

# The Impact of Studying a Postgraduate Course in Clinical Biomechanics on Professional Practice

Helen Branthwaite (✉ [H.R.Branthwaite@staffs.ac.uk](mailto:H.R.Branthwaite@staffs.ac.uk))

Staffordshire University Faculty of Health Sciences <https://orcid.org/0000-0002-8625-1008>

Sian Calvert

Staffordshire University

Nachiappan Chockalingam

Staffordshire University Faculty of Health Sciences

---

## Research

**Keywords:** Interprofessional, Postgraduate, Education, Allied Health

**Posted Date:** June 9th, 2020

**DOI:** <https://doi.org/10.21203/rs.3.rs-33350/v1>

**License:** © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

---

# Abstract

**Background** There is a continual need for allied health professionals to maintain an active CPD portfolio for registration. Profession specific postgraduate studies have been shown previously to clinically enhance practice leading to extended scope and leadership roles. It is not well known though if completing an interprofessional, subject specific award has any impact on clinical practice. The aim of this paper was to retrospectively review what the clinical and professional practice impact was from gaining a postgraduate award in Clinical Biomechanics had on alumni's practice.

**Methods** 25 multidisciplinary alumni from Staffordshire University, Clinical Biomechanics suite of postgraduate awards, responded to a questionnaire designed to review any changes in clinical practice and the impact studying had had for participants.

**Results** Thematic analysis of results highlighted trends in competency development and clinical impact of postgraduate study, indicating professional development and improved confidence in work interprofessional practices.

**Conclusion** This study supports interprofessional cohorts of postgraduate study for a wider subject area, which has shown to enhance the evaluation of specific clinical practice whilst taking on a broader perspective of the topic, developing stronger and wider clinical conclusions.

## 1. Background

The last twenty years has seen an increase in the responsibility Allied Health Professionals (AHP) have in the management and care of patients. This was driven initially in 2000, when the NHS plan acknowledged the expanding roles AHP's play in social and health provisions and more recently in the development of first contact practitioners delivering musculoskeletal (MSK) services in primary care [1, 2]. AHP's delivering extended roles have been shown to be cost effective and are accepted by patients as being capable [3].

To provide these services the available workforce needs to be clinically competent in their field and have completed the relevant training to equip them with suitable skills. Studying postgraduate masters awards in manual therapy has previously shown to enhance clinical practice with graduates gaining consultant and extended roles [4]. Similarly, it has been acknowledged that a clinical expert is better equipped with a postgraduate qualification [5] and engagement in regular continued professional development (CPD) [6]. Provision of subject and profession specific postgraduate training is well established [7–9] and is often used to follow a career framework within the chosen specialism.

Clinical Biomechanics is a broader specialist area that applies biomechanical principles to injury and pathology seen in clinical therapeutic practice. Application of postgraduate training in Clinical Biomechanics crosses a multidisciplinary field and within therapies includes all practitioners that deal with MSK related problems. In particular, Podiatry; Physiotherapy; Osteopathy; Orthotists and

Chiropractors. Yet the clinical impact of completing this interprofessional postgraduate programme has gone unreported. The aim of this paper, therefore, is to retrospectively review the clinical impact of completing a postgraduate masters award in Clinical Biomechanics on the career progression and specialism of the awards alumni.

## 2. Method

A retrospective review of graduates from the postgraduate Clinical Biomechanics suite of awards, Staffordshire University was completed to explore the impact that completing the award has had on their career progression and clinical practice. Students had completed postgraduate study from 2002–2020 in the following awards; MSc Clinical Podiatric Biomechanics, MSc Clinical Biomechanics, Postgraduate (PG) Certificate Gait Analysis, PG Certificate Mechanics of the Diabetic Foot, PG Certificate Musculoskeletal Diagnostic Process and individual postgraduate modules studied as CPD. The questionnaire was sent to alumni to help explore their perceptions of the impact of completing a postgraduate Clinical Biomechanics course had on career progression and current clinical practice.

### 2.1 Participants

The sample consisted of 10 males and 15 females. Respondents were from various geographical locations, specifically: the South East of England (n = 9), South West of England (n = 4), North East of England (n = 2), North West of England (n = 3), Midlands (n = 2), Scotland (n = 2), Ireland (n = 2) and Australia (n = 1).

### 2.2 Questionnaire

The questionnaire was a 15-item questionnaire which included both open- and closed-ended questions. The first part of the questionnaire asked alumni for demographic information including what postgraduate study they undertook, modules they studied, year of completion, and information about current job role. The second half of the questionnaire asked respondents to reflect on the impact of completing a postgraduate qualification, including how this had influenced their career progression and current clinical practice.

### 2.3 Analysis

A mixed-methods approach was employed to explore the impact of completing a postgraduate Clinical Biomechanics award on students' career progression and clinical practice. Quantitative data (responses from 7 closed-ended questions) was extracted from the questionnaires and entered into Statistical Package for the Social Sciences (SPSS version 26) in order to conduct descriptive analysis. Qualitative data (responses from 8 open-ended questions) was exported into NVivo Pro 12 software (QSR International Pty Ltd, 2018) in order to conduct thematic analysis. The qualitative analysis was guided by the 6 stages of thematic analysis [11] (which were: *familiarization, initial coding, searching for themes, reviewing themes, define and name themes, report findings*).

### 3. Results

Twenty-five alumni who had graduated from a postgraduate Clinical Biomechanics award at Staffordshire University between 2002–2020 (Fig. 1) completed the 15-item questionnaire. Respondents' current professions include Podiatrist (n = 20), Physiotherapists (n = 3), Osteopath (n = 1) and Teaching Sports Biomechanics (n = 1).

Respondents' currently work in a range of settings including Private practice (n = 10), NHS (n = 10), Academia (n = 2), Industry (n = 2) and within the Army (n = 1). Of the alumni questioned, 14 had completed MSc Clinical Podiatric Biomechanics, 8 MSc Clinical Biomechanics, 1 PgCert Gait Analysis, 1 PgCert Musculoskeletal Diagnostic Process and 1 PgCert Clinical Biomechanics. There had been a variety of different modules studied to equate to the award achieved with the majority of alumni studying the module on Origins and Principles of Biomechanics (Fig. 2)

### 3.2 Summary of Thematic Analysis findings

The thematic analysis produced two main themes, which were *Competency development* and *Clinical impact of postgraduate study*. The findings from the thematic analysis suggest that students who have completed a postgraduate course in Biomechanics have developed professionally, enhancing their clinical practice and contributing to improved patient care. Students hold the perception that the postgraduate training that they undertook aided them to acquire a greater depth of subject knowledge, and to advance their clinical skills, which has supported students to improve their clinical reasoning and helped change their perceptions related to clinical practice.

### 3.3 Thematic analysis

#### *Competency development*

The first theme discusses how students have developed their capabilities during and implemented them following the completion of a postgraduate course. This theme has three sub-themes which describe how students have acquired a *greater depth of knowledge*, which has promoted *enhanced clinical skills* and has improved their *clinical reasoning*.

#### *Greater depth of knowledge*

Students discuss that completing a postgraduate course has helped them acquire a greater depth of knowledge and understanding which can be adapted for use within their professional careers, and this has led to the revision of their working practices. Further, this underpinning knowledge is adaptable to support the treatment of a variety of conditions.

*"It is the underpinning of my knowledge of lower limb biomechanics and gives me the foundation to understand all mechanical injuries that come through my clinic door, whether they are tendinopathies or stress bone responses"* (Respondent 7).

Furthermore, the students express that being part of an interprofessional cohort has contributed to their learning process. Respondents converse that by exchanging knowledge with other professions allows for a greater level of understanding from a different perspective.

*"It is also good to work with different Professions such as Physios and Orthotist to enhance shared knowledge."* (Respondent 25)

*"Perhaps by listening and observing how other students on the course worked biomechanically."* (Respondent 4)

Moreover, this acquisition of knowledge has led to improved professional confidence.

*"Support through learning helped with confidence as growing underpinning knowledge was learnt"* (Respondent 17) and has *"enhanced and given me more confidence in my clinical treatment"* (Respondent 15).

### *Enhanced clinical skills*

Students disseminated that this greater level of knowledge informed from course content has supported them to enhance their clinical skills. This has supported student innovation by helping them think differently about patient conditions, and be clearer about treatment options, which can impact the effectiveness of treatment.

*"My understanding of biomechanics has allowed me to address overuse injuries with greater success, working backwards to target the causes of their problems not just treat the symptoms"* (Respondent 13).

*"I have a more clear understanding about what treatment will be most effective in specific situations."* (Respondent 21)

*"I'm much more aware of the insufficiencies in day to day gait and can direct my treatment based on what I observe in an individual's gait analysis".* (Respondent 24)

These skills are adaptable and have allowed students to treat a range of conditions by using enhanced strategies to evaluate complex conditions.

*"It has given me the skills to research and formulate treatment pathways for a variety of conditions"* (Respondent 11).

*"I apply biomechanical principals[sic] and tissue stress to all foot pathology from diabetic wounds to tendinopathy not just Podiatric paradigm theories. This has given me a better understanding of how to treat the root cause and not just the symptoms."* (Respondent 25)

### *Improved clinical reasoning*

The completion of a postgraduate course has facilitated students to advance their clinical reasoning. Students suggested that they have adopted a more critical and reflective methodology within their professional practice which has also enhanced their problem-solving abilities within a clinical setting. Students are using their renewed understanding to challenge their perspective of their professional 'landscape' [12] which has supported the modification of their professional thinking.

*"I was able to move away from the dogmatic approach taught at undergraduate level to be more critical. It elevated my problem-solving skills when you realise that there are so many more factors to consider"* (Respondent 8).

Students have become more analytical not just about their own practice, but the practices of others with the aim to improve practice. The postgraduate course has given students confidence to communicate in a professional setting.

*"It has given me the foundations to challenge existing practice and try to improve patient care"* (Respondent 11).

*"To implement new changes in the NHS which are researched base [sic] and give me more confidence in questioning and arguing the case for improvements within the department."* (Respondent 5)

*"The MSc made me analyse and critically think about everything I was doing (to a higher level than as an undergraduate) the depth in which we covered the course content also gave me the confidence to challenge current systems."* (Respondent 20)

### *Clinical impact of postgraduate study*

The second theme discusses how, by students enhancing their clinical skills and capabilities through postgraduate study, it has made a positive clinical impact. This theme has two sub-themes which are *clinical practice* and *professional development*. These themes discuss how clinical practices have improved through evaluating problems in a broader sense, using a different perspective, which has helped improve assessment and treatment methods; this has also aided in better dialogue with patients. The acquired skills and knowledge have improved confidence which has supported professional development (external and internal).

### *Clinical practice*

Students outlined that they have altered their approach in clinical practice by changing their perspective when treating patients.

*"The influence has changed the way I observe manage and treat patients with Biomechanical dysfunction especially from a foot-driven perspective."* (Respondent 4)

*"Changed the way I thought and managed patients, altered materials used, ways of managing conditions changed and read a lot more".* (Respondent 19)

This has also informed process changes within clinical practice.

*"Assessment process focussing on identification of structure causing tissue stress".* (Respondent 17)

Students' enhanced understanding has helped improve the dialogue with their patients by having the skills to better explain to patient's information regarding their conditions, leading to improved patient outcomes.

*"I also feel better equipped to explain biomechanical causes of injury to patients in a way that they understand - which helps with compliance."* (Respondent 13)

*"It has developed my ability to gain patient understanding of the condition."* (Respondent 15)

The improved confidence in their own clinical practice and communication skills has allowed students to work as part of an interdisciplinary team, which contributes to the improvement of interprofessional communication and collaboration.

*"My master's module has enhanced my knowledge and allowed me to work integrated in a multidisciplinary team and given me the confidence to discuss concerns i have with paediatricians re my patients."* (Respondent 2)

*"The course has given me confidence to pursue a leadership role across a multidisciplinary team."* (Respondent 16)

*"Improved links with physiotherapy/joint clinics for adults and paediatric patients."* (Respondent 5)

### *Professional development*

The impact of completing a postgraduate course has helped students evolve and acquire skills and knowledge that have supported professional development, including the establishing of new clinics.

*"Opened a new clinic specialising only in MSK injuries, running gait analysis and Sports Podiatry".* (Respondent 7)

Further, being part of a postgraduate course with other professionals has helped to support the formation of new working relationships.

*"I went on to set up and develop the 1st community orthopaedic post with another colleague on my cohort".* (Respondent 6)

The impact of the course is far-reaching: it has not only helped individuals to progress in their chosen profession, but it has allowed students to share their learning by educating their colleagues.

*"My masters allowed me to undertake training to my colleagues and pass on my new knowledge on orthotics and pressure redistribution for ulcers."* (Respondent 2)

*“The MSc allowed me to embed my understanding and be able to teach clinical and functional biomechanics to the junior staff”. (Respondent 16)*

*“Helped me manage patients better and as went through the course all my team benefited from my learning as we all grew with the experience.” (Respondent 19)*

## **4. Discussion**

Continual development of practice is essential for AHP's to remain current in their education and is a core standard to remain registered on the Health and Care Professions Council (HCPC). Advanced professional development at a postgraduate level is thought to provide clinical competencies beyond routine care, yet previously the impact of a postgraduate interprofessional award has not been explored. The results from this questionnaire indicate that completion of a broader subject that can be applied across several different AHP's provides the student with altered clinical perceptions to practice with advanced clinical reasoning skills that have had a direct clinical impact on their work and developed their competency and confidence in advanced level care.

Delivering the awards to an interprofessional cohort is a key benefit as it allows students to appreciate other professions' perspective(s) and to recognise how they differ from their own. This type of learning environment allows students to evaluate specific problems taking a broader perspective of the topic, developing stronger and wider conclusions [4]. Within this suite of awards the module content does not include taught specific competencies but supports learning to apply principles, judgements, and to have practical interaction which encourages decision-making regarding the implementation of therapeutic intervention, within their own professional practice [13]. Students from this review highlighted that completing their award made their thinking process deeper, more complex and challenged embedded beliefs with a positive outcome. Their practice was also supported by an additional confidence in the decisions made for patient outcomes. Completing a postgraduate course has previously been identified as a factor that helps students to gain a greater depth of knowledge and enhance their clinical skills, supporting the improvement of professional confidence [12, 14].

Conversations that develop within interprofessional groups, that are studying the same content, enhance the depth of understanding around the scope of other professional practice [15, 16]. This change in perspective assists in the knowledge transferred into clinical conversations with patients and improves multidisciplinary team working (MDT). An MDT represents several professional working together in a speciality and represents best clinical practice for patient outcomes [17]. This improved dialogue with patients and other professionals was evident from the student's responses where improved skills in discussing pathology were highlighted. There can sometimes be differences in professional communication within health care settings because of differences in professional backgrounds [18, 19]. This can lead to lone working and closed practice which could have a detrimental impact on patient outcomes. Interprofessional education is necessary to help foster collaborative practices and help improve patient outcomes [20, 21]. Completing an interprofessional postgraduate award develops bridges

to communicate outside of an individual profession and collaborate in an MDT. The awards draw upon students' professional diversity which supports students to understand and speak different professional languages supporting diverse informed discussions.

Furthermore, the awards delivered do not focus on improving clinical competencies but rather offer students the opportunity to learn broader adaptive techniques that can be utilised within a variety of professions, clinical settings and geographical locations. The geographical location of the students encompassed practices from all over the UK, Ireland and from Australia. This broad spectrum of working practice based in either a city or rural location and then including the diversity of National Health Service (NHS), private and military practice ensures that discussions are broad, distinct and thought provoking adding to the diversity of the students' experience.

With this approach to teaching the awards support innovative learning and aim to use translational research in education to bridge the gap between research and clinical practice. The postgraduate awards are underpinned by translational research which is developed by research-active professionals within the academic department and is translated, embedded, and disseminated through the awards course content. Translational research is described as the conversion of scientific knowledge into clinical applications to improve health and health outcomes [22, 23]. Translational research can bring together professionals from a variety of backgrounds as it allows adaptive learning with the goal of learning to communicate across disciplines and it prepares individuals to work adaptively in an array of settings [24]. Furthermore, knowledge acquired from translation-based education has been shown to help improve patient care and support better patient outcomes [25].

Research informed teaching and professional development also occurs within the student's own profession with enhanced CPD being delivered to NHS teams and private practice. Course exposure has helped support shared learning with the disseminating of new knowledge and skills to colleagues and junior team members, which helps to update working practice and improve mentalities, within their working environment. This provides an efficient and cost-effective dissemination of learning and changes the culture of clinical practice beyond the individual that has completed the award [26, 27]. This extended development could alter clinical practice through mentoring and departmental frameworks. Knowledge sharing in this format also empowers the individual leading and developing strategies which is often aligned to leadership or senior roles within clinical practice. Students included in this study went on to build their own clinical business or development of original services in the (NHS).

## **5. Conclusion**

It is evident from this retrospective review of Staffordshire University Clinical Biomechanics alumni that completing a postgraduate award not only benefits the individual on a personal level but directly improves their clinical practice as well others that work alongside or are junior to them. Additionally, studying an award that recruits from many MSK disciplines develops skills and competencies to bridge

the gap of lone working into an effective and efficient MDT demonstrating the best clinical speciality and practice outcomes for patients.

## **6. List Of Abbreviations**

AHP- Allied Health Professional

MSK- Musculoskeletal

CPD – Continued Professional Development

MSc- Master of Science

PG- Postgraduate

HCPC- Health and Care Professions Council

MDT- Multidisciplinary Team

NHS- National Health Service

## **7. Declarations**

### **Ethics Approval**

The questionnaire was completed as part of an impact audit regarding the outcomes of the MSc Clinical Biomechanics programmes and is covered by Satffordhire University Ethics committee policy.

### **Consent for Publication**

All alumni contacted had previously given consent to be contacted regarding course development and were aware of the nature of this study.

### **Availability of Data and materials**

Not applicable

### **Competing interests and Funding**

The authors declare that there were no competing interests or funding sources required for this study.

# Authors Contribution

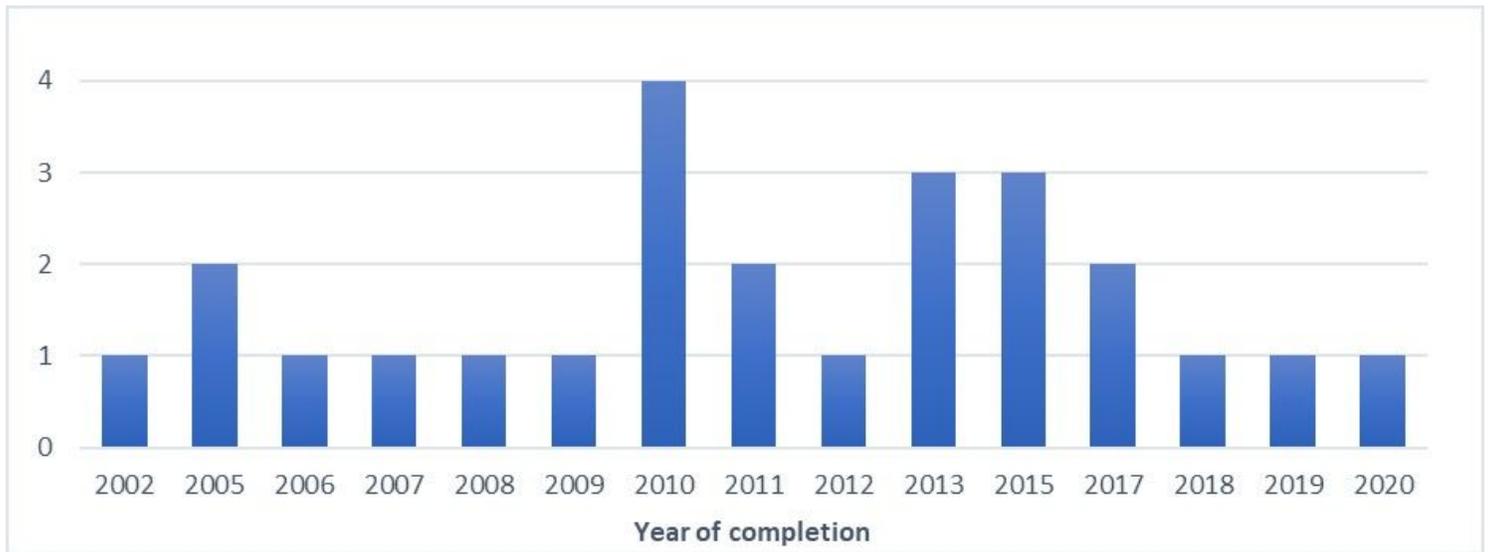
NC developed the concept of this study with HB and NC designing the study. HB conducted the survey. SC contributed to the design and conducted the analysis. HB and SC prepared the manuscript. All authors contributed to the final proofing of the manuscript and approved the final version.

## References

1. Health DO. Meeting the Challenge: A Strategy for the Allied Health. Secretary. 2000;
2. NHS England and NHS Improvement. Elective Care High Impact Interventions: First Contact Practitioner for MSK Services. 2019;
3. Saxon RL, Gray MA, Ioprescu F. Extended roles for allied health professionals: An updated systematic review of the evidence. *J Multidiscip Healthc.* 2014;7:479–88.
4. Green A, Perry J, Harrison K. The influence of a postgraduate clinical master's qualification in manual therapy on the careers of physiotherapists in the United Kingdom. *Man Ther. Elsevier;* 2008;13:139–47.
5. Petty NJ. Becoming an expert: A Masterclass in developing clinical expertise. *Int J Osteopath Med. Elsevier Ltd;* 2015;18:207–18.
6. Humphreys J, Wakerman J, Wells R, Kuipers P, Jones J, Entwistle P, et al. Improving primary health care workforce retention in small rural and remote communities: How important is ongoing education and training. ... *Prim Heal ....* 2007;63.
7. Leirós-Rodríguez R, Souto-Gestal AJ, García-Soidán JL. Post-graduate education requirements for access to jobs in physical therapy | Requerimientos de educación de postgrado para el acceso a puestos de trabajo en fisioterapia. *Educ Medica.* 2018;19:79–84.
8. Petty NJ, Scholes J, Ellis L. The impact of a musculoskeletal masters course: Developing clinical expertise. *Man Ther.* 2011;16:590–5.
9. Culvenor AG. Professional pathways towards excellence in sports physiotherapy: Opportunities and barriers. *Br. J. Sports Med. BMJ Publishing Group;* 2017. p. 415–6.
10. QSR International Pty Ltd. QSR International Pty Ltd. 2016.
11. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol. Taylor & Francis;* 2006;3:77–101.
12. Perry J, Green A, Harrison K. The impact of Masters education in manual and manipulative therapy and the 'knowledge acquisition model.' *Man Ther. Elsevier;* 2011;16:285–90.
13. Fredholm A, Henningsohn L, Savin-Baden M, Silén C. The practice of thresholds: autonomy in clinical education explored through variation theory and the threshold concepts framework. *Teach High Educ. Routledge;* 2020;25:305–20.
14. Payne H, Pelz F, Brooks R, Horrocks L, Kemp A, Webb E, et al. Benefits of interprofessional learning: An interprofessional MSc in child health. *Hosp. Med. MA Healthcare London ;* 2005. p. 239–41.

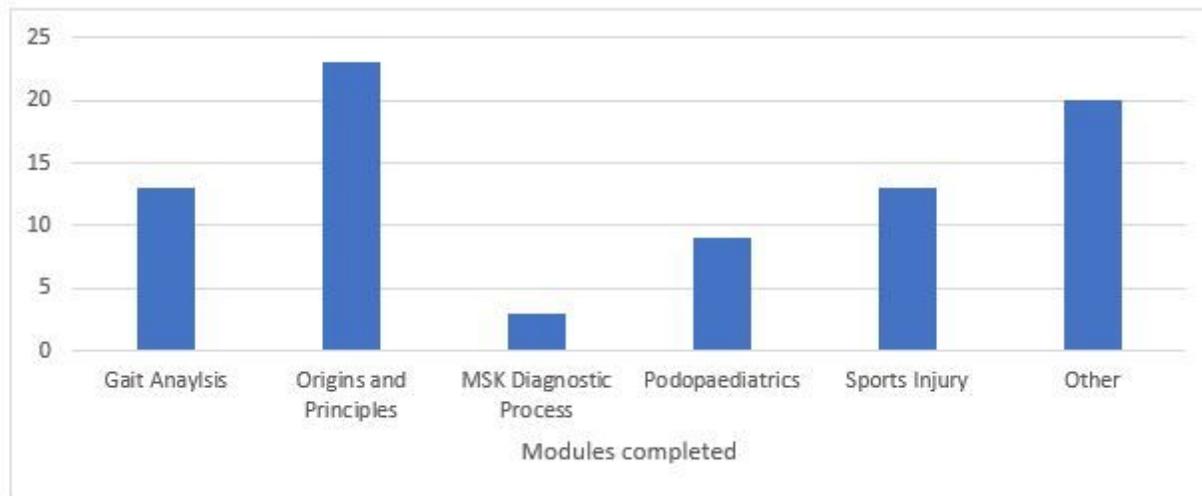
15. Buring SM, Bhushan A, Broeseker A, Conway S, Duncan-Hewitt W, Hansen L, et al. Interprofessional education: Definitions, student competencies, and guidelines for implementation. *Am. J. Pharm. Educ.* American Association of Colleges of Pharmacy; 2009.
16. Dumont S, Brière N, Morin D, Houle N, Iloko-Fundi M. Implementing an interfaculty series of courses on interprofessional collaboration in prelicensure health science curriculums. *Educ Health (Abingdon)*. Medknow Publications and Media Pvt. Ltd.; 2010;23:395.
17. NHS. MDT development: Working toward an effective multidisciplinary/multiagency team [Internet]. NHS Engl. 2015 [cited 2020 Apr 6]. Available from: <https://www.england.nhs.uk/wp-content/uploads/2015/01/mdt-dev-guid-flat-fin.pdf>
18. Hammick M, Freeth DS, Copperman J, Goodsman D. Being interprofessional. *Polity*; 2009.
19. Daly G. Understanding the barriers to multiprofessional collaboration. *Nurs Times*. 2004;100:78–9.
20. Kim YJ, Radloff JC, Stokes CK, Lysaght CR. Interprofessional education for health science students' attitudes and readiness to work interprofessionally: a prospective cohort study. *Brazilian J Phys Ther*. Elsevier; 2019;23:337–45.
21. Green BN, Johnson CD. Interprofessional collaboration in research, education, and clinical practice: working together for a better future. *J Chiropr Educ.* the Association of Chiropractic Colleges; 2015;29:1–10.
22. Sainburg RL, Liew S-L, Frey SH, Clark F. Promoting translational research among movement science, occupational science, and occupational therapy. *J Mot Behav*. Taylor & Francis; 2017;49:1–7.
23. Titler MG. Translation research in practice: an introduction. *OJIN Online J Issues Nurs*. 2018;23.
24. Ameredes BT, Hellmich MR, Cestone CM, Wooten KC, Ottenbacher KJ, Chonmaitree T, et al. The Multidisciplinary Translational Team (MTT) model for training and development of translational research investigators. *Clin Transl Sci*. Wiley Online Library; 2015;8:533–41.
25. McGaghie WC, Issenberg SB, Cohen ER, Barsuk JH, Wayne DB. Translational educational research: a necessity for effective health-care improvement. *Chest*. Elsevier; 2012;142:1097–103.
26. Brown CA, Belfield CR, Field SJ. Cost effectiveness of continuing professional development in health care: A critical review of the evidence. *Br Med J*. British Medical Journal Publishing Group; 2002;324:652–5.
27. Schostak J, Davis M, Hanson J, Schostak J, Brown T, Driscoll P, et al. Effectiveness of continuing professional development project: A summary of findings. *Med Teach*. Taylor & Francis; 2010;32:586–92.

## Figures



**Figure 1**

Graph demonstrating the year respondents completed their course.



**Figure 2**

Graph demonstrating modules completed by respondents as part of a postgraduate course.