQ [27] is a two-part questionnaire assessing student's K&U of pain, alongside their confidence in applying this understanding (Supplementary file S2). Each question in the PUnCQ is based on one outcome from the core curriculum of the International Association for the Study of Pain (IASP) [30] and British Pain Society (BPS) [31]. Moreover, it was developed by consensus of an expert panel consisting of: an anaesthetist, nurse, pharmacist, physiotherapist, psychologist, occupational therapist working within a pain setting. Thus supporting its construct validity. Furthermore, it has previously been used with final year student medics and physiotherapists [26]. The questionnaire consists of a chronic pain case vignette, with the first set of questions consisting of a 12-item multiple choice questionnaire, assessing K&U in the context of the vignette. Correct answers were awarded a score of 1, and incorrect a score of 0, with a total score range from 0 – 12. A higher overall score would therefore indicate an increased K&U of pain concepts according to the IASP and BPS outcomes for pre-registration pain education. The second part of the tool is a 21-item Likert scale ranging from “not at all confident” (0) to “no problem!” (10), with total score ranging from 0 – 210, and a higher score indicating a higher self-perceived confidence in applying this knowledge and understanding. The overall average confidence score was calculated for each participant as per previous research [26]. Using a per-protocol (PP) data set for preliminary analysis of this questionnaire, the K&U and confidence sections demonstrated adequate internal consistency ($\alpha = 0.58$), and excellent internal consistency respectively ($\alpha = 0.96$). Overall median scores of K&U were less than half of total available marks, therefore careful interpretation of this value of internal consistency is warranted.

Data analysis

A Little's Data Missing Completely at Random (MCAR) test, ($\chi^2(2448) = 2552.12, p = .07$) found that the missing data was MCAR. On this condition missing values were imputed using expectation maximisation (EM), with a maximum of 25 iterations, to manage the extent of response bias, and preserve statistical power due to partially missing data [32]. A PP data set where all participants with missing data were removed listwise, was used to cross-examine the results from the imputed data set.

The distribution of HC-PAIRS, PUnCQ K&U and confidence scores were determined using a Shapiro-Wilk test. In line with the normal distribution of HC-PAIRS and confidence scores, an ANCOVA was performed on the attitudes and confidence data with discipline as the independent variable. Year of study was adjusted for as a covariate due to variation in group sizes, to allow for a more equitable comparison of pooled means between disciplines. Post-hoc pairwise comparisons with a Bonferroni correction for Type I error, were performed. An exploratory analysis was performed to investigate within group differences for HC-PAIRS and confidence scores, between first and final year students, using independent samples t-tests as per previous research [22].

Multiple choice K&U scores were analysed using a Kruskal-Wallis test for differences across course and year of study, and within degree disciplines for differences across year groups, as this data was not normally distributed. To appraise the results, the ANCOVA, Kruskal-Wallis and independent t-tests were repeated with the same statistical tests using the PP dataset (Supplementary table S3; Supplementary table S4). The Statistical Package for the Social Sciences Version 24.0.0.2 (IBM Corp., Armonk, NY, USA) was used to analyse the data.

Results

Participants

Across all courses surveyed within the university there was 2 238 pre-registration healthcare students. The emails distributed by programme leaders to healthcare students led to an invited sample of 1383 students, of which 605 clicked through to the survey, and 248 participants did either did not supply demographic information, or complete at least 50% of one questionnaire, leading to their exclusion. Due to the low responses from LD (n=2), dual registration LD and child nursing (n=5), and postgraduate adult nursing (n=4) these programmes were excluded. A total of 346 participants met the inclusion criteria, resulting in a final response rate of 25% ($n = 346/1383$, 25%). This sample size was comparable or superior to previous studies with similar design and population [20,23,26,29]. Descriptive statistics for each group are presented in Table 1.

HC-PAIRS

346 students were included for the analysis of the HC-PAIRS scores among courses. Significant main effects were found by the ANCOVA for both degree discipline $F(7, 337) = 12.986$ $p = <0.001^*$, $\eta_p^2 = .212$, and the covariate year of study $F(1, 337) = 22.78$, $p = <0.001$, $\eta_p^2 = .063$. Pairwise comparisons between disciplines are presented in Table 2. A PP ANCOVA validated these findings with comparable results: $F(7, 337) = 12.986$ $p = <0.001$ $\eta_p^2 = .209$ and $F(1, 337) = 22.78$ $p = <0.001$, $\eta_p^2 = .057$, respectively (Supplementary table S3).

PUnCQ

A total of 333 students were included in both the confidence and K&U analysis. According to a Kruskal-Wallis test K&U did not differ significantly between degree discipline $H(5)=5.795$, $p = .327$ and did not change significantly within programmes when compared by year of study $H(3)=1.397$, $p=0.706$. These findings were further validated with PP Kruskal-Wallis tests ($n = 303$) for K&U between course $H(7) = 3.651$, $p = .819$, and year of study $H(3) = 30.227$, $p =$

.992. K&U Multiple Choice Scores were generally low with 20% (n = 60/304) of participants achieving 50% or more.

An ANCOVA reported significant main effects for confidence with a moderate effect size for discipline $F(7, 324) = 12.34$ ($p = <0.001$, $\eta_p^2 = .204$), and the covariate year of study $F(1, 346) = 21.99$ ($p = <0.001$, $\eta_p^2 = .061$). Pairwise comparisons between disciplines are shown in Table 3. A PP ANCOVA validated these findings with comparable results ($p = <0.004$, $\eta_p^2 = .162$ and $p = <0.001$, $\eta_p^2 = .107$, respectively) (Supplementary table S3).

The PP independent t-tests supported that results presented in Table 4 were similar except for adult nursing, which had a significant difference in confidence between first and final year in the PP analysis (Supplementary Table S4).

Discussion

Interpretation of Main Findings

The aim of this cross-sectional study was to explore the attitudes, confidence, K&U of healthcare students toward people with chronic pain across disciplines and between years of study. The results suggest that pre-registration physiotherapy students may have more positive attitudes and higher confidence toward treating people with chronic pain compared to the other disciplines included (Table 2; Table 3). There were no significant differences in pain K&U between any discipline or year group.

When comparing the results for physiotherapy students to previous research carried out at the same HEI with a larger sample [22], this study found lower HC-PAIRS scores in final year physiotherapy students implying more biopsychosocial attitude toward function in people with chronic pain. Nevertheless, comparable results were obtained when comparing first year physiotherapy, and the generalisability of the findings to this population were strengthened,

due to similar mean differences, and confidence intervals, between first and final year students across both this study -9.2 (CI 95% -14 to -4.5), and research by Ryan et al [22] at this HEI -9.2 (CI 95% -12.2 to -6.1).

The HC-PAIRS results for physiotherapy in this study were also supported by previous research from one HEI in England [29], and two in Australia with similar sample sizes [20,33]. However, physiotherapy HC-PAIRS scores were also more positive than larger samples of students from Taiwan, Singapore, Brazil and Saudi Arabia [20,23] although this may in part be due to socio-cultural issues as the authors suggest. One other HEI in Australia [5] found ten and fifteen point lower total HC-PAIRS score for OT and physiotherapy disciplines compared to this study, respectively. However, this study used the 13 item HC-PAIRS in contrast to the 15 item version, thereby limiting comparison of normative values with the results from this study and the literature above. This variance could also be explained by the larger sample, but equally could be due to collecting data toward the end of the final semester and pooling undergraduate and postgraduate scores together. As this will maximise exposure time to curricula, and include those with previous healthcare related education, both of which may lead to improved scores. It may be advantageous for future research to collect start and end of course data within one month of matriculation and graduation to adjust for exposure time. Similar comparisons between professions in this study and the literature highlight a common theme of positive attitudes in Physiotherapy, however the heterogeneity found when comparing different physiotherapy cohorts globally could be due to the socio-cultural issues, or facilitated by learning experiences on clinical placement. Although, clinical placement experience is variable for each student and difficult to generalise its effects on attitudes, confidence and K&U across a degree programme, due to the difference in students own personal perceptions, the placement environment, and practice educator [17,18,34].

239 The results for confidence in physiotherapy students were similar to previous work with a
240 similar sample size utilizing the PUnCQ [26]. Previous research in the literature has
241 highlighted a lack of confidence in treating chronic pain [17], however, there appears to be no
242 research evaluating confidence in a context like the PUnCQ case vignette. Conversely, this
243 research found lower scores for K&U of pain concepts compared to Seenan et al [26] who
244 found most participants selected the correct answer in all but two questions. Although, they
245 sampled two additional HEIs in Scotland in addition to the one in this study, so this
246 difference may relate to heterogeneity among HEI pain education curricula. However, we do
247 not currently have any data on curricula per degree programme to compare across Scotland.

248 As highlighted in Table 4, postgraduate physiotherapy students had the greatest rating of
249 confidence as well as a lower mean HC-PAIRS score in the first year when compared to any
250 other course in their final year. A potential contributor may have been pre-existing attitudes
251 due to previous undergraduate training. This finding however, was not replicated in the
252 postgraduate pre-registration OT students, nor did postgraduate OT students display a
253 difference when compared with their undergraduate counterparts (Table 2). These contrasting
254 results may be explained by the unique requirement, not shared by the postgraduate OT
255 programme, of prior health science related education for entry to the postgraduate
256 physiotherapy course at this HEI. Future research should examine if prior undergraduate
257 healthcare related education (i.e. anatomy, physiology, psychology, sports science) is related
258 to more positive attitudes at the beginning and end of a pre-registration healthcare
259 programme.

260 It appears that the magnitude of change in attitudes could be curriculum specific as displayed
261 when comparing OT and physiotherapy students, only the physiotherapists displayed a within
262 course significant magnitude of difference between first and final year, despite having similar

scores in first year. These results in tandem with significant improvements between first and final years' postgraduate and undergraduate physiotherapy (Table 4), support the literature linking physiotherapists, who typically receive more pain education, with more biopsychosocial-orientated attitudes when compared with other programmes [9,13,15]. However, from the chosen study design, need for future research and conflicting literature [21] it is hard to generalise this finding.

Our results were consistent in showing that final year undergraduate pre-registration physiotherapy students have similar HC-PAIR scores to final year medical students [21,22]. However, postgraduate pre-registration physiotherapy still had a lower HC-PAIRS score than both of these groups. It may be that pain education is not the only contributor to improvements in attitudes toward function with pain, and may be impacted by variables such as age, socio-cultural factors, and as discussed before previous healthcare relevant higher education. This could be an explanation for our results where mental health nursing also had a significant improvement to attitudes despite no K&U differences between courses, and generally less pain curricula hours in the UK than physiotherapy [14]. Future research should aim to identify mediators of change in these groups.

There is a suggestion from the results that curricular benefit may be finite as indicated by a smaller mean difference and broad confidence intervals in the physiotherapy postgraduate group (Table 3). Furthermore, in the undergraduate disciplines, there was a small variance among the undergraduate disciplines in first year, as data collection started approximately one month after matriculation, this may insinuate that dissimilarity upon entry is in part multi-factorial, and related to: individual, socio-genic [35], and cultural beliefs [23] that contribute to attitudes when beginning the course and potentially their prognosis of improvement.

It appears that the capacity to improve K&U of pain concepts alongside attitudes in this population is possible, as research examining both the IASP pain curriculum, and Pain Neurophysiology Education (PNE), have demonstrated they facilitate concurrent increases in positive attitudes and improved K&U from baseline [10–13]. Although, the significance of the results in comparison with this study are bounded by the difference in outcome measures [11,12,36].

Implications for Future Research

Future research should consider a cohort study design, following healthcare students through the duration of their course. In order to better inform cause and effect in the development of attitudes and confidence, including possible mediators identified in this study such as prior education.

Limitations

The main limitations of this study were its that the respondents were self-selected, and demographic information was not collected other than course and year of study, thereby limiting the generalisability of the results through potential sample bias, however this helped to maintain anonymity of participants. There was a high non-response rate from the convenience sample, however, this was similar to previous surveys in the UK [22,29]. The cross-sectional design meant that no assumptions about cause and effect could be made, therefore the results should be interpreted with caution. Moreover, this survey was conducted at one HEI in the UK and the results may not be generalizable.

There was a large amount of missing data, and to mitigate response bias, data imputation was used and validated with a post-hoc PP test to include partially completed surveys in the analysis, however no method can account for missing data entirely. For this reason, future

studies could utilise ‘pain champions’ to advertise the survey and consider using a paper-based questionnaire to encourage a higher response rate as per previous research [22].

Despite a large overall sample some of the healthcare courses i.e. adult nursing and podiatry had a small sample size and comparisons with these disciplines may not be sufficiently powered. The use of a minimum cut-off of 10 respondents per course to enhance generalisability, and less than of completed 50% questionnaire exclusion is not supported in the literature, no guidance could be found to advise on an appropriate minimum response or completion. In addition to this, the variability in the results as highlighted by large confidence intervals, may be still be in part to some small sample sizes in degree programmes, or due to outliers in the data. This is most obvious in the adult nursing cohort who had the highest amount of students enrolled in a course and the lowest sample. Again, a paper based survey endorsed by local ‘pain champions’ may help with more adequate sampling of these groups in future research. Still, this study was the first to compare these six different disciplines at the same HEI with the HC-PAIRS and PUnCQ, and the results are supported with findings from similar research [5,22,29]. Therefore, it is entirely possible this variance is normal and ecologically valid.

As the PUnCQ is still in the preliminary stages of validity testing, it is not advisable to make any significant interpretation of the results, beyond the possibility that the K&U of pain concepts relative to the IASP and BPS curricula is low, and confidence is moderate in applying this K&U to a case vignette in this population. While we assessed the internal consistency of the PUnCQ from the PP dataset, the median scores of K&U were less than half of the total available marks, so we would advise careful interpretation of the Cronbach’s alpha value for K&U.

Conclusion

334 The results suggest that physiotherapy students may have higher confidence in managing
335 people with pain, and more positive attitudes, when compared with occupational therapists,
336 nurses and podiatrists. Despite this, knowledge and understanding is poor overall, with only
337 20% of participants achieving half marks or more, and did not differ between healthcare
338 course. Improvements between first and final year students suggest certain healthcare courses
339 improve attitudes toward chronic pain. However, it appears that this difference exists without
340 any change in knowledge. Future research should follow a cohort through the course of their
341 degree program to examine the relationship between attitudes, confidence and K&U.

342 **Ethical approval:** Glasgow Caledonian University, School of Health and Social Care,
343 Research and Ethics Committee.

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497 Table 1:

Table 1: Descriptive statistics presented by programme for each questionnaire

Course	Total Population	HC-PAIRS	CI 95%	Confidence	CI 95%	Knowledge & Understanding *
Adult Nursing	n = 1073	n = 30 61.6 (10.0)	[57.9 – 65.3]	n=29 5.8 (2.0)	[5.0 – 6.5]	n=29 4 (4)
Child Nursing	n = 213	n = 30 63.5 (10.5)	[59.6 – 67.5]	n=30 4.2 (2.2)	[3.4 – 5.0]	n=30 4 (2)
MH Nursing	n = 209	n = 36 62.6 (7.6)	[60.1 – 65.2]	n=35 4.4 (2.6)	[3.5 – 5.2]	n=35 4 (3)
OT PG	n = 91	n = 20 58.7(8.3)	[54.8 – 62.6]	n=20 3.7 (2.0)	[2.8 – 4.7]	n=20 4 (1)
OT UG	n = 239	n = 66 60.6 (7.8)	[58.7 – 62.5]	n=64 4.5 (1.8)	[4.0 – 4.9]	n=64 4 (3)
Podiatry	n = 122	n = 24 62.7(7.8)	[59.4 – 66.0]	n=21 5.6 (1.9)	[4.8 – 6.5]	n=21 4 (3)
PT PG	n = 101	n = 33 49.6 (8.9)	[46.5 – 52.8]	n=30 6.3 (1.1)	[5.9 – 6.8]	n=33 4 (2)
PT UG	n = 250	n = 107 55.2 (10.2)	[53.3 – 57.2]	n=104 5.4 (2.1)	[5.0 – 5.8]	n=104 4 (2)
Results are given as: number of responses, mean, and (standard deviation) unless stated otherwise. Total population refers to the total amount of students enrolled on each respective course at this HEI. CI: Confidence Intervals; PG: Postgraduate; UG: Undergraduate. * Number of responses, Median and (Inter-Quartile Range) given as data non-normally distributed						

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501 Table 2:

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Table 2: Pairwise comparisons for HC-PAIRS

	Adult Nursing	Child Nursing	MH Nursing	OT PG	OT UG	Podiatry	PT PG	PT UG
Adult Nursing	0	-1.6 [-8.9 to 5.6]	0.1 [-6.8 to 7.1]	4.6 [-3.6 to 12.7]	1.5 [-4.7 to 7.6]	-0.4 [-8.1 to 7.3]	13.9* [6.7 to 21.1]	6.8* [1.0 to 12.6]
Child Nursing	1.6 [-5.6 to 8.9]	0	1.7 [-5.2 to 8.7]	6.2 [- 14.3 to 1.9]	3.1 [-3.1 to 9.2]	1.2 [-6.4 to 8.9]	15.5* [8.4 to 22.7]	8.4* [1.3 to 12.1]
MH Nursing	-0.1 [-7.1 to 6.8]	-1.7 [-8.7 to 5.2]	0	4.5 [-3.4 to 12.3]	-1.4 [-4.5 to 7.2]	-0.5 [-7.9 to 6.9]	13.8* [7.0 to 20.5]	6.7* [- 4.6 to 9.1]
OT MSc	-4.6 [-12.7 to -3.6]	-6.2 [- 14.3 to 1.9]	-4.5 [- 12.3 to 3.4]	0	-3.2 [- 10.3 to 4.1]	-5.0 [- 13.5 to 3.5]	9.3* [1.4 to 17.3]	2.2 [-9.1 to 4.6]
OT BSc	1.5 [-4.7 to 7.6]	-3.1 [-9.3 to 3.1]	-1.3 [-7.2 to 4.5]	3.1 [-4.1 to 10.3]	0	-1.9 [-8.5 to 4.8]	-12.4* [6.4 to 18.5]	-5.4* [1.0 to 9.7]
Podiatry	0.4 [-7.3 to 8.1]	-1.2 [-8.9 to 6.4]	0.5 [-6.9 to 7.9]	5.0 [-3.5 to 13.5]	1.9 [-4.8 to 8.5]	0	14.3* [6.8 to 21.8]	7.2* [0.9 to - 13.5]
PT MSc	-13.9* [-21.1 to -6.7]	-15.5* [- 22.7 to - 8.4]	-13.8* [-20.5 to -7.0]	-9.3* [-17.3 to -1.4]	-12.4* [-18.5 to -6.4]	-14.3* [-21.8 to -6.8]	0	-7.1* [-12.7 to -1.4]
PT BSc	-6.8* [- 12.6 to - 1.0]	-8.4* [- 14.2 to - 2.7]	-6.7* [- 12.1 to - 1.3]	-2.2 [-9.1 to 4.6]	-5.4* [- 9.7 to - 1.0]	-7.2* [- 13.5 to - 0.9]	-7.1* [- 1.4 to - 12.7]	0

Values given as Mean Difference [95% Confidence Interval]
 *indicates significance of <0.05 with Bonferroni Correction
 Covariates in the model evaluated at year of study = 2.59
 MH: Mental Health, OT: Occupational Therapy, PG: Postgraduate; PT: Physiotherapy, UG: Undergraduate.

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505 Table 3:

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Table 3: Pairwise comparisons for PUnCQ confidence

	Adult Nursing	Child Nursing	MH Nursing	OT PG	OT UG	Podiatry	PT PG	PT UG
Adult Nursing	0	-1.4 [-0.2 to 2.9]	1.0 [-0.4 to 2.5]	1.5 [-0.3 to 3.2]	1.1 [-1.9 to 2.4]	-0.7 [-1.8 to 1.6]	-1.2 [-2.8 to 0.4]	0.2 [-1.1 to 1.4]
Child Nursing	-1.4 [-2.9 to 0.2]	0	-0.4 [-1.9 to 1.1]	0.9 [-1.6 to 1.8]	-0.3 [-1.6 to 1.1]	-1.5 [-3.2 to 0.2]	-2.6* [- 4.2 to - 1.0]	-1.2* [-2.5 to -0.1]
MH Nursing	-1.0 [-2.5 to 0.5]	0.4 [-1.2 to 1.8]	0	0.5 [-1.2 to 2.1]	0.2 [-1.4 to 1.1]	-1.1 [-2.8 to 1.0]	-2.2* [- 3.7 to - 0.7]	-0.9* [-2.0 to 0.3]
OT MSc	-1.5 [-3.2 to 0.3]	-0.9 [-1.8 to 1.6]	-0.5 [-2.1 to 1.2]	0	-0.3 [-1.9 to 1.2]	-1.6 [-3.4 to -0.3]	-2.7* [- 4.4 to - 0.9]	-1.3* [-2.8 to 0.2]
OT BSc	-0.2 [-2.5 to 0.2]	0.3 [-1.1 to 1.6]	-0.1 [-1.4 to 1.1]	-0.3 [-1.2 to 1.9]	0	-1.2 [-2.7 to 0.3]	-2.4* [- 3.7 to - 1.0]	-1.0* [-1.9 to -0.1]
Podiatry	0.7 [-1.6 to 1.8]	1.5 [-0.2 to 3.2]	-1.1 [-0.5 to 2.7]	-1.6 [-0.3 to 3.4]	-1.2* [-0.3 to 2.7]	0	-1.1 [-2.8 to 0.6]	0.3 [-1.2 to - 1.7]
PT MSc	1.2 [-0.4 to 2.8]	2.6* [1.0 to 4.1]	2.2* [0.7 to 3.7]	2.7* [0.9 to 4.4]	2.4* [1.0 to 3.7]	1.1 [-0.6 to 2.8]	0	1.4* [0.1 to 2.6]
PT BSc	0.2 [-1.4 to 1.1]	1.2 [-0.1 to 2.5]	0.9 [-2.0 to 0.3]	1.3 [-0.2 to 1.9]	1.0* [0.1 to 1.9]	-0.3 [-1.7 to 1.1]	-1.4* [- 2.6 to - 0.1]	0

Values given as Mean Difference [95% Confidence Interval].
 *indicates significance of <0.05 with Bonferroni Correction
 Covariates in the model evaluated at year of study = 2.61
 MH: Mental Health, OT: Occupational Therapy, PG: Postgraduate; PT: Physiotherapy, UG: Undergraduate

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Table 4: Comparison of attitudes and confidence scores between first and final year students

	Attitudes			Confidence		
	First Year Mean (SD)	Final Year Mean (SD)	Mean Difference (95% CI)	First Year Mean (SD)	Final Year Mean (SD)	Mean Difference (95% CI)
Adult Nursing	n = 7 64.1 (13.6)	n = 18 59.7 (8.7)	-4.4 (-5.0 to 13.8)	n = 6 4.5 (1.9)	n = 18 6.2 (1.8)	1.7 (-0.2 to 3.5)
Child Nursing	n = 8 63.3 (8.8)	n = 16 62.0 (12.4)	-1.3 (-8.9 to 11.6)	n = 8 3.2 (2.5)	n = 16 4.9 (2.0)	1.7 * (0.3 to 3.7)
MH Nursing	n = 12 67.8 (6.2)	n = 12 60.5 (7.0)	-7.3* (-12.9 to -1.7)	n = 11 4.4 (2.9)	n = 12 4.6 (2.5)	0.2 (2.2 to -2.7)
OT PG	n = 13 58.7 (8.6)	n = 7 58.7 (8.4)	-0.1 (-8.4 to 8.4)	n = 13 3.1 (2.0)	n = 7 4.8 (1.5)	1.7 (-0.1 to 3.6)
OT UG	n = 14 62.9 (8.5)	n = 27 59.8 (7.0)	-3.2 (-1.8 to 8.1)	n = 12 3.9 (2.1)	n = 25 4.8 (1.5)	1.1 (-2.4 to 0.1)
Podiatry	n = 4 67.8 (5.6)	n = 7 63 (11.8)	-4.8 (-9.7 to 19.2)	n = 3 3.4 (0.6)	n = 7 6.7 (1.2)	3.2* (1.0 to 5.4)
PT PG	n = 23 51.2 (9.0) ^c	n = 10 45.0 (7.4) ^a	-6.7* (-13.2 to -0.8)	n = 21 6.4 (1.1) ^d	n = 9 6.2 (1.4)	0.2 (-0.8 to 1.1)
PT UG	n = 24 61.2 (10.7)	n = 36 52.5 (7.7) ^b	-9.2* (-14.0 to -4.5)	n = 22 3.1 (2.4)	n = 35 6.3 (1.4)	3.2* (2.2 to 4.2)

*indicates a significant difference between first and final year at $p=0.05<$ ^a indicates a significant difference with all disciplines in year group except from PT BSc^b indicates a significant difference with OT BSc and Child Nursing^c indicates a significant difference with Mental Health Nursing, OT BSc and PT BSc^d indicates a significant difference with all disciplines except podiatry, adult and child nursing

MH: Mental Health, OT: Occupational Therapy, PG: Postgraduate; PT: Physiotherapy, UG: Undergraduate

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